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The "backwards, forwards and sideways" changes of ICT

Mario Arias-Oliva
Terrell Ward Bynum
Simon Rogerson
Teresa Torres-Coronas

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The –backwards, forwards and sideways" changes of ICT

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INTRODUCTION

1. ETHICOMP conference series

The ETHICOMP conference series was launched in 1995 by the Centre for Computing and Social Responsibility (CCSR). Professor Terry Bynum and Professor Simon Rogerson are the founders and joint directors. The purpose of this series is to provide an inclusive European forum for discussing the ethical and social issues associated with the development and application of Information and Communication Technology (ICT). Conferences are held every 18 months.

There have been ten conferences, ETHICOMP 95 (De Montfort University, UK), ETHICOMP 96 (University of Salamanca, Spain), ETHICOMP 98 (Erasmus University, The Netherlands), ETHICOMP 99 (LUISS Guido Carli University, Italy), ETHICOMP 2001 (Technical University of Gdansk, Poland), ETHICOMP 2002 (Universidade Lusiada, Lisbon, Portugal), ETHICOMP 2004 (University of the Aegean, Syros, Greece), ETHICOMP 2005 (Linköping University, Sweden), ETHICOMP 2007 (Meiji University, Tokyo, Japan) and ETHICOMP 2008 (University of Pavia, Italy) . Delegates and speakers from all continents have attended. Around 800 papers have been presented at the ten conferences. All abstracts from the ETHICOMP conferences are posted on CCSR's renowned website. Most of the leading researchers in computer ethics as well as new researchers and doctoral students have presented papers at the conferences.

The conference series has fostered much international collaboration and resulted in exciting new ideas being presented at ETHICOMP by newly formed author partnerships. Indeed the series has been key in creating a truly international critical mass of scholars concerned with the ethical and social issues of ICT. Indicative of this is the International Society for Ethics and Information Technology (INSEIT) formed in 2000 and now associated with the series. The electronic ETHICOMP Journal (www.ccsr.cse.dmu.ac.uk/journal) was launched in 2004 to further the work of the conference series and enable those in the field of computer ethics to gain access to the rich resource of papers from the ETHICOMP conference series. Papers from the conference series will appear in the electronic journal.

The ETHICOMP name has become recognised and respected in the field of computer ethics.

2. ETHICOMP 2010

As Alvin Toffler wrote "change is non-linear and can go backwards, forwards and sideways. ETHICOMP 2010 has the overall theme of "The backwards, forwards and sideways changes of ICT". Society has changed dramatically over the last sixty years with the advent of ICT. Some ICT-related changes have been good and have moved society forward, others were bad and caused harm, while some appear to have had no ethically relevant effect at all, simply moving us sideways. In developing and adding ICT, the ethical dimension must be considered so the potential positive, negative and neutral impacts on society, organisations and individuals can be understood and appropriate action taken. There are four aspects to consider within this overall theme. The first is "social" and considers how ICT has impacted the way in which we spend our time. The second is "government" and considers how governments use and control ICT to provide services to the public. The third is "business" and considers how businesses utilise technology to realise goals in an ethically acceptable manner. The fourth is "tools" and considers the implications of advances in technology tools and approaches on us in the context of the previous three aspects.

These proceedings contain the papers presented at the conference. Papers are published in alphabetical order of the first author's surname. The two keynote addresses are included in these papers. Together the papers represent a body of new work from over 100 authors from around the world. It is an important contribution to our understanding of what the ICT-related changes are in our lives and how we might cope, accept and or enjoy such changes.

A conference is not just about the written papers. It is about dialogue, collegiality and friendship. The conference directors and programme committee thank you in your roles as authors and delegates for making ETHICOMP 2010 a reality. We hope you will enjoy the conference and be inspired to continue to contribute to this vital area. We look forward working with you at future ETHICOMP conferences.

STUDENTS' ATTITUDES TOWARDS SOFTWARE PIRACY-THE GENDER FACTOR: A CASE OF A PUBLIC UNIVERSITY IN AN EMERGING COUNTRY

Ali Acılar and Muzaffer Aydemir

Abstract

The main purpose of the present study is to explore the relationship between gender of the students and their attitudes towards software piracy. Research data were obtained by surveying the undergraduate students of the Department of Business Administration at a public university in Turkey. Independent samples t-test was used for comparisons between male and female students' attitudes. It is found that female students find software piracy less acceptable than male students. The study finding is consistent with previous studies that reported female student participants are significantly more ethical than male student participants in terms of software piracy.

Keywords: software piracy, gender, undergraduate students

1. Introduction

Computer is one of the most important technological developments affecting our daily lives. Computers have changed almost everything in our personal and social life: from communication to education, from business to entertainment. There is no doubt that computers and the Internet have become essential parts of modern societies, but these technologies have also raised some ethical issues such as piracy, privacy invasion, unauthorised access and use of computer systems. In today‘s technology-driven world, piracy is one of the major ethical and legal issues that have arisen in the context of information technology usage. Software piracy is widespread in many parts of the world and costs software manufacturers billions of dollars annually. According to Sixth Global Software Piracy Study prepared by the Business Software Alliance (BSA) and International Data Corporation (IDC) 35% of software installed on computers worldwide (110 countries) was pirated in 2008, with estimated losses at $53 billion (BSA and IDC, 2009).

We constantly confronted with important technological changes and the need to create new attitudes towards new situations arose from the computer technology within the information age (Masrom and Ismail, 2008). Technological developments create new opportunities for action and new sets of choices that are ultimately of a moral nature (Mullen and Horner, 2004). As the use of computers and Internet has become widespread, misuses of these technologies have also increased dramatically (Banerjee et al, 1998). The easy of reaching, storing, changing and transmitting information provided by computers and Internet has made unethical behaviours much easier, particularly among students in the academic environments (Abdul Karim, Zamzuri, and Nor, 2009).

Academic institutions also face the problems of illegal and unethical use of information technologies. Students enter universities from different backgrounds with different experiences and many students are unaware of ethical issues of computer usage such as software piracy (Cohen and Cornwell, 1989). According to Calluzzo and Cante (2004) students had misconceptions about what represented ethical and unethical behaviours in the use of software and information technology and systems. It is possible that if university students are uncertain about what constitutes appropriate and inappropriate behaviour then this uncertainty will be carried forward into their workplaces after graduation (Calluzzo and Cante, 2004; King and Case, 2007).

Employee abuse of company information technology resources can result in lawsuit or dismissal. Even though some organization adopted code of ethics for members, not every computer user and information system professional is a member of these organizations, and therefore does not necessarily follow these codes (Harris, 2000). Many companies depend on people who are computer literate and computer users face ethical problems everyday in the work-place. For these reasons the teaching of computer ethics to future employees and managers is becoming increasingly important in college

schools of business as computer and Internet usage increases in the business world (Pierce and Henry, 1996; Calluzzo and Cante, 2004; Simon and Chaney, 2006).

Given these issues, the main purpose of the present study is to examine whether students' attitudes towards software piracy differ in terms of their gender. The paper will first give an overview about the relevant literature and then test the hypothesis of the study through a survey on a sample of students in a public university in Turkey.

2. Gender Differences in Ethical Use of Computers and Software

Gender is one of the most heavily researched variables in the literature of ethics. There are considerable amount of studies that have investigated the role of gender in ethical decision making. Some studies found that females are more concerned about ethical issues than males. However, some researchers found that gender has no significant effect on ethical judgments. Although research on ―gender and ethics" and ―gender and information technology usage" has increased, a few of the studies are available about gender issues in the ethical use of computers (Adam, 2008, 589), especially software piracy. Most of the studies investigating gender differences in the issues of computer ethics found that females are more ethical than males.

Khazanchi (1995) investigated whether gender differences had an influence on recognizing unethical computer usage behaviours during in the use and development of information technology. His study results show that females are better able to recognise unethical actions described in seven information systems scenarios involving disclosure, social responsibility, integrity, conflict of interest, accountability, protection of privacy, personal conduct than males.

Kreie and Cronan (1998) conducted a survey among 307 university students using five ethical scnairos related to information system usage and their study results show that male and female students were distinctly different in their assessment of what is ethical and unethical behaviour, with male students less likely to consider certain behaviours as unethical. Their analysis showed that different factors influence male and female students' decisions regarding unacceptable behaviour. Kreie and Cronan (1998) found that the significant factors for females were societal environment, belief system, personal values, legal environment, moral obligation, and the scenario and the significant factors for males were legal environment, moral obligation, awareness of consequences, and the scenario.

Adam (2001) has addressed the subject in terms of feminist ethics as an issue of equality. Feminist ethics argues that traditional ethics is manly and fails women. Therefore, aim of the feminist ethics is to create a gender-equal ethics. Adam argues that feminist ethics can help us to understand gender issues in computer ethics.

McCarthy, et al. (2005) surveyed undergraduate and graduate computer information systems students in the USA and found that significant differences existed between male and female students in their ethical beliefs regarding information technology usage.

Leonard and Cronan (2005) examined shifting attitudes of students towards ethical behaviour in the information systems using a survey containing five computing cases. They found that male students view unethical behaviour in computer usage was more acceptable than females.

Simon and Chaney (2006) studied to determine students' perceptions of the ethicality of selected computer activities using seven scenarios. They found that gender appeared to the strongest demographic factor and female students perceived certain computer activities as more unethical than males.

Masrom, et al. (2008) surveyed 159 undergraduate computer science students at two public Malaysian universities and found that there was a significant difference between male and female undergraduate students regarding their ethical awareness of computer use.

Akbulut, et al. (2008) surveyed a sample of 559 Turkish undergraduate students to study whether gender, programme of study and PC experience have an influence on unethical computer using behaviours of undergraduate students in a faculty of education, in Turkey. They found significant differences between males and females, with males outperforming females in terms of unethical judgments. Akbulut, et al. (2008) also found that females tend to judge unethical behaviours consistently across different departments while males‘ ethical judgments differed based on the department.

Peslak (2008) conducted a survey among 304 individuals consisting of student, faculty, staff and information technology professionals and found that females had stronger opposition to unethical situations regarding information technology usage.

Beycioğlu (2009) surveyed students in a faculty of education, in Turkey. He found that the participating female candidate teachers' ethical judgments on computer use were significantly different than male candidate teachers'. It is found by this study that prospective female teachers were more concerned about ethical issues than male counterparts.

Based on the results of a meta analysis, Krisanda and Peslak (2009) stated that "In all studies regarding gender's effect on ethics, men have never been shown to behave more ethically than women" regarding information technology usage.

Gender is also one of the most researched demographic factors that have attracted considerable attention from researchers who study factors influencing ethical software usage. Simpson et al. (1994) studied 209 students in the United States and found that gender is a significant factor in affecting the propensity to pirate software. Sims et al. (1996) surveyed 340 undergraduate business students and MBA students to develop a profile of those who illegally copy software and found that male students pirate software more frequently than female students. Rahim et al. (2001) investigated factors affecting softlifting intention of computing students using survey data collected from 205 computing students in Brunei Darussalam and found that gender affected softlifting intention of students, but to a lesser extent. Based upon the results of the survey of 148 students in the U.S. Chiang and Assane (2002) found a significantly higher likelihood of software copyright infringement for male students. Lau (2003) surveyed 263 students in Hong Kong and found that male computer users were more lenient in their attitudes to pirated software than female users. Kini et al. (2004) surveyed 1506 U.S. and Thai university students and found that male students were less moral than female students regarding software piracy among both U.S. and Thai students. Higgins (2006) used a non-random sample of 392 college students and found that a gender gap exists in software piracy -males were more likely than females to pirate software. He suggested that self-control theory and social learning theory completely eliminate the gender gap. Van Der Merwe (2006) found that male distance computing students are more likely to softlift than female distance computing students. Based on the results of surveying of 224 students, faculty, and professionals Peslak (2007) found that females had a higher recognition of copying others' software than males.

There are different theoretical explanations why males and females exhibit different ethical behaviours. According to gender socialization approach, males and females have different values and traits due to gender creating different moral orientations and resulting in different decisions and practices (Roxas and Stoneback, 2004). The gender socialization approach asserts that the gender brings different values and traits to their work roles. The gender socialization approach assumes differences in willingness to be unethical will exist among men and women in the same occupation (Betz, O'Connell, and Shepard, 1989). Many ethics studies that investigate gender differences find females to be more caring, more concerned with relationships, more likely to define themselves through relationships, and more prone to behaviours that support relationships which are likely to gain approval by others (McCabe et al., 2006). Females may be conditioned to reject less ethical actions to obtain desired outcomes because they have been conditioned to take actions which gain the approval of others. On the other hand, males may be conditioned to accept less ethical actions to obtain desired outcomes because they have been conditioned to be more aggressive and competitive (Becker and Ulstad, 2007).

According to Gilligan, whose research was an extension of gender socialization theory (Dawson, 1995), males and females have had very different moral orientations, with males being more "justice" oriented and females being more "caring" oriented (Albaum and Peterson, 2006). Although males conceptualise moral questions as problems of rights and obligations, females conceptualise them as problems of care involving empathy and compassion (Betz, O'Connell and Shepard, 1989).

Theory of cognitive moral development by Kohlberg suggests that the moral reasoning of males and females is based on justice considerations (Albaum and Peterson, 2006). According to the theory of cognitive moral development, any individual, irrespective of gender, progresses through six stages in their development of moral reasoning (Robin and Babin, 1997).

Even though majority of the research found that females are more ethical than males in terms of computer and software usage, some studies found no significant differences between ethical attitudes

of males and females. Hay, et al. (2001) surveyed 108 U.K./Irish and Malaysian background undergraduate students to investigate differences in the ethical perceptions of undergraduate students in different computer-related situations and observed minimal differences. They concluded that gender doesn‘t appear to significantly affect perceptions of ethical behaviour in computer-related situations. Calluzzo and Cante (2004) surveyed 169 undergraduate and graduate students with a questionnaire consisting of eleven statements and found no significant differences between male and female students' attitudes towards information technology and software usage. Moores and Chang (2006) found that male and female students interpret the act of software piracy similarly. Van der Byl and Van Belle (2008) did not find statistically significant relationship between gender and digital piracy.

3. Methodology

In this research, convenience sampling technique was used to obtain the sample of the study and a questionnaire was used as a research instrument to collect data.

As a part of a broader study, eleven statements, developed by Rahim et al. (2001), were included in the questionnaire to explore students' attitudes towards software piracy. All statements were measured on a five-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5). The questionnaire also includes demographic variables. To be able to determine the relationship between gender of the students and their attitudes towards software piracy, the following hypothesis is proposed:

H0: There is no significant difference between female and male students' attitudes towards software piracy

The study was conducted in Fall semester of 2009. The data for this study was obtained by surveying undergraduate students at the Department of Business Administration at a public university in Turkey. A total of 438 volunteer undergraduate students agreed to participate to the survey and a total of 435 usable questionnaires were used for the analysis.

45.5% of the participants are male and 54.5% of the participants are female. Majority of the participants (78.3%) were between 17 and 21 years old. 37% of the respondents are freshman, 34% of the respondents are sophomore, 12% of the respondents are junior and 17% of the respondents are senior students.

66% of the participants own a personal computer (PC). 44% of them are male and 56% of them are female. 68% of female students and 64% of male students own a PC. 68% of the participants have been using PC for at least 4 years. 67% of the participants use the Internet less than 9 hours in a week. The demographic characteristics of the participants are presented in Table 1.

	Frequency	**%**
Gender		
Male	198	45.5
Female	237	54.5
Age		
17-19	169	38.8
20-21	172	39.5
22-26	70	16.1
Academic Level		
Freshman	159	36.6
Sophomore	146	33.6
Junior	51	11.7
Senior	74	17.0
PC Ownership		
Yes	288	66.2
No	146	33.6

Percentages may not equal to 100% because of missing values

Table 1. The Demographic characteristics of the participants

4. Results

The main objective of the analysis was to investigate the relationship between gender of the students and their attitudes towards software piracy. Independent samples t-test was used to compare the

difference between males‘ and females‘ attitudes. Results of t-test are presented in Table 2 with mean score and standard deviation of each attitude item for male and female students.

Overall mean of the eleven attitude items for the sample was calculated as 2.93 which is very close to the neutral position in Likert scale. However, while mean of these items for male students was above the neutral position (3.12) and for female students was below the neutral position (2.77).

Based on the results of the t-test shown in Table 2, it is concluded that there is a significant difference between attitudes of male and female students towards software piracy. As it can be seen from Table 2, the mean score of male students is greater than the mean score of female students for each item. Therefore, the study findings suggest that female students are more ethical than male students in terms of their perceptions of software piracy.

Table 2. Results of the t-test	**Male**		**Female**		
Attitude Items	**Mean**	**S.D.**	**Mean**	**S.D.**	**p**
I think it is not okay to use pirated software because it may create negative image.+	2.95	1.28	2.65	1.20	0.012*
I think pirated software helps monetary savings.	3.56	1.21	3.12	1.27	0.000*
I think it is okay to use pirated software to improve my productivity.	2.55	1.24	2.18	0.98	0.001*
I see nothing wrong in giving friends copies of my software in order to foster friendship.	2.94	1.25	2.63	1.15	0.007*
I think it is okay to use pirated software if it improves my knowledge.	3.41	1.23	3.16	1.12	0.025*
I think it is okay to use pirated software because community at large is eventually benefitted.	2.91	1.24	2.47	1.09	0.000*
I believe that software piracy helps to increase my computer literacy.	2.57	1.21	2.24	0.93	0.002*
I think it is okay to use pirated games software for entertainment.	3.04	1.30	2.54	1.13	0.000*
I see nothing wrong in using pirated software if it is badly needed for the success of a project.	3.55	1.22	3.35	1.10	0.072**
I think it is okay to use pirated software for research purpose, because everybody shares the benefits.	3.31	1.17	3.06	1.11	0.018*
I think software piracy is okay to punish software publishers who charge very high price.	3.53	1.27	3.11	1.17	0.000*

+Reverse coded, S.D.=Standard deviation, * indicates significant at the 0.05 level, ** indicates significant at the 0.10 level

The highest mean score of male students was ―I think pirated software helps monetary savings” (Mean: 3.56, S.D.: 1.21) followed by ―I see nothing wrong in using pirated software if it is badly needed for the success of a project” (Mean: 3.55, S.D.: 1.22). The highest mean score of female students was ―I see nothing wrong in using pirated software if it is badly needed for the success of a project” (Mean: 3.35, S.D.: 1.10) followed by ―I think it is okay to use pirated software if it improves my knowledge” (Mean: 3.16, S.D.: 1.12). The lowest mean score of male and female students was the same item that was ―I think it is okay to use pirated software to improve my productivity”.

The highest difference between male and female students‘ mean scores was 0.50 corresponding to ―I think it is okay to use pirated games software for entertainment”. The lowest difference between mean scores of males and females was 0.20 corresponding to ―I see nothing wrong in using pirated software if it is badly needed for the success of a project”.

5. Conclusions

The main aim of this study was to examine whether students' attitudes on software piracy differ in terms of their gender. Data was collected through a paper questionnaire which was administered to students of the Department of Business Administration at a public university in Turkey. Eleven items were used to measure attitudes of students towards software piracy and independent samples t-test was used for comparisons between male and female students' attitudes.

This research found that there is a significant difference between male and female students‘ attitudes towards software piracy. The study findings suggest that female students find software piracy to be much less acceptable than male students. This result is consistent with previous studies showing that female students are more ethical than male students in terms of software piracy. This difference should be taken into consideration in preparing corporate ethics policies, professional codes of conduct, and rewards/punishment systems for computer related unethical conduct (Khazanchi, 1995). The more that is understood about the relationship between gender and ethics, the better chance of education and training programmes will be designed to improve ethical awareness and sensitivity (Roxas and Stoneback, 2004).

A number of limitations should be taken into account when interpreting the results of this study. First, this study used convenience sampling technique. Therefore, it is difficult to generalise the results. Secondly, the sample of this study is composed of undergraduate students of the Department of Business Administration. Third limitation is that study was administered in a public university in Turkey. The inclusion of students from different departments and universities provides opportunities to better understand gender differences in software piracy.

Further studies need to focus on why and how gender influences student‘ attitudes towards software piracy.

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INTEGRATIVE APPROACH TO MAINTAINING THE IMAGE OF THE INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ORGANIZATION: CASE STUDY AMONG FINNISH ENTERPRISES

Mirja Airos

Long Abstract

Theoretical Viewpoints

Images of the organizations are nowadays exposed to the drastic moves and changes in society, organizations and among individuals. One organization may have multifaceted, ambiguous and polyphonic fragmented images depending on the multiple discursive voices to be followed. Together these partial images create the overall and common image of that organization. This study aims to find out, how chosen three ICT enterprises are reflecting their ethical and responsible ideals and how the overall society is attempting to guide these acting firms through public discourses. Thus, there are theoretical scientific voice, official company voice and voice of the regulatory authorities or interest groups present in this examination.

Caring leadership and responsible business may be conducted by defining values and other basic principles: visions, missions, goals, rules and guidelines. Systematic communication on responsible and ethical issues proves the overall stance of the corporation. These days the stakeholder communication is crucial part of every firm‘s strategic performance and different parties are waiting for more than just theoretical discussions in the form of public statements. (Kujala & Kuvaja 2002, 49, 72-75) Desire and willingness to communicate the responsible way of thinking varies and amount of which the companies interact in outlining processes differs. These are absorbing issues to be approached.

This paper reveals that major professional organizations and regulatory authorities, which are having impacts and effects to Finnish ICT field: Global Reporting Initiative (GRI), The European Telecommunications Network Operators' Association (ETNO), Ministry of Transport and Communications Finland, Finnish Communications Regulatory Authority (FICORA), Finnish Federation for Communications and Teleinformatics (FiCom), Finnish Information Processing Association (FIPA) etc. have their own published codes of ethics. Enterprises also have their own written ethical principles, professional guidelines, corporate social responsibility reports or like. These codes have differences in presentation and emphasis, but they are still in vast agreement on some general principles. This paper profiles also, how these explicit, commonly admitted and stated, codified rules of ethics are tight to the other implicit discursive statements, which chosen firms are introducing in their own discourses. Firms are using multiple discourses as a strategic devices, how to govern ethical and responsible issues. Dialectical and pragmatic way to see the multiple voices are relevant and also the contextual understanding of these voices. Both normative and empirical aspects shall be encompassed in integrative approach (Singer, 2009).

Empirical Viewpoints

This research attempts to show, how some publicly presented discursive thoughts are heading to formulate the stakeholders view and visualization on the ethical and responsibility issues of the selected ICT firms. Chronological contemplation is conducted through years 1997 - 2007; the aim is to reveal some extensive ideas on the subject. Last two years 2008 and 2009 of this longitudinal study has taken into account by revealing some descriptive statements. Reason for that is the ever-growing number of discursive statements.

In this research the contemplation concentrates on three companies, which are TeliaSonera, TietoEnator and Elisa, formerly Yomi. These corporations may have had many names in previous years, but in present paper above-mentioned names are in use. The development and the route of the

two first ones are more unilinear than is the case in the last one. Selected firms differ in the sise and fields of business-making are partially unlike, but the well-known definition (European Commission in Virallinen Lehti L 107 1996, 4-9) of the large-scale firm annual turnover more than 40 MEUR and total sum of balance sheet more than 27 MEUR holds true in every case.

TeliaSonera and Elisa are communications service providers and TietoEnator is service producer, which offers computing, research and development and consultancy services. Although these firms present the different sides of the broadly perceived information technology enterprises, these all have had operations both in domestic markets and also in international level and the scales of the operations have been multi-filament, making the firms equally essential for this kind of research. This way we are able to explore more comprehensively the common phenomena of different kind of voices, which are present in image building processes of ICT enterprises. The research has then more cross-sectional nature, too.

Methodological Viewpoints

This study belongs to qualitative research tradition and it has nuances of both interpretative and radical humanistic paradigm (Burrell & Morgan, 1979 and onwards). Critical business research as this study seems to be tries to create new ways of thinking (Alvesson & Deetz 2000, 22-31) and written texts and documentations are seen as socially constructed phenomena (Atkinson & Coffey 1997, 47), which are related to prevailing society and produced by individuals. Empirical examination is based on the official written documents (annual reports, responsibility reports, ethical codes, web-contents) of the firms and the theoretical notions are made with the scientific literature about business ethics and corporate responsibility and also ICT related references. Research data represents only some of the possible discursive cases, but in this particular study that procedure is acceptable, because of multi-dimensional and rich sources of data. This kind of data is called discretionary samples (Eskola & Suoranta 1998, 15–18).

This study could also be named as cross-case methodological approach (Gerring 2007, 1 & Yin 1990, 27 etc.), because of multiple cases and sources of data. Methodologically this study has signs of three various dimensions: case analytical points, interpretations are made both about the individual cases and also from more abstract entities, (Hammersley & Gomm 2000, 3-4) as mentioned already, discourse analytical elements and then content analytical views; analyzing discourses goes through different steps (Tuomi & Sarajärvi 2003, 94), data shall be categorised in a suitable way (Holsti 1969, 94-95; Carney 1972, 167-168) and one possible hermeneutic understanding is created. Researcher is seen as active subjective creator of meanings and it is relevant to recognise and confess that openly (Hardy & Harley & Phillips 2004, 19 – 22).

Conclusive Viewpoints

This study continues the scientific work, which have studied ethics and responsibility in ICT industry in conceptual-historical way and prospects and challenges for management and leadership with public-discourse based approach (Airos, 2006 and Airos, 2009) and has some neighbouring studies among Finnish (Onkila, 2009; Kooskora, 2008; Takala & Syrjälä, 2008; Siltaoja, 2006) and international (Payne & Landry, 2005; Gilbert & Rasche 2008; Vaccaro & Madsen 2009) current discussions. In the paper the reality is seen as socially constructed phenomena, this is consistent with author‘s thinking. (Ilmonen 1993, 69-70; Beck 1990, 17-23; Giddens 1991, 3 etc.) The reality and also business environments are fragmented to partial realities and constructing of the each actor‘s own reality is exclusive.

Other essential perceptions or facts are the presence of the stakeholder issues in current discourses as well. Stakeholders are seen multiple ways and various dividing and illustrating approaches are in use as was present already earlier many cases in literature, too (Näsi 1995, Carroll 1989 & 1993, Clarkson 1998, Freeman 1984 etc.). Stakeholders may be seen as theoretical practicalities as normative recommendations or as instrumental methodological approach (Friedman & Miles 2006). In this study the stakeholder interaction is seen with more theoretical emphasis than as methodological practice even though three kind of discursive voices are explained more thoroughly.

At the same time firms are trying to reflect them as individual among others and also underline their ability to be open and transparent. Some of Seeger‘s (1997, 18-19, 26, 34) ideas about diminishing the

organizational ambiguity in their ethical and responsible image are implicated in discourses, too. Enterprises attempt to reveal them as entities, which allow different audiences and stakeholders to reflect their feelings etc. Interaction and remoulding of the ethics and responsibility interpretations is enclosed.

As also Elia (2009) also points out transparency is supposed to encourage stakeholder trust, separate the company from its competition and persuade new investors, clients and employees, which leads to better prosperity and growth. Corporations' ethical and responsibility policies are tangible illustrations, which show the firms commitment to develop the operations and act in good way in business dealings (Wood & Rimmer, 2003).

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WORK-LIFE BALANCE IN THE JAPANESE INFORMATION AND COMMUNICATION TECHNOLOGY INDUSTRY: WHO THWARTS FEMALE WORKERS' CAREER DEVELOPMENT?

Ryoko Asai and Kiyoshi Murata

Abstract

Even in the recession, the Japanese information and communication technology (ICT) industry has been expected to provide many people, especially women, with employment opportunity. ICT has been recognised as an important factor to enhance economic efficiency, and to realise the gender-equal environment in terms of career opportunity and status in society. However, it is alleged that workers in the ICT industry are often forced to sacrifice their daily lives for their demanding works and some female workers even give up their marriage and children to continue to work. In order to examine the actual situation of female ICT workers, the authors interviewed seventeen female ICT workers. Through the interviews, it becomes clear that the most serious gender issue in the Japanese ICT industry is that almost all of the female workers don't notice the existence of gender issues at all. The present gender equal work environment perceived by them has been established so that the women are forced to behave similarly to men in their workplaces.

1. Introduction

Due to the ten-year-long *Heisei* recession since 1991, many Japanese companies span off their in-house ICT divisions and system development sections into separate companies. Consequently, the ICT industry became more competitive and grew rapidly while other industries remained in the grip of the serious recession. ICT has already been infrastructure in almost all business areas and functioned as an indispensable component of people's daily lives. Therefore, the ICT industry continues to provide expanded job opportunities (The Cabinet Office in Japan, 2009; The Health, Labour and Welfare Ministry, 2009)

On the other hand, Japanese society has faced big social problems of a declining birth rate and aging population. This means that Japanese society would suffer a labour shortage in the near future. In the *Heisei* economic depression, many companies didn't care about the shortage of their workers; rather they wanted to make a hiring cutback. However, once the economy began to recover, they started to rebuild personnel planning and to recruit good employees. On this occasion, the ICT industry was bothered with a shortage of workers more seriously than other industries because the industry was not popular among young people due to the bad reputation of its physically demanding jobs (Kumazawa, 2000; Bando 2009). Since then, most ICT companies have taken a proactive stance to employing women as regular employees and a significant number of women have flowed into the ICT industry (The Health, Labour and Welfare Ministry, 2009).

Nonetheless, little research in gender issues in the Japanese ICT industry has not been conducted. This study is the first step towards a policy recommendation for establishing gender equal workplace environment in the industry. In particular, the authors attempt to examine gender issues in the Japanese ICT industry through narrative analyses focused on its masculine workplace culture and practices in this paper. The structure of the remainder of the paper is as follows. In the next section, the Japanese socioeconomic circumstances surrounding workplaces and gender policies recently adopted are reviewed. After that, in Section 3, Japanese workplace culture is explained and narratives of working women in the Japanese ICT industry based on the interviews the authors conducted are described. In Section 4, the narratives are analysed and concluding remarks are made.

2. Japanese Socioeconomic Circumstances and Gender Policies

In April 1986, the Law concerning Equal Opportunity and Treatment between Men and Women in Employment (Act No. 113 of 1972; revised in 1986, 1997 and 1999) was enacted in Japan. Fourteen years later, the Basic Law for a Gender-equal Society (Act No. 78 of 1999) was enforced. Both of the

laws aim at enhancing to construct a gender-equal society and prohibiting gender segregation in workplaces. Furthermore, the Japanese government has recently adopted policies to promote a work-life balance in order to encourage women to continue their careers after marriage or childbirth. However, the effectiveness of these policies has been deteriorated due to the Japanese culture with respect to *work*. This circumstance can typically be observed in the Japanese ICT industry.

The conventional work-life style had established during the Japanese high economic growth period (1955-1973); a male worker devoted himself into his work while sacrificing his own personal life for his family. On the other hand, a female worker was expected to marry a man, typically, at the same company and to become a fulltime housewife to take care of her family two or three years after she joined the company. Unmarried woman past the marriageable age and two-income households were the deviation from the gender roles. Therefore, they were dogged with negative image based on the gender bias and the gender norms in Japan.

However, Japan has experienced the economic depression in the 1990‘s, and this caused a decrease in average household income. Furthermore, Japan has faced expected labour shortages due to a declining birth rate and aging population. These situations have enhanced social awareness that women should continue to work after marriage and/or maternity leave. The laws to support and protect working women have enforced one after another and any discriminatory treatment of women or men in workplaces has no longer been permitted in Japan. Under these circumstances, however, female full-time workers tend to be required to have an equal workload to men without ridding themselves of housework at all.

3. Does ICT Make a Change for Women‘s Working Life?

3.1 Working Women in the Japanese ICT Industry

Now women play an active role in workplaces in almost all industry. Especially the ICT industry has employed working women, because it has consistently grown and is expected to continue to create further job opportunities even in the current recession. Job opportunities provided steadily by the Japanese ICT industry would be helpful for women who are eager to develop their career as well as for construction of a gender-equal society. The fact that ICT workers are expected to be professionals due to their social influence (Murata, 2005) may suggest that increase in employment in the industry is advantageous to improvement of social status of women. However, the industry has faced the pressure for significant cost-cutting and a shortened system development period in the fiercely competitive, globalised market and, thus, the working environment of the Japanese ICT industry has become severer.

If ICT, especially the Internet, facilitates gender equality in workplaces as the government alleges, the most progressive gender equal workplace would be realised in the ICT industry (The Cabinet Office, 2009). In actuality, however, the Japanese ICT industry is known as a typical masculine one where employees experience physically demanding and prolonged work. Additionally, the industry is notorious for its poor working conditions and bad business practices such as multi-tier subcontract in information system development. Some people are forced to sacrifice their daily lives for heavy workloads to develop ICT-based information systems. In particular, some female workers even give up their marriage and children to continue to work. Although the industry provides employment opportunities, workers are forced to accept severe working conditions which are a far cry from a work-life balance. In order to examine actual conditions in detail, we have conducted semi-structured interviews with seventeen female workers in the Japanese ICT industry. Narratives of seven working women who are selected from the seventeen are described below.

3.2 Narratives of Female Workers in the Japanese ICT Companies

Woman *A* has worked at a Japanese ICT company in Tokyo for six years. At present, she is twenty nine years old and single, has no child, and lives with her parents and grandmother. She graduated from the economics department of a university in Tokyo. When she looked for a job in her final school year, ICT companies grew rapidly and attracted much public attention as a new field with promising future growth. She had not studied computer science or engineering, but she vaguely felt that she could undertake creative and interesting jobs in the ICT industry. Then, she looked for her job

opportunity at some ICT companies. Finally she got her job at the ICT company affiliated with one of the major Japanese trading companies.

She works as a service engineer now and she does not feel any discrimination between sexes/gender in terms of working conditions, job promotion, training programmemes and performance appraisals in her workplace. All the difference between men and women is that men have more muscle than women physically, she said. However, she is concerned about her future related to a work-life balance. In short, she wonders if she is able to balance work and family in the near future. She grew up in a traditional Japanese family where her father worked at a company as a breadwinner, and her mother was a full-time housewife. That is, she has lived in a culture in which women are supposed to take care of their husbands, children and parents at home. Thus, she intends to give up her career to become a full-time housewife in case she has difficulty in taking a work-life balance in the future. She thinks of her mother as a role model in her life.

On the other hand, at the same company, a working mother is employed. Woman *B* is a forty-nine-year-old working mother and lives with her husband and two children. She has been working for the company for over twenty five consecutive years. She is at the managerial position while the proportion of women in managerial posts is quite low at the company. When she entered the job, the ICT industry was a developing business area and was not so popular among young job seekers. She studied at undergraduate school of integrated arts and sciences and decided to enter the new business area and to work as a full time *system engineer* which was the job for men at the time; most of female workers were expected to work as supportive staff and were considered as prospective brides for male workers at companies (Ogasawara, 1998a, 1998b). There were few women who had professional career like her. At the beginning of her career, almost her colleagues were men in her division. She had sometimes worked through the night with the other workers in order to meet the due dates for cutovers.

Therefore, she doesn‘t have any idea that there have been any discrimination and differences in working conditions between men and women at her company. Her view is almost same as *A*‘s. However there is a great difference from the previous woman in family forms because she has her own family and has raised two children while working fulltime. Thus, based on her experiences, she strongly believes that it is possible for working women to work fulltime and to have children. But she told that if women have a child while working, women need to juggle between family and work by making use of their limited time, especially, for supporting their husbands. She emphasised that the most important factor for women‘s keeping their career is career consciousness. Many working women contrive to achieve a good balance between their work and housework supported by their families and social institutions. In her case, the nursery, the school and the cram school helped her nurture her children when they were little. She said that she could not take care of her children and continue to work fulltime without the facilities as well as her husband‘s support. Needless to say, she took maternity leave and returned to work after it. Women *A* and *B* work at a famous company affiliated with a big trading company as described above. Therefore, the company complies with the law and their working conditions have been improved. However, both women told that there were few role models who have children while working fulltime at their company. Then what about women in working at a small company?

Woman *C* develops software for graphic at a small Japanese company. She is a thirty-two-year-old software engineer and lives with her husband. She graduated from the department of education of a university. When she looked for her job, Japan was in a serious economic depression and it was much more difficult for many female students to find the job than male students. Like other female students, she didn‘t get a job as good as she wanted and eventually she entered into a small ICT company. Her company is a subcontractor that specialise in developing particular modules of software. This kind of small company needs to do more work with fewer people. That‘s why she inevitably has to carry out a lot of assignment at low pay inadequate to compensate for her performance. In other words, she is usually under pressure to meet deadlines and she is too busy to have private time. When a deadline is looming, she spends most of her time at her office without being back to home. She often spends a series of days without bathing or taking shower and sleeps with cardboard futon and newspaper blanket on a floor next to her male colleagues.

There are no women but her at the company. She cannot consult with other female colleagues and all she does is to work like male workers. In addition, the company is unable to afford to improve the working conditions and even to comply with the law in order to survive the competitive economic

environment. This means she cannot take any maternity leave and child-care leave. At her wedding party, her boss told her that if she had a baby he would want her to quit the job. His saying was definitely against the labour law and the equal employment opportunity law, and she could sue him and the company for it. She was shocked at his words, but she could not refute his unfair idea, because, in actuality, she was too busy to have a child. Now, however, she is pregnant and plan to work till the ninth month of pregnancy. She says that she has no idea what will happen to her career after delivery, and at present she does not know if she will be able to take maternity leave. Some female workers in small companies are forced to face serious problems in their taking a work-life balance.

3.3 Narratives of Female Workers in the Foreign-affiliated ICT Companies

Woman *D* works at one of the biggest foreign-affiliated ICT companies. She is thirty two years old and single and has no child. She specialised in computer science at a graduate school. She decided to enter the ICT industry and engage in something that involves computer technology at the beginning of her job hunting. For her, corporate culture was decisive in her choosing job. Her company has implemented family benefit programme since its formation such as long maternity and child-care leave, training programme for retreads after taking maternity leave. Therefore her company retains larger population of female fulltime workers than other companies in the ICT industry. In addition, the discretionary labour system makes many workers easier to keep their job even though they have own families. She was attracted to these points and decided to work for the company.

She works as a *system engineer* to develop personnel management system in-house. Her division is composed of fifteen members and five of them are women. Of the five women, two are married and another one takes maternity leave at present. Some male colleagues take days off to take care of their children and take part in the activities of the children‘s school sometimes. Under the present working environment, she does not have any idea that she will quit job even when she get marry and have a child in the near future, and she wants to keep her job after having a child. That‘s why she is not aware of any difference and discrimination between men and women at her company. A difference is, she said, nothing more than differences among individuals regardless of gender. The most important thing in dealing with her job is to manage assignment which she takes on and to produce the best performance as she plans. These make no difference to all workers in getting ahead with their work. Thus, she has a lot of assignments under deadline. However, her male colleagues are under the same conditions, and she thinks that her company has never taken a gender discriminatory behaviour for all workers. As noted above, she is single and has no child. It is plausible that those who are able to work as hard as men are single women with no child. In fact, wage disparities between men and women in their twenties are few. Then, what do married women think about their working conditions?

Woman *E* works as a *system engineer* at the same company as Woman *C*‘s. She is thirty one years old, married her colleague and has no children. She researched on theoretical chemistry using computers in her master's course. This experience let her decide to join the leading company in computer technology. Both men and women take a lot of assignments and working conditions are equal for all workers at the company. Thus, she thinks that there is no difference between men and women. She takes a good balance between her work and home life thanks to the discretionary work system. Is this consciousness of their gender equality in working places specific to this company? We interviewed other working women at another leading foreign-affiliated ICT company.

Woman *F* is thirty nine years old and married and has no child. She is in the managerial position at the contents service division. She graduated from the department of English at a women‘s junior college, and after her graduation she has changed her jobs four times. The company where now she works for offers better working conditions and benefit programmes compared to other companies at which she worked in the past. Actually, her present company engages in a work-life balance programme and positive recruitment of female employees led by the headquarters in the US. Under this environment, she thinks there are few differences in working conditions between men and women at her company. However, she has a lot of work and a little private time every day. Therefore she points out that management of time and assignments is important for her work and also that her husband‘s cooperation is essential for their family lives. His cooperation is almost equal to his patience to forgive her in putting work at the company before housekeeping. Then, what do working mothers think of their work-life balance?

Woman *G* is forty six years old and married and has two teenage sons. She studied physics at a women's college. She keeps her career in one company Woman *F* now works for. She was interested in manufacturing technology when she was a college student and decided to get her present job. She undertakes system development and her colleagues are almost men. She thinks that her company offers equal opportunities for all workers and contents of work and their performance review is almost fair. Therefore, she emphasised that if women didn't care about delay in their career progress, it was not difficult for them to have children and work fulltime at the company. In fact, she felt her promotion was slower than male colleagues' owing to her maternity leave, but she did not concern about it in her career from a long-term viewpoint.

4. Analyses and Concluding Remarks

The interviews revealed how working women in the Japanese ICT industry juggled their work and family lives on their own responsibilities. Almost all of them consider their work as physical work, not as intellectual one, and that the level of pay is inadequate to compensate for their workload. Some women said that they had no idea how long they would keep on working under such severe working conditions. However, all of them recognise that marriage is never an obstacle to their careers and that working conditions of them are the same in men and women, because, they consider, male workers take on a lot of assignments and work under strong pressure as female workers do. In some cases, male workers suggested female workers to go back home earlier with caring for them and their families. That is, the ICT industry provides female workers with almost equal opportunities to work fulltime regardless of physical force and, however, they are adjusted to the traditional female and male working style. At present, some companies takes equal treatments of all workers without sex difference (Bartol and Aspray, 2006; Bartol, Williamson and Langa, 2006; Chapple, 2006). However, we need to consider whether the treatments are fair for both men and women.

The narratives suggest that the Japanese female ICT workers don't perceive particular inequality or discrimination between sexes at their companies even though they are placed in severe working conditions which are derived from their gender. Gender issues in the Japanese ICT industry found through the interviews and the process of making out the narratives are as follows. First, both male and female workers suffer off-balance between work and life. Secondly, the equal opportunity in the workplaces perceived by the interviewees seems to cause increased workload for them. Actually, they are unconsciously forced to accept that housework and/or child-rearing are their responsibility. Thirdly, law enforcement to enhance a gender equal society has lowered employers' incentive to hire women. Even though the original aim of the law is to address the problem of low fertility in Japan. Employers seem to recognise that hiring female employees is costly. Finally, the most serious issue in the Japanese ICT industry is that the employees interviewed didn't recognise the existence of the gender issues at their companies at all. They have been accustomed to the male-dominated working environment.

In order to resolve the issues, the following polices are recommended. First, social support for child-raising is necessary (Kumazawa, 2000; Kajima, 2003; The Cabinet Office, 2009; Bando, 2009). For example, the number of nursery centres which open 24 hours and can look after babies younger than one-year old should be increased. Actually, there is a very long waiting list for nurseries in Japan. Bringing down the corporate tax rates in order to encourage companies to work on a realisation of work-life balance of their employees is another way of supporting working mothers. Furthermore, networking among female ICT workers across companies may be useful because this would clarify a role model of female ICT workers and would make it possible for them to enjoy peer consultation (Youngs, 2001).

However, Japan currently faces another gender issue which runs counter the efforts of improving social status of working women. Namely, a new social trend that an increasing number of women, especially in younger generation, want to become a full-time housewife has been set off. This social phenomenon would obscure a role model of a working woman who keeps developing her career. After all, who thwarts female workers' career development in the Japanese ICT industry?

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EDUCATION ON INFORMATICS ETHICS: A CHALLENGE TO SOCIAL DEVELOPMENT

Porfirio Barroso Asenjo and Mario González Arencibia

Abstract

The article aims at offering a propositional evaluation of several topics related to the education on informatics ethics, generally sharing the concept of ethics in this field, as a theoretical and practical instrument to orient human being towards attitudes that are consistent with social development. The main idea in which the stated proposal is based is that changes brought about by the Information and Communication Technologies should be accompanied by a cultural and axiological awareness, which also involves different ethical behaviours.

Keywords: informatics ethics, education, social development, values, moral imperatives.

1. Introduction

"There is no good education without instruction. The moral qualities increase their value when they are realised by intelligent qualities".[1]

José Marti

One of the tendencies that reveals a strong increase since the last decade of the 20th century and keeps up in the beginning of the 21st century, is the reference to the intensification of the attempts in the different technological disciplines by introducing value criteria that allow to orientate professionals in their decision making. This has as substance the acknowledgement that the technological developments are not ethically neutral. Remarkable in this scope of transformations is the emphasis that lies on the concept of applied ethics, attending the importance of the treatment of ethical questions, bound to the practice of engineering and technologies.

Especially in the specific case of ethics applied to informatics, these attempts have been meaningful. This is determined by its impact in today's society, emerging behaviours that imply a close relationship between ethics and informatics, such as the confidentiality of personal data, the invasion of electronic advertising via the Internet ("spamming"), and cases of child pornography. It is clear that these are not the only possible examples.[2]

Currently, the prevalent approach revolves around the need to confront the dilemmas occurring in a product of improper use of technology. In this argument, the very common idea is promoting ethical attitudes of IT professionals, with the particularity to acknowledge the relevance of ethics training in the use of the computer systems of society in its entirety, especially starting from the regards of the socializing role of this technology across many different areas and cultural knowledge.

In this sense, the current text, starting from the background debate about the relationship between ethics and informatics, aims to provide an assessment of a range of topics related to ethics education in Informatics Ethics, in general sharing the concept of ethics as a theoretical and practical guidance of human beings towards attitudes consistent with human dignity. In other words, ethics essentially are a learning to act in a rational way.

[1] Martí, José. "Educación popular". En: Obras Completas, Tomo 19. Editorial ciencias Sociales. La Habana, 1991. P. 375-376.

[2] Littlejohn Zinder, Debra and Ed Tittel. Le escena del crimen cibernético. Manual para Forenses de la Computación. Copyright © 2002 por la Compañía Editorial Syngress, EEUU 2002, pp 30-57.

As regards the informatics, in this work it is understood as "the science that studies the phenomenon of information, information systems and processing, and transfer and use of information through computers and telecommunications, as tools for the benefit of mankind".[3]

This concept is complemented by the definition obtained from a study by Neif Silva, when you put forward that: the Information and Communication Technologies are a set of tools that rely on informatics: software and hardware, for the implementation of automated processes with speed and precision criteria, of which derive from products that serve as communication channels for support, storage, processing and digital transmission of information.[4]

Methods

Applied the method of the documentary observation, this allowed to obtain diverse criteria about the Ethics Informatics, which collect to continuation:

Ethics Informatics: different definitions

Having clarified the concepts of ethics and informatics, it is relevant to situate some of the definitions that are outlined in the debate about the Ethics Informatics, aiming to enlarge the understanding of the subject.

In its narrow sense Informatics Ethics is considered as the discipline that examines the ethical problems that are *created, processed* or *compounded* by people who use the advances in information technology.[5]

James Moor defines Ethics Informatics more broadly as the discipline that identifies and analyzes the nature and social impact of information technologies and communication in the human and social values. These are: health, wealth, work, freedom, privacy, safety or self-actualization, democracy, knowledge, among others. In addition, it involves the formulation and justification of policies to guide our actions, and ethical use of these technologies.[6]

Terrell Bynum, based on Moors' definition, defines computer ethics as a discipline that identifies and analyzes the impacts of information technologies in human and social values. These values are health, wealth, work, freedom, democracy, knowledge, privacy, safety or self-actualization. This concept of Ethics Informatics includes terms, theories and methods from disciplines such as applied ethics, sociology of computers, social assessment of technology or rights in informatics.[7]

Moreover, Joyanes regards it as "analysis of the nature and social impact of information technology, and the corresponding formulation and justification of policies for its ethical use". [8]

Likewise, Cortina says that Ethics Informatics is a source of the "applied ethics" and emerges as a need to generate professional ethics in the use of information and communication technologies, based this, caught in ethics to fill the void that exists of rules to guide their use in solving problems, created by man in society through their use.[9]

The intent of each of the outlined definitions is to incorporate a social conscience associated with computer technology, helping to develop its use not only with efficiency but also with ethical criteria.

According to this he goal will be that Ethics Informatics could participate in taking decisions about technological themes in a stable, valuable way that goes together with social development.

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[3] Hajna, Rifo, Lagreze, Byrt y Muñoz, Navarro (1989). Derecho e Infromática, Ediciones Instituto profesional de Santiago. Pp 1-86.

[4] Silvan Neif (2006). Cultura Informática en la Gestión de Actividades Académicas. En Memorias de la 5° Conferencia Iberoamericana en Sistemas, Cibernética e Informática CISCI 2006. Volumen II. *Ponencia*. Orlando, Florida-EEUU.

[5] Del Brutto, Bibiana Apolonia. Globalización y el nuevo orden internacional: las sociedades de la información, Revista TEXTOS de la CiberSociedad, 3. Temática Variada. Disponible en http://www.cibersociedad.net 2003.

[6] Moor, James H. What is Computer Ethics, Metaphilosophy, Vol. 16, No. 4, October 1985, pp. 265-275.

[7] Bynum, Terrel W., Ethics and the Information Revolution, ponencia en el curso de verano "Etica de la Informática", Universidad Complutense de Madrid, Madrid, 1996.

[8] Joyanes, Luís. Cibersociedad. Los retos sociales ante el nuevo mundo digital. McGraw-Hill; Madrid, España. Pp. 198-199.

[9] Cortina, Adela. Etica de la Empresa. Tercera edición. Editorial Trotta. Madrid, España 1998. Pp 88.

Results

The study realised of the literature studied allowed to define the lines to follow for the development of the Ethical Informática, this can observe in the following comments:

The previous concepts we treated allow us to assemble different partial reviews:

The task of Computer Ethics is to give guidelines for action when there is no regulation or when the actual guidelines are not up to date anymore. That‘s why Computer Ethics also have to analyze and propose a conceptual framework that is adequate to understand the ethical dilemmas caused by Informatics Technology (IT). For this discipline formulates different objectives:

- To discover and explain solutions (or keys) for ethical dilemmas in IT.
- To determine to what extent they are aggravated, transformed or created by computer technology.
- In the face of ethical dilemmas caused by IT, to analyze and propose an adequate conceptual framework and to formulate principles of action to determine what to do with new activities that are caused within IT and for which there are no clear lines of action. The effect should be that an ethical analysis of realistic and significant cases is realised.

Discussion

The realised analysis has an extraordinary meaning for the studies on Computer Ethics that is realised in countries as Cuba, where still this topic has not had advances sufficient. This approach can be seen in the fact that this work may be making decisions in different dimensions that are given below:

The need to make decisions about the use of IT technology

The message consists of the context in which computer science is unfolding, refers to behaviour that goes against human dignity, involves the necessity to take decisions about the use of information technology, and to manage the professional and non-professional who uses the information media. He or she should participate in defining their social responsibility through multiple pathways, becoming someone who promotes cultural behaviours that is consistent in an ethical way with social development.

We consider it as a fundamental key, as an awareness of the social implications of informatics, and it is not enough to do that from a legal point of view. The ethics of education should contribute to fill the empty space that is produced in most cases. The legal regulations have as obstacle that IT technology advances so fast, so it‘s difficult to keep the rules up to date to the technology.

What is raised requires thinking in different dimensions, what in a close interrelationship complements education in Informatics Ethics. These relate to the role of education, to moral imperatives, to professional excellence, to the necessity to foster cultural promoters in the field of computer ethics and to make the collaborative relationships every time more and more effective and actual. All this could contribute to an education that will make us more responsible in the field of informatics. The question until here could be the following: Which significance has all these dimensions?

a) The role of education

The life today is extremely influenced by information technology. A lot of people consider themselves very bad prepared to practise their rights when they have to face the complex social implications that evolve out of computer media. Educating people about these issues from an ethical point of view is very important for the future of our society.

Therefore to help, to understand, to think the implications of the social and cultural nature of information technology, is something essential to educate, not only in this 21st century, but also in the next.

To educate in the frame of a formation of ethics applied to information technology, means to develop values that permit that a person, acting in a reasonable and independent way, relates to the environment that surrounds the principles that make our life worthy on earth.

The recognition of ethical dilemmas that tends to create the inadequate use of information technology, is thus supposed to recognise the hard task for specialists, and users of this area as promoters of ethical behaviour in the use of IT media. This in fact means to participate in building professional ethics itself, assuming taking a stand alongside the need of a special ethics that permit to lead professional and non professional users of this technology to follow paths of action in line with social welfare.

On this basis the task of computer ethics is to promote a culture of actions responding to the dilemmas that could generate the bad use of TIC. For this it is necessary to develop a conceptual framework around ethical criteria that are indispensable considered the use of information technology. The purpose is to assume ethical positions about the social implications of technologies in a way consistent of a statement of fitting values that every time provides more dignity for the life of men on planet earth.

This is an urgent task for any country considering a role to be played by informatics in the social life of human beings, ―tis not only about informatics to communicate, but to know, learn, teach, help, share"[10]. That is to say , the centre of thought is a sustained conception of ethics about the principles of social development, what requires an ethical education applied to information technology activities.

The goal of this work are principles of social development, those points of view that guarantee in the frame of informatics the active participation of all members of society to make those common goals of development indeed happen, in full respect and at the same time is a guarantee for learning. In this setting is also a principle of social development included, the possibilities that hold information technology to be an answer to social needs, reaching equality as a new order of social justice, what allows fair access on the level of education and welfare, and to construct a new condition of citizenship, based on the full recognition and guaranteed exercise of rights.

b) Moral imperatives

The criterion is that an understanding of the importance of the reflexion about ethics starting from the principles of social development, from the stage of information technology, could contribute to the debate about moral imperatives[11] so important in such ethical legacy[12]:

1. Professional privacy and confidentiality.
2. Professional responsibility.
3. Loyalty towards your institution and country.
4. Dignity, honesty and integrity.
5. Primacy in the service of social goods.
6. Academic preparation and continued formation.
7. Professional solidarity
8. Professional integrity
9. To support and practice the right to provide and receive information.
10. To transmit exact data.
11. To prevent invasions of privacy
12. To employ only fair and honest means in the exercise of your professional activity
13. To collaborate in the development and promotion of information technology.

10Fidel Castro Ruz. Speech for the commander in cheef F.C.Ruz in the act for the fifteen years of the Young Club of Computacion, 7 May 2006.

11 The imperatives are formulas that express the notion of duty and that, therefore, manifest the pressure that the moral laws impose in a constrictive way at the will. All the imperatives express themselves by the formula of the must be and show the relation of an objective law of practical reason and a will that, because of its subjective constitution, is not necessarily determined. All this implies that even if an imperative is not necessarily determined on subjective will, this not necessarily dictates reason. What it does do is to exert pressure or compulsion , such imperatives are shown as something external that imposed obligations. In this sense, the imperative seems like something constructed upon the will, but, at the same time, we don't have to determine her necessarily. For a really good analysis about this theme consult Sevilla Segura, Sergio and Montero Moliner, Fernando. Analyses about moral imperatives in Kant. Valencia: University, Madrid 1979 pp. 55-67.

12 See: Barroso Asenjo, Porfirio. Four principles of Ethics and Internet. Available at: http://www. ccee.edu.uy/ensenian/catcomp/material/etica.pdf. (Consulted 7 of January 2006).

14. To prove competitiveness
15. To respect and defend intellectual ownership , observing copyright, reference sources, citations and references
16. To keep confronting your ideas, to refine them and make them known.
17. To defend their professional criteria, objectivity and respect for others
18. To assume a critical and autocratic attitude to mistakes as a tool for moral self-regulation
19. To accept the points of view, as well as the experiences of others, who contribute to the development of the professional and the profession itself
20. To study and evaluate the possible impacts that their actions can produce to the natural and social environment
21. To ensure the saving of resources, both renewable and not renewable, since some are exhausted and others need to recovered.
22. To forward theoretical and practical education to understand the dimension of environmental engineering.

c) Professional excellence

In accordance with the above this new idea emerges: ―The access to knowledge and culture on its own does not result in the acquisition of ethical principles; but without knowledge and culture it is impossible to reach ethics". Being put into the context of this article, this means that one should not validate the level of professional preparation of informatics and non-informatics, nor the quality or professional excellence, using as only reference the level of qualification related to the knowledge of informatics.

The excellence of the professional is obtained when informatics technology convert into an instrument to the service of a more humane reality. The idea is that informatics only holds a humane sense when it preserves the exquisite respect for each right and liberty in which materialises the human dignity.

d) Promoters of cultural attitudes

In this scope, every project that has a profound social focus will have to conceive the ethics of informatics prioritizing the roll not only of the professionals of informatics but of society in general, like promotional agents of cultural attitudes in concordance with an ethics that emancipates to man all types of incoherent conduct with the practice of social development.

e) Making the relations of collaboration more and more real and effective

This in fact has its basis in making the relations of collaboration more and more real and effective and respect, based on the socialization of informatics on the basis of ethical principles. The idea is that no matter what social project centred on the development of man and its surroundings, by its essence will generate its own ways to socialise the informatics founded on the principles of ethics and socialist moral. Such affirmation parts with the criteria, of which this social project sustained in humanism, will have to conceive it as a challenge the necessity of finding its own conceptual formulations and practices, about how to implement an ethics of informatics that's fully in agreement with social dynamics.

Proposal for the development of a responsible education in the use of informatics.

The aspects mentioned before lead us to the necessity of realizing a proposal that could be useful in no matter what context, of which the ultimate goal will be to obtain an honest and responsible usage of informatics. It is sustained in the following directions:

Programming of activities in the form of conferences, forums that will be oriented on the effective use of informatics.

The planning of group dynamics for members of the institution with the objective of raising the level of support when it comes to reaching decisions.

The spreading of knowledge of ethical codes for the use of information technologies, this would mean an excellent contribution to the intellectual growth of the collective effort.

Educate the staff of the organization about the correct use of the existent technologies and how to get the most out of them, to facilitate the incorporation of new and emerging technologies.

The planning of extra courses to get to know the systems of communication in real time and the systems of analysis and collaboration.

To make possible the acquirement of skills that will help awaken in each member of the organization the necessity to use them and will at the same time help them to discover the potential advantages that come with them.

To evaluate the possibility to adopt a modality that could be incorporated to the control of the staff of the organization, a scheme that could motivate a possible reduction of some ethical problems such as lateness, absenteeism and abnormalities that in general can be affecting the work and the service quality of the organization.

To define a politics of information, communication and spreading of the use of informatics over an effective management of technologies of information and communication, with the objective to adequately direct your handling.

The idea is that the organizations in general have to strengthen the importance of the ethical component in their managing processes which are supported by information technologies. The ethical deontological codes have to be assumed by all those involved, in such a way that they can raise awareness of a better use of information technologies, this should deepen their moral compromise with the organization, in this way it would be securing in a way a better work performance.

Conclusions

The transformations in science and technologies go accompanied by an awareness of modifications in the cultural and axiological order, which involves a change in ethical conduct as well. In this sense the disadvantages of the practice need to recognise more and more the following truths:

a. It is impossible to approach these solely from a technological point of view, owed to the fact that there exist discussions and decision-making that require the application of values.

b. The evolution of the cultural knowledge, has affected every society in general, and in particular, every country has a different set of codes to confront the dilemmas of it‘s time.

This implicates the creation of scenarios of reflection in which the society as a whole serves as the measuring unit, it could lead to a way to confront the practical problems derived from this development of science and technology. Therefore, to impose as a moral imperative the development of a capacity to activate the force of its subjects, before the dilemmas caused by the transformation of science and technology.

In the specific case of the ethics of informatics, it intends to contribute to the performance of the professionals whilst considering the following aspects:

The use of ethical principles to clear up the ethic problems and detect erroneous ethical reasoning.

Through a multidisciplinary analysis collaborate with other disciplines in the debate, being conscious of the alternative viewpoints on the issues referring to values and knowing how to delimit the ethical and technological considerations in different cases.

Despite all this, the ethics of informatics does not only seek to propose principles of conduct and then see what values are affected but it seeks to reconsider values that are taken for assumed facts. An example of this is the use of software, which supposes some kind of property that does not entirely correspond with the traditional concept of property.

Computer programs suppose some kind of property of goods that does not adjust easily to other concepts of property of goods. At first it seems that the problem could be included in the protection of intellectual property.

The answer to the above is that from the approach of ethics of informatics one could investigate what sort of concept of property is the most adequate to fit in software, one could also raise a far more profound debate, wondering: Why is there intellectual property? Nevertheless, the question that rises when it comes to the subject of software protection is: What in fact is a (software) program, is it an algorithm or an idea that cannot be possessed by anyone because it is part of the cultural heritage of humanity?

Is it intellectual property that can be possessed and protected?

From this situation new problems evolve about possession of property, attribution, pirating, copying, copyright, industrial secrets, rights on certain products, etc.. Joint with this are the contradictions of ceding commercial software, the production of new software built from an already existing one, the improvement of products using materials registered by the competition, the reclamation of property of software developed in a university or a company, etc.

These aspects require rethinking the subject of intellectual property in respect to informatics in a very careful and permanent way, which implies a re-implementing of the values that up till now have been adopted by society in this environment, and to reconsider their uses.

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ENHANCING RISK MANAGEMENT IN A SOFTWARE PROCESS TO COVER RISKS REFERRED TO SOFTWARE USERS

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Abstract

Risk management has become the routine part of a software process. So far the identified risks are mostly related to cost and schedule which may be exhausted. In the described solution the set of analyzed risks is extended to consider risks related to software product acceptance by its users. Those risks deal with software quality failures including improper solution which my cause various inconveniences in software usage. Users are allowed to introduce risks from their point of view into software risk management system. The prototype system supporting risk management in such meaning is described.

1. Introduction

Technology is all around us and citizens more and more have to rely on electronic devices and solutions built in information systems. Software products are expensive for many reasons including a lot of risks in software development. Most of them result in cost excess and delivery lateness. In particular, various failures in product performance may cause that software product will be rejected by its purchaser. Nowadays this is the essential kind of risk. Software that fails to deliver its promised functionality can have devastating consequences for its producer, its purchaser, and often tax payers if a software system is built by making use of public funds. To respect the software customer the functionality risk in information system development has been emphasised to identify functionality risk factors, then to describe and analyze their impact on a given project (Tiwana and Keil, 2006). Results of this research emphasise the importance of customer involvement to predict and reduce a project‘s exposure to risk including requirements volatility.

There is still a risk that software product will not satisfy its users because of diverse uncertainties in software development and, in particular, in risk management. Enthusiasts of modern information technologies believe that a delivered software system is or, at least after some corrections, may be functional, useful, and accessible for all people interested in it. It happens when a product meets all specified requirements. But the practice shows that it is impossible to specify in details all requirements at the very beginning of a software process as it is required in the waterfall model of a software development cycle. In turn, the software process based on a cooperation of developers and software users is not fully predictable. So software developers should identify and quantify uncertainties that threaten project success. If user expectations are passed over then there is a danger (risk) that software users may decidedly complain software solutions and/or even reject the product. The terms and solutions concerning software quality and user satisfaction with a product are presented in section 2.

Software production is risky because risks of various natures may materialise. For this reason the risk management has become an important process in software development. Its main goal formulated from the producer‘s point of view is to prevent software supplier from the risk that the project fails because the term and budget are exhausted. Research in the area of risk management explores risk factors by concerning the question what strategies, tactics and techniques can help eliminating the risk of such failure. The basics of risk management in a software process are described in section 3.

Considered ethical dimension refers to the risk that the developed software product may bring negative impact on software users, including an entire society. The problem is how to manage that risk. The SoDIS methodology and tool (Gotterbarn and Rogerson, 2005) and so called ethics assurance (Szejko, 2002) show how to incorporate ethics in the software process. An ethical approach emphasised in the paper means to respect software users such as they are in real life. It means that software developers are supposed to learn user expectations and their point of view and then to consider it in software development. The risk sources identified from software users‘ point of view are discussed in section 4. Then the implemented prototype system to manage risk in software process is

described in section 5. There are presented risk attributes and its associations. The category of *guests* has been introduced among potential system users to let them to participate actively in risk management.

2. Software quality, user centeredness, and user satisfaction with a product

Quality characteristics of a software product are specified in a form of a quality tree − quality criteria selected according to quality goals of a given product are decomposed into its quality measures. The structure of the quality tree developed for a given software product depends of its type, features and circumstances of its usage. User requirements contain various quality features. It is not enough to implement a set of required functions. User expectations deal with many other quality features, referred mainly to the usability of a software product and a comfort of individual's work with it. Each category of software users has specific expectations and a system is supposed to meet those expectations. The more complicated product as an advanced expert system built for a new area of application, the more diverse user expectations. To assure quality 39 socio-technical dimensions related to expert systems quality have been formulated (Conrath and Sharma, 1992). In addition, some quality measures may be assessed subjectively by various users.

Problems with quality and misunderstandings in that area have been the reasons that several standards concerning quality have been developed to help software developers to understand and manage product quality. The ISO/IEC 9126 series of International Standards and Technical Reports define a general-purpose quality model, quality characteristics, and give examples of their metrics. The ISO/IEC 14598 series gives an overview of software product evaluation process including guidance for this evaluation. The ISO 9000 family of standards has been developed to assist organizations to implement (regardless of product provided) and operate effective quality management systems. Then the ISO/IEC 25000 series of international standards (ISO 25000, 2005) addresses software product quality requirements specification, measurement, and evaluation. In particular, measurement of quality in use requires a set of measures defined to evaluate the extent to which a software product used by specific users meets their needs to achieve specific goals with effectiveness, productivity, safety, and satisfaction in specific context of use. Thus specific procedures to ensure quality are recommended in a software product life cycle. Many of them may involve user participation in a software process. Quality criteria and measures become the problem of greatest importance in the Web era (World Best Websites Awards, 2004; Saturn, 2008) because software user may simply switch to another Web site when the previous one has been found improper or too difficult in use from the user's point of view.

Software factories declare customer orientation to demonstrate their will to act according to quality standards. The notion of *stakeholder* is used in software engineering to illustrate various interests of software process participants and a wide range of applied techniques. But a selection of stakeholders and their real qualifications and power are not absolutely democratic and ethical. The salience model of a stakeholder classification prevails in practice where the salience is described as the degree to which managers give priority to competing stakeholder claims. Managers who possess the power to influence their organization's activities are considered the *definitive stakeholders* − they sign a contract and other important documents including a bank transfer to pay an invoice when a software process is finished. In practice, stakeholders are often not defined, nor classified, not recognised.

The role-based stakeholder identification model is found a promising approach for selecting stakeholders in a project; it refers to any project (not only software project) undertaken by making use of public funds (Achterkamp and Vos, 2008). There are actively involved stakeholders, like customer representatives, decision makers, and designers. Active stakeholders are expected also in software projects (Ambler, 2003). Passively involved stakeholders are the third parties affected by the project, like: applicants of the city office, bank clients, patients of a hospital, or simply tax payers. Some examples of roles in any software project are: product owners, users, sponsors, controllers, advisors, work executors, software designers, programmers, and testers. Thus the core problem is to identify stakeholders according to the social needs to reduce the risk that a project fails.

Various user-centred approaches and design methods have been recommended and applied. But there is the *variety of user-centeredness*: user focus (customer's goals are specified in a given project),

work-centeredness (no attention is paid to any real user; context of an anonymous user‘s workplace is considered), user participation in a software process and at last system personalization to particular users needs (Iivari & Iivari, 2006). Two first of the listed above forms of the user-centeredness are most often met in practice.

In the author‘s opinion, one solution to improve software product quality from its user‘s point of view is to involve the real user (nor abstract or hypothetic) in software development because uncertainty of user requirements has a negative impact on software responsiveness and its quality. It‘s been confirmed that user reviews reduced the magnitude of this impact (Hsu & others, 2008). It works only when users share the responsibility for software product quality. User involvement in early phases of software development has been found effective and the analysis of user needs has been improved this way (Kujala, 2008). But the relationship between user participation and software responsiveness to customer needs is not obvious because of a variety of software systems and context of their use, conflict of business interests, and a level of social responsibility observed among software developers. User involvement may have various forms including software product quality assessment by its users (Begier, 2007).

Valuable results of user involvement depend on user‘s attitude, knowledge, skills in computing, and experience to cooperate with software developers. Forms of user involvement may be only informative at the beginning (users answer the specified questions), then consultative (users give consultations and instructions to developers when some artefacts, especially working prototypes, are delivered), and at last participative (users influence system design decisions). To make user involvement effective also users should know their role in a software process and insist to empower it (Damodaran, 1996). First of all, users‘ involvement makes possible to formulate goals of information system from their perspective and then analyze quality of these goals (Begier, 2002a), especially referred to public interest (Begier, 2002b). Users as active stakeholders may improve software quality because they are experts in their domain of application. At the same time it may also help respect social and ethical values in a software project since users are close to their work problems (Begier, 2009).

User involvement is required in agile methodologies (Highsmith, 2004; Martin & Martin, 2007) to make a software process effective and a product accepted. One of twelve principles expressed in Agile Manifesto says that *Business people and developers must work together daily throughout the project* (Principles, 2001).

Software development tends to personalised content of generated and/or searched and presented documents (Liang & others, 2007), and then to developed personalised versions of software functions and user interface. It may extend to entire electronic solutions to deliver fit-for-purpose software system to the specified user or user category. User involvement is definitely required to implement any personalization.

User satisfaction has become a pervasive measure of success of information systems. The original instrument defined in 1988 to measure EUCS (*End User Computing Satisfaction*) consists of five first-order factors (Doll and Torkzadeh, 1988) which may be further decomposed into particular measures. It is been widely used and then extended to develop a stable instrument applicable to various software tools (Doll & others, 2004).

Software products are often produced in global organizations and then applied in a global scale. The research concerning cross-cultural comparison of software system effectiveness and user satisfaction in global organizations shows that the 12-item EUCS instrument may be robust across cultures (samples were gathered in 5 different national cultures: India, Saudi Arabia, Taiwan, US, and Western Europe) (Deng & others, 2008). It is interesting that there were no significant differences concerning content, format, accuracy, and timeliness. But *ease of use* was assessed differently across national cultures. So there is still a risk that user acceptance in the case of software applied in private circumstances may be not valid in cross-cultural comparisons.

In many cases, including systems and various expert systems developed for public organizations, the aim of a software project is not only the specified product delivery but also development of numerous services offered by the designed solution and rendered for direct users and customer applicants (indirect users). In this context a framework for managing user expectations on software projects points out three strategies: user involvement, leadership, and trust. The most successful tactics in user involvement are: listening to users, working *with* users (instead of at them or for them), letting users make tough decisions concerning budget, schedule, and functionality (Petter, 2008). And service

quality is an ongoing and long-term effort. But the literature has failed to explain how to manage user expectations (Petter, 2008). Increasing dependence on IT systems calls for guarantee that this dependence is well justified and the trust that the developed software system will meet safety, security, privacy and other social expectations. In such context the concept of Trust Case refers to the need of providing a complete and explicit justification supporting the trustworthiness of an IT system and its infrastructure (IAG, 2008).

User involvement in the software process may be also considered as a condition that software engineers act consistently with the public interest and incorporate the Software Engineering Code of Ethics (Software Engineering Code of Ethics, 1999) into their standards of practice (Gotterbarn, 1999).

3. Risk sources and risk management in a software process

Real activities in engineering are burdened with a risk of failure. In reference to software project the term of risk is defined as a probability of suffering loss in software development. In practice it refers most often only to the financial loss. Even if a risk is limited to financial aspects there are various risk sources that may appear in some circumstances. In software engineering there is recommended to establish a procedure of risk management to build a list of triples $<s_i, p_i, x_i>$ analyzed in a given project, where s_i is an identified risk (may be in a form of scenario describing that something may go wrong in a given project; then it helps identifying a particular risk), p_i is its probability, and x_i is a consequence of this scenario and it describes a possible damage and/or loss (Pressman, 2001).

To avoid or at least to reduce the particular risks the process of risk management is established. Its aim is to identify *risk items* of the utmost importance in a given software project and to mitigate its impact if it appears. The first step is to identify the project-specific risks and risk factors (elements) that may cause the particular risk is materialised. Then an analysis of each risk takes place to assess its possible impact on a product development. Thus the predicted risks are analyzed to specify their probability and possible consequences, and to estimate their impact on a given project (its performance, cost, and schedule). This, in turn, constitutes the base of risk prioritization in a given software process. Then the plan of RMMM (*Risk Mitigation, Monitoring, and Management*) is developed concerning particular risks. Planned and undertaken activities help software developers avoiding or reducing particular risks in software development − risk monitoring involves tracking the software process toward resolving its risk items and taking corrective actions if necessary. The plan is under control to supervise its realization and makes possible its required changes.

With time the software risk management has become the routine process, one of the most important processes supporting software development. Risk management is started from the very beginning of a given project. To make risk analysis easier the potential risk sources are grouped into several subsets related to: product sise, business impact (at the supplier‘s side), attitude and availability of a customer, product requirements (their type, number and possible uncertainty), software process (its maturity), applied technology, development environment, and a staff (professional qualifications and experience, number, availability of required specialists). Then detailed risk factors are specified in each group. Such approach is applied for a particular project separately but the developed set of risk items may be extended. There are described and recommended principles and practices of software risk management to software developers (Boehm, 1991). The content of the Boehm‘s list of risks is applicable and repeated in many cases of software development. But its content refers mostly to producer problems although the word —user” appears one or two times. Namely, it is related to user interface uncertainties or uncertainties in the area of software reusability. The risk management process requires methods and infrastructure provided. There are still open problems how to manage risk successfully.

Nowadays user satisfaction with the given software tool is a widely accepted measure of that product success. So the problem is how to avoid a risk that software users abandon to use the developed software product when their expectations are missing. The problem is how to incorporate that kind of risk into risk management process and to focus its activities on user satisfaction with a product and user involvement in a software process.

4. Extensions of the considered risk area according to user involvement

The risk management process should be reoriented and redefined to cover more kinds of risk including those related to user expectations and involvement. The following problems are still open questions:

- What risk items are important from the software users‘ point of view?
- Who should be responsible for risk prioritization?
- How to extend risk management to include managing user expectations and ensure software quality assessed by its users?
- What kind of risk is related to user involvement?

User orientation and first of all their active participation in a software process involves some extensions of risk management to consider the threats referred to expectations of direct and indirect software users. Indirect software users are affected by a software product, possibly an expert system developed for public or business organization. If threats and inconveniences caused by informatisation are to be reduced or eliminated, it is necessary to raise the awareness of these threats and to emphasise them in the developers‘ community and in the entire society (Begier, 2009). Some practices introduced by informatisation of the public sector seem initially advantageous but they may bring completely undesired side effects.

There is a general risk that users may be unsatisfied with the product under development. This risk requires decomposition into particular risk items which are then analyzed one by one. These particular risks refer to quality of a software product. Not only technical quality is to be provided and assessed − some risks refer to reactions among the staff, their comfort of daily work and feelings regarding the developed software tool. Examples of risk of this kind are:

- Time and effort of a clerk are not respected − an applicant has to enter a lot of data manually (system does not cooperate with other data systems; no sufficient number of scrolled lists of required items are available, etc.).
- Some maintained data are incorrect and can cause a lot of troubles for direct and indirect users (there are insufficient data verification actions).
- The applicant must rewrite an entire application again in the case of wrong data.
- Average time to serve a client is too long (for example, too many data are required).
- Data transmission from the server is too time-consuming in real circumstances (maybe the decision to locate and maintain one remote central server was wrong).
- System navigation is incomprehensible for direct users (it‘s been designed from the developer‘s point of view).
- Clerks have no influence on system solutions including defined rules of conduct and procedures; they complain the lack of independent work and decisions, and no opportunity to show their initiatives and creativity.
- Work with the system is tiresome or simply boring; as a result, competent clerks don‘t like their job and start looking for the more exciting one.
- High level of bureaucratization at work place is discouraging for employees and for office applicants.
- Intelligent employees who do not agree to do the job below their expectations are replaced by less competent workers who are expected to be a supplement to the developed system; this way the risk to ignore the rules of conduct, to confuse data (names, addresses, symptoms, etc.), to make a lot of mistakes, and to dismiss indirect users is growing.
- Maintained data are available to some irresponsible people including inexperienced fresh clerks, technicians, trainees, etc.
- The implemented procedures may violate someone‘s privacy.
- Indirect users are forced to fulfil a lot of documents.
- Indirect users are not respected − they have to visit the organisation several times to have their affairs fixed.

- Computer systems are applied in a back office and also replace clerks in a front office in the high degree; indirect user interacts with a heartless automaton instead of a clerk and sometimes acts for nothing trying to fix his/her business/official affairs.
- Software system does not consider all required real life cases.
- Some categories of potential applicants are not considered (like elderly people or inhabitants of rural areas).
- No gender free language is applied in system messages operating mostly male forms of nouns and adjectives (it is evident especially in Slavonic languages).

The risk of staffing fluctuation in public administration operating large software systems is high. According to the official report of the Polish Ministry of Economy the annual rate of staffing fluctuation in the county labour offices in 2005 was 65% (ca 10 thousand from among 16 818 employees left their jobs). Even worse rates are observed in the area of social aids. Although the informatisation is not the only reason of this phenomenon, the unsatisfied job causes staffing fluctuation resulting in all its negative effects.

Software product assessment by its users can be one more (although indirect) source of risk identification. Software users can indicate weak points of the assessed software version and to formulate software improvements from their point of view. Then the indicated weak points are included into common risk factors, then are analysed and managed.

The risks listed above help software developers to be early informed what kind of threats and inconveniences may result from the developed software system for direct and indirect users. Risk identification makes possible to avoid wasted efforts. All categories of risk require to be considered in risk management process.

5. Prototype solution of risk management

The prototype risk management system has been developed to experiment with an extended set of various risk sources. Its implementation was the subject of the Master Thesis described by Mr. Artur Tomaszewski (the author was his mentor). The essential data entities maintained in the database of this system are its *Users* and the identified *Risks* as shown in Figure 1. It‘s been assumed a priori that provided facilities of the prototype system are addressed and available to two kinds of users: internal users (administrator of the risk management system, team leader, software designers and programmers) and external users called *guests* who will become direct users of the software product under development. Both categories are allowed to introduce risks which are important from their point of view.

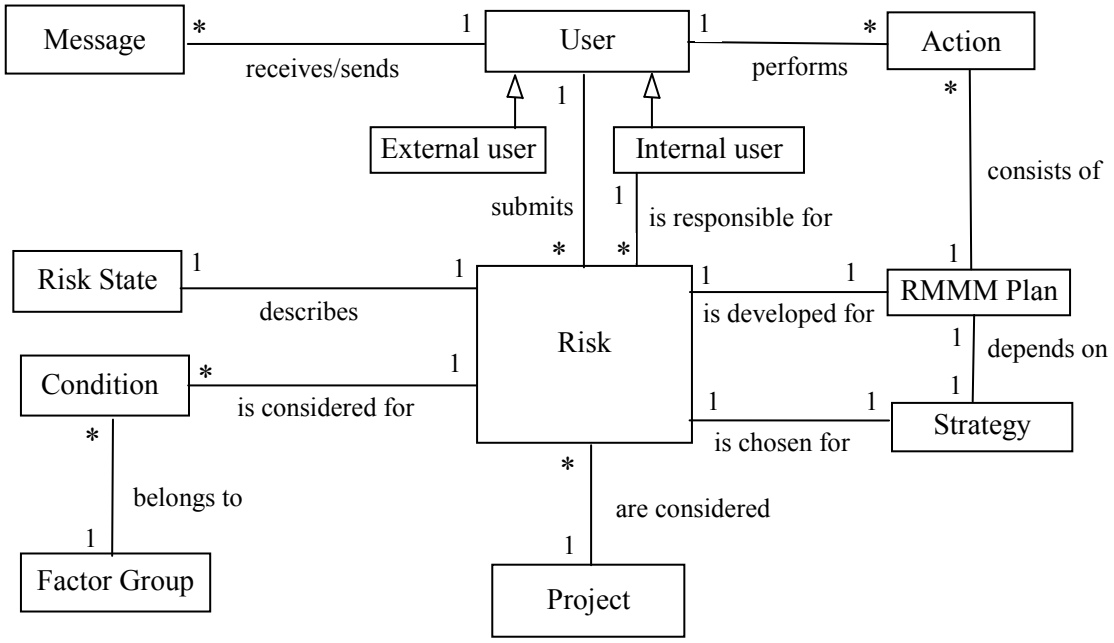

Figure 1. Data entities and their relationships in the risk management prototype system

The category of guests has been introduced among the system users to extend the range of risk management. They are allowed to introduce the particular risks and their attributes from their point of view. This way the routinely developed list of risk sources may be extended. Not all categories of risk sources are available to the guests.

Representation of a particular risk consists of a set of describing it attributes. At first, its *identifier* and *category* (group) are specified. Each identified risk is associated with a given *project* in the maintained database. The *user* who identified the considered risk (a person reporting it) is recorded also as a risk attribute. Then the *context* and *condition* of risk materialization and its possible *consequences* are described. Risk *priority* is based on these data. Then the *probability* of occurrence (in percentage terms), general *impact* on a project (sise of the loss), estimated impact on project schedule (referred to planned deadline) and quality are specified. Risk *exposure* is calculated first as the mathematical product of risk probability and its impact; then it is expressed using the five-point scale: from the Very Low up to Very High.

The *strategy* to eliminate the specified risk is chosen after analysis of risk attributes. It may be confidential. In particular, it may mean that risk is less important and no actions are to be planned and undertaken or on the opposite, the risk is declared as essential or even *critical* in the project. The value of the risk attribute *Range* can express a level of the required confidentiality (Public, Restricted Read, or Confidential). Risks with a range assigned as Public or Restricted Read are available to external users.

The strategy chosen for the essential risk is associated with its Mitigation Plan. This Plan is developed starting with its aim and contains a list of recommended actions for each specified risk. An action has its own identifier, identifier of the associated risk, its description, the assigned person responsible for it (action performer), the time to undertake that action, the finish time, required resources, current state, conclusions, and comments.

When the strategy has been already defined several other data are maintained for each identified risk to manage risk successfully, like: the current *State* of the risk (Identified, Analyzed, Planned, Processed, and Closed, for example), several dates concerning time of performance (from the date of risk identification, through the plan development, the starting date of first undertaken action, to the final one), along with the assigned *user responsible* for the considered risk. Thus the required resources to manage each risk are specified including involved employees and time of their involvement.

Functions implemented in the prototype system can be divided into four groups of facilities which are provided to:

- Describe each identified risk to introduce it into the system and to value its attributes
- Compose mitigation plans of actions
- Track states of the described risks
- Inform users about the identified risks and their attributes including risk current state, chosen strategy, and undertaken actions
- Generate designed reports concerning risk management.

The functions of communication between users play the key role. Messages sent and received by system users allow exchanging all information concerning occurring problems: identified risks, estimated loss, risk mitigation plans (as lists of actions), current states of their performance, and so on. Users have an access to the current state of each risk and it is the basis of the risk tracking facility. Most of information maintained in the risk management system is open to its public − internal and external users who may browse the required data and send messages to each other. Only the facility of report generation is available only for internal users who are responsible for particular risk and actions. The team leader may, in turn, assess this way the assigned duties of his/her staff (team members).

There are designed reports to generate a list of identified risks and their attributes, details of a particular risk, an entire history of each identified risk, planned actions (Mitigation Plan Report), involvement of particular user‘s in risk management, estimated losses, planned deadlines, reschedules, risk management statistics, etc. Besides these reports, users can define their own reports if necessary. Each report contains: its identifier and possibly version, date of generation, its title (type), addressee (a user who requires it and/or should read it), identifier of the related project, report state (for example: draft, finished, checked, accepted, rejected, corrected).

A list of several dozen possible risk factors that condition the risk materialization in a software project has been a priori established to make risk identification easy. They have been grouped into several factor groups. New kinds of risk and its conditions have been added to the initially prepared list. Risks dealing with users who may make troubles in suitable cooperation are included, too. The system itself generates some messages in the case of special events like specified deadlines for the particular actions. The prototype system was applied during the development of the software system *Election* designed to support the elections on the faculty of Electrical Engineering in Poznan University of Technology.

The maintained history of risk mitigation and generated reports make possible to learn the most frequently identified risks, the way of their mitigation, kinds of user‘s involvement, and required reports. This constitutes, in turn, the basis to make various valuable analyses and to reorganise the software developer‘s organization to eliminate or at least mitigate specified kinds of risk in the future.

6. Conclusions

Focus on user satisfaction with a software product and recommended cooperation of software developers with users involve the described extensions of risk management in a given software project. First of all the range of considered risks is extended to cover those introduced from the software user‘s point of view concerning product quality. Also risks related to user involvement in the software process are concerned.

Risk management requires specified infrastructure to be effective. The other kind of risk management extension concerns rights to introduce risks and their factors into the system supporting the risk management. In the presented solution particular risks and their impact on a given project are identified by both software developers and users. To make it possible the additional category of users, namely *guests* who represent the external users, has been introduced in the described prototype risk management system. Then all identified kinds of risk are considered in software development. The test data concerning risks were based on data collected in the real life case. The next step in further development of the described prototype system is to enable users to track actions placed in the mitigation plan and to learn this way also the state of any particular risk.

The introduced and then analyzed risks indirectly help to improve the quality of the particular software product. The consciousness of possible risks, introduced by software developers and users, and effective risk management can help avoiding many risks, considering their various kinds, and mitigating their some instantiations. The gathered history of identified risks, their consequences and undertaken activities in the context of particular risk materialization make possible to learn software users‘ point of view and to adapt the software process to meet user expectations including social and ethical aspects.

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CONRAD, KANT AND COMPUTERS: LOOKING TO THE PAST FOR THE FUTURE OF PROFESSIONAL DUTY

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Abstract

An idea of professional duty is examined and elaborated by drawing upon Joseph Conrad‘s seafaring fictions. Questions of probity, integrity, and the conscientious performance of duty under difficult circumstances resonate throughout these stories. A comparison is made against Kant‘s conception of duty. Whilst there are obvious differences between the professionalism demanded by seafaring and that required of professionals in IT, the meaning of duty is interesting and worth exploring. We argue that these stories can provide a stimulating and entertaining resource for developing concepts of professionalism that might be relevant to IT practitioners today and in the future.

1. Introduction

An earlier discussion of the issue of trust in the context of the development, operation and maintenance of IT systems argued that, although accountability mechanisms (such as quality management systems) can help to a degree, a paradox of such ‗technical‘ strategies is that without strong guiding ethical values these measures alone cannot guarantee the successful employment of information systems (Shibl *et al*, 2008). It concluded that we would really like a guarantee that ‗wise, experienced, knowledgeable professionals will conscientiously perform their duties‘ (*ibid*: 61). Raising the issue of duty in relation to IT professionalism is of interest, and seems worth exploring further. It is a concept little discussed in the professional codes of the IT industry.

An idea of professional duty is examined and elaborated using seafaring fictions by Joseph Conrad, especially *The Shadow-Line,* written in 1915. The use of fiction as a source for research poses some interesting questions about the ‗evidence status‘ of such material. However, sufficient support is available from the literature to provide reassurance that this strategy can be valid, provided that it is carefully used (Banks & Banks, 1998). For example Strom (2007) demonstrates the use of fictive scenarios in industrial software development, and Bolton (1994: 56) argues the general case that fiction can be used to drive the exploration of complex or ambiguous issues, even though ‗A fictional text does not present a complete picture any more than it offers a set of facts‘. Of particular relevance is the use of fictional material to explore professional development (Bolton, 1994; 2000). Here fiction can be employed to shed light upon important matters in the realm of less accessible – subjective – issues, such as personal identity.

Whilst important criticism has been levelled at some of Conrad‘s work (Achebe, 2001), the seafaring fictions provide a vivid and compelling account of the dedication that those working in the field of IT might recognise as part of ‗professionalism‘. Most IT projects or the operation of computer systems do not contain the life-or-death, high drama of these seafaring tales, but the great significance of computer systems to society make the question of the professionalism of IT practitioners an important one. When examining the concept of maritime duty some features and trends can be discerned and some lessons drawn out. The seafarer‘s duties from the age of sailing ships – to the crew, to the owner, to the vision of their vocation – might enliven and enrich the conception of professional duty today. Especially relevant is the issue of professional identity, which is often at the heart of these stories. Conrad‘s protagonists often function on the subjective terrain of professional identity in a fashion that can be related to Wenger‘s ‗communities of practice‘. Of relevance to the community of the ship and the roles of the crew, Wenger remarks that identity:

> is defined socially not merely because it is reified in a social discourse of the self and of social categories, but also because it is produced as a lived experience of participation in specific communities. What narratives, categories, roles and positions come to mean as an experience of participation is something that must be worked out in practice. (Wenger, 1999: 151)

Conrad‘s protagonists are indeed ‗working out‘ the meaning of their ‗identities‘ through their ‗narratives‘. Professional duty and professional identity are closely bound together here. The capacity for personal self-regulation often appears in these stories via identification with an ideal professional model, not simply through an unthinking respect for the law, and certainly not through reward. In this respect there is an echo of Kant‘s conception of duty and the need to think, and voluntarily follow the categorical imperative in any given moral situation (Kant, 1970). The Kantian perspective is of interest in relation to information systems (Horner, 1998) and will be summarised during these discussions.

Questions of probity, integrity, and the conscientious performance of duty under difficult circumstances resonate throughout these stories, which have been read and studied for around one hundred years. Although fictional, their meaningfulness for millions of readers is hard to dispute. If only at the subconscious level the nature of ‗doing one‘s duty‘ contained in these tales must have contributed to shaping cultural attitudes. We go on to highlight some current day implications. We believe that these stories can provide a stimulating and entertaining resource for developing concepts of professionalism that could be relevant to IT practitioners today and in the future.

2. Why Seafaring Fiction?

Gotterbarn (1997) traces the general development of professions using the paradigmatic status of some of the older established professions such as that of priest, physician and lawyer. He notes that the codes promoted by the professional bodies of the IT industry have essentially three levels of prescription – codes of ethics, codes of conduct, and codes of practice – and that not only are these often intermingled within any given set of guidelines, as Horner (1998) agrees, but that their emphasis shifts as professions mature. Professions associated with IT are much more recent than these older, more mature professions. Gotterbarn judges that in 1997 in the USA computing was roughly eighty years behind engineering in its development, and argues that neither the traditional ‗paternalistic‘ nor the ‗agency‘ models of professionalism are entirely suitable for professions such as software engineering. The current BCS and ACM/IEEE-CS codes barely mention ‗duty‘, yet duty is an interesting concept that may be worth exploring for the light that it could shed upon the development of professionalism. Older ideas might still have some relevance; Prior (2005), for instance, has considered the question of a Hippocratic Oath for IT practitioners.

Marine navigation has ancient origins. Like the paradigmatic professions it has grown into a mature, recognised, respected profession with its own codes, traditions, specialised knowledge and practices. Like the older professions its more senior practitioners such as radio operators, first officers (‗mates‘) and most especially captains (‗masters‘) are regulated by being licensed.

Criminal law addresses the conduct of sea travel. For instance, various marine navigation laws (‗orders‘) stipulate severe penalties for recklessly or negligently endangering a vessel, its crew or passengers. But Gotterbarn notes that professional codes go beyond law, and indeed that in the traditional paternalistic model of professionalism, ‗professionals set higher standards for themselves than society requires of its citizens‘ (*ibid*.: 21). The scandalised opprobrium by which the stereotype of the drunken physician – or the drunken sea captain – is commonly met is testament to this. It is interesting to ponder whether a drunken IT systems developer would – or should – be regarded in the same light. This goes beyond the issue of an employee being effective when we consider the importance to social and economic activity that computing often has, and the potential risk to society that IT can carry.

3. Joseph Conrad‘s Seafaring Tales

Conrad‘s conception of duty stems in part from his essentialist conception of ‗human nature‘. In a state of nature, ‗…the life of man (is) solitary, poor, nasty, brutish and short.‘ (Hobbes, 1985: 186). This view is visible also in Conrad, and thus only civilisation keeps humanity from chaos and bestiality. Duty becomes a critical guiding factor when circumstances (and other people) conspire to threaten chaos. It is not necessary to share these views in order to appreciate Conrad‘s version of ‗duty‘.

A key idea is that of the ship itself. At first perceived as a thing of beauty – especially in the case of a sailing ship – the ship in Conrad‘s fiction constitutes a moral core, a central moral compass. The ship appears as the quintessence of moral decision. The ship and the people on it become their own society

or community – the ship in effect becomes the world, at least whilst it is at sea, ‗an object of responsibility and devotion' (Conrad, 1985: 40). Directly operating a ship, ensuring the safe passage not only of ship but of its crew and cargo, and fulfilling obligations to external parties such as the ship owners and cargo owners, is a unique primary claim besides which all other considerations must give way. This primary claim is furthermore emotively and aesthetically mobilised in the special case of a sailing ship. Hawthorn remarks ‗As Conrad made clear on repeated occasions, the sailing ship acted as a moral educator of its crew; it demanded hard work and provided a direct contact with the elements rather than labour-saving devices' (1985: xx). Hawthorn points out that the narrator of *The Shadow-Line* in quixotically resigning his previous post ‗cannot give his late ship blind loyalty because it is a steamship' (*ibid*.).

Four significant aspects relating to duty emerge from these stories. Firstly, the phenomenon of professional commitment under pressure; secondly and conversely the phenomenon of dereliction of duty; thirdly the individual professional as part of a professional dynasty; finally the role of the commander of a ship and its crew as bearing an especially heavy responsibility and concomitant levels of duty.

Arguably the most developed exemplar of duty appears in the Conrad's short novel *The Shadow-Line*. Written in 1915, the title refers to the transition from youth to a more mature and responsible adulthood. As the narrator, a young but competent first officer muses: ‗It seems to me that all my life before that momentous day is infinitely remote, a fading memory of light-hearted youth, something on the other side of a shadow' (Conrad, 1985: 106). Although semi-autobiographical, drawing on events during 1887-88, in part this is Conrad's indirect response to the First World War, and poignantly the novel is dedicated to his enlisted son Borys ‗and all others who like himself have crossed in early youth the shadow-line of their generation' (*ibid*: 1). The ‗shadow-line' refers to a point in one's life beyond which, as a wise older sea captain tells the young narrator ‗a man should stand up to his bad luck, to his mistakes, to his conscience, and all that sort of thing' (*ibid*.: 131-2). This sounds analogous to a professional taking responsibility for his or her work, including its mistakes and limitations.

The self-confident young narrator of *The Shadow-Line* has, on a whim, resigned as first officer from a ship docked at Singapore. His good reputation gains him his first command as he assumes temporary captaincy of a sailing ship that has diverted to Bangkok after its previous captain has died and been buried at sea. Under the unnamed narrator's command, the ship is becalmed for eighteen days during the attempt to return the ship to Singapore. The crew, apart from himself and one other seaman, succumb to fever. It transpires that the ship's apparently full supply of quinine has in fact been sold for money by the philandering former captain. The narrator blames himself for the helpless predicament of the ship and its moribund crew. Despite his sense of guilt *(ibid*.: 121), his self-doubt, his ‗remorse' and feeling of his ‗unworthiness' (*ibid.*: 117) the narrator rallies the near-dead crew to save the ship as a storm ends the paralysis. With this – literally – skeleton crew, the ship is returned to Singapore to the amazement of the medical and nautical authorities. The narrator has crossed his own ‗shadow-line'.

The story offers several cameos of the meaning of duty. Most striking of all is that of a seaman named Ransome, who is the only other crew member apart from the captain-narrator not stricken by fever. Normally assigned to light duties owing to a cardiac weakness, Ransome unsparingly exerts all his physical strength to help rig the ship to survive the phantasmagorical storm. Furthermore he maintains a steady attitude and helps to support the morale of the sick crew and the self-doubting captain. But crucially he reminds the demoralised narrator as the storm crisis threatens that the captain's duty is to be on deck so that he might reassure and direct the crew – though ‗as weak as a kitten' to a man they may be (*ibid.*: 111) – in order that the ship be saved.

Another example of fidelity is furnished by the first officer, Mr Burns. At first rivalrous with and envious of the ship's new master – a role that he had himself coveted – at the critical moment of the storm, Burns summons up a bizarre defiance despite his fever-ridden condition, a defiance directed at the supposed malign influence of the treacherous former master, who now lies buried at sea, directly in the ship's path. It emerges that Burns had faced down the ‗downright wicked' former captain in order to save the ship and its crew (*ibid*.: 118-119). Several further examples of duty being performed in the face of great adversity are presented by those members of the crew able to rouse themselves, if only for a few minutes, in order to perform critical tasks under the guidance and encouragement of the captain, despite their sickness. The captain's reaction to this is to wonder ‗whether it was the temper of

their souls or the sympathy of their imagination that made them so wonderful, so worthy of my undying regard‘ (Conrad, 1985: 100).

These instances of **professional commitment under pressure** represent a key aspect of duty as rendered in these stories. The following remark from the narrator concerning Ransome‘s efforts makes explicit the link between duty as professional identity and duty as devotion to an ideal of work:

> I avoided turning my eyes his way for fear of seeing him fall down and expire in the act of putting out his strength – for what? Indeed for some distinct ideal. The consummate seaman in him was aroused. He needed no directions. He knew what to do. Every effort, every movement was an act of consistent heroism. It was not for me to look at a man thus inspired.
>
> (Conrad, 1985: 126)

Doing one‘s duty in Conrad‘s fiction requires that all obstacles – even a mortally dangerous one as in this scene – must be confronted. Death would, it seems, be better than the ignominy of failing in one‘s duty, or ‗shirking‘, as The Shadow-Line‘s narrator puts it.

> What appals me most of all is that I shrink from going on deck to face (the storm). It‘s due to the ship, it‘s due to the men who are there on deck – some of them ready to put out the last remnant of their strength at a word from me. And I am shrinking from it ... Now I understand that strange sense of insecurity in my past. I always suspected that I might be no good. And here is proof positive, I am shirking it, I am no good. (Conrad, 1985: 107)

On the other hand, in an idea related to that of the ship providing its own moral being and purpose, work – doing one‘s duty, with its associated sense of identity – possesses a redemptive aspect. As Conrad‘s protagonist in *The Shadow-Line* puts it:

> I discovered how much of a seaman I was, in heart, in mind, and, as it were, physically – a man exclusively of sea and ships; the sea the only world that counted, and the ships the test of manliness, of temperament, of courage and fidelity – and of love. (Conrad, 1985: 40)

The same character goes on to explain his chosen vocation:

> I had a general sense of my preparedness which only a man pursuing a calling he loves can know. That feeling seemed to me the most natural thing in the world. As natural as breathing. I imagined I could not have lived without it. (Conrad, 1985: 83)

The training and tradition of duty become powerful saviours in the depth of the narrator-captain‘s despair at the ship‘s deadly plight: ‗The seaman‘s instinct alone survived whole in my moral dissolution‘ (Conrad, 1985: 109). When Ransome tells the narrator that he, as the captain, ought to be on deck, Hawthorn records that ‗It is Ransome‘s catalytic initiative here, along with the accumulated instinct of years as a seaman, that saves the captain (1985: xiii).

Note here how the work itself has become not just an apt and enjoyable activity, or even part of personal identity: it has gained a moral character. The sea itself and its associated work are held in the Shadow-Line as intrinsically valuable and redemptive. The sea is ‗pure, safe, and friendly … where all our troubles of every sort would be over at last‘ (Conrad, 1985: 70-71).

An associated sub-theme is of action – work – versus fate. The young captain is told by an older (and wiser) captain at the end of *The Shadow-Line* that work is the main thing in the life of the professional mariner: ‗Precious little rest in life for anybody. Better not think of it‘ (Conrad, 1985: 132).

Kant‘s (1970) view is that we have duties towards others, and that we cannot consider other people merely as means, but must always consider them to be ends in themselves for any action to be ethical. Neither could we will such a maxim as a universal law of Nature which would allow us to not work to our best ability under pressure, as that would imply that we would accept it also when another is in the same position and we the suffering party. (Kant, Imperfect duty to self).

Dereliction of duty is viewed as something that goes beyond mere neglect of professional ethics into complete moral degeneration. It is regarded with horror. Those mariners who are merely incompetent or lazy are regarded with scorn by ‗worthier‘ characters. Those, such as the former captain who betrayed the ship and its crew are described by Mr. Burns with words such as ‗wicked‘ and ‗evil‘. In this respect the narrator remarks: ‗I was profoundly shocked by my immediate

predecessor … a complete act of treason, a betrayal of the tradition which seemed to me as imperative as any guide on earth could be.‘ (Conrad, 1985: 62).

This is self-evidently problematical according to Kant (1970). Both duties to rational beings (humans) in general would be neglected but especially this could not be willed to be a universal law of Nature, as again, dereliction of duty would then have to be accepted when we are the suffering party as well. (Kant, Imperfect duty to self; imperfect duty to others).

The **dynastic nature of the profession** is seen as comforting, a tradition that justifies itself and provides a source of example and lore. If doing one‘s duty may become a critical test, then in difficult circumstances a key strength in Conrad‘s conception of professional duty is provided by professional identity, the idea that an individual professional – in their very identity – becomes part of a continuous ‗dynasty‘, formed by experience, training, tradition, and a self-conscious acceptance of duty.

In a remarkable scene in *The Shadow-Line*, as the narrator sits for the first time in the captain‘s chair in the cabin of his new command, he regards himself in a mirror accompanied by an almost hallucinatory vision: ‗a succession of men had sat in that chair. I became aware of that thought suddenly, vividly, as though each had left a little of himself between the four walls … a sort of composite soul, the soul of command‘ (Conrad, 1985: 53). The narrator continues:

> I stared back at myself with … some sympathy for this latest representative of … a dynasty; continuous, not in blood, indeed, but in its experience, in its training, in its conception of duty, and in the blessed simplicity of its traditional point of view on life … He had his place in a line of men whom he did not know, of whom he had never heard; but who were fashioned by the same influences, whose souls in relation to their humble life‘s work had no secrets for him. (Conrad, 1985: 53)

The emphasis in this vision is on a shared understanding and valuation of the work, and the simplicity of performing one‘s duty.

In Kant‘s view this is a more problematic question. Kant presumes *a priori* that we can know all the necessary Categorical Imperatives. The dynastic tradition can help in forming and understanding them, as in carrying the tradition from one generation to another, but is in itself not a necessary premise, although it can be a sufficient one.

Command in Conrad‘s fiction is portrayed as the most responsible of all roles. Fictively it provides a dramatic focus for the individual protagonist and their decision-making, but ultimately it is cast as a high form – perhaps the highest – of duty. Command of a ship is:

> The reward of faithful service. Well, faithful service was all right. One would naturally give that for one‘s own sake, for the sake of the ship, for the love of the life of one‘s choice; not for the sake of the reward … There is something distasteful in the notion of a reward. (Conrad, 1985: 36)

Hawthorn (1985: x) notes the ‗fascinating tension between isolation and collectivity‘ in respect of the captain and the crew. Conrad has the former musing: ‗In that community I stood, like a king in his own country, in a class all by myself. I mean an hereditary king, not a mere elected head of a state‘ (Conrad, 1985: 62).

In Kant‘s (1970) ethics the commander shares the same duty to follow the Categorical Imperatives (universal law, never merely as a means, voluntariness) as anyone does. The happenstance that he has power over others makes this no less so. By contrast, in Conrad‘s fiction the burden on the commander to diligently follow his or her duty appears all the greater. This burden is embraced by Conrad‘s characters with a self-consciousness of their role and their corresponding personal identity, and a self-awareness of their decisions and actions in the scheme of things. The narrator of *The Shadow-Line* speaks of being oppressed ‗by my lonely responsibilities‘ (Conrad, 1985: 75) and is aware of his commitment ‗to the endless vigilance of my lonely task‘ (*ibid*.: 76).

4. Discussion: Duty and the IT Industry

What relation might the picture of duty painted by Conrad have to the present day IT industry? One obvious adjustment to take into account is the predominantly male world of seafaring at the time about which Conrad was writing, as Hawthorn discusses (1985: xx). Conrad‘s narrator remarks, in response to his first officer‘s suggestion that he too might one day have a family:

> As to the wife-and-child (some day) argument it had no force. It sounded merely bizarre … I could imagine no claim that would be stronger and more absorbing than the claim of that ship, of these men snared in the river by silly commercial complications, as if in some poisonous trap.
>
> (Conrad, 1985: 70)

Although there may be unfortunate elements of gender bias in the IT industry (Bednar & Bissett, 2001), there should be no stark conflict between modern employment practices and doing one's professional duty in the way that Conrad's tyro sea-captain expresses it in the quotation above.

Another obvious transposition to make is that between ship's commander and IT project manager or IT system operations manager. Here the parallels might seem stronger, as a manager or team leader ultimately takes a greater level of responsibility for the work done (or not done) by the people that they manage, and must co-ordinate, guide, reassure and inspire those staff. However, enlightened team organisation approaches nowadays such as using reviews and collaborative strategies are suggestive, if not of democracy, then certainly not of the ‗hereditary king' described earlier.

With regard to the dynastic tradition in a profession: this may represent a difference between Conrad's vision and the modern IT industry, wherein a mobile, fast-changing aspect is evident. The relative lack of tradition in the IT industry may limit the formation of a professional identity, or at least give it a particular character. Furthermore, in Sennett's view employment in the larger ‗high-tech' organisations is increasingly contingent, and commitment on both sides of the employment contract has become shallower. In such circumstances of shareholder-driven short business cycles and frequent re-structuring, many employees feel an anxious insecurity: ‗in fluid structures, sensitivity replaces duty' (Sennett, 2006: 51). Loyalty, or to use Conrad's word ‗fidelity', can suffer: ‗Cutting-edge institutions ... elicit extremely low levels of loyalty' (*ibid*.: 64).

On the other hand, a powerful correspondence between Conrad's idea of duty and the modern IT industry is suggested by the work of Dan Couger (see e.g. Couger & Ishikawa, 1995). In a series of studies across different continents Couger has consistently found that ‗the work itself' is the key motivating factor amongst IT professionals, ahead of remuneration, holidays and so forth. IT professionals appear to value the work itself in much the same way as the narrator of *The Shadow-Line* values his, and its embodiment in the beauty of a sailing ship. The fact that the work may be difficult may well be part of the reason for its being valued so.

Regarding personal identity, the professional in any field might well find that a key part of their identity is provided by their vocation, as with Conrad's protagonists. One of the present authors recalls a keynote speech given by Fred Brooks at a conference – *Professional Awareness in Software Engineering* – organised by the University of Westminster in London in 1996. Brooks urged that those who chose professions such as software engineering should do so as something that they really want to pursue. Doing it for the money was not a good enough reason, in Brook's view. This strongly echoes the idea from Conrad presented above that the work – especially responsible work – is its own motivation and its own reward.

5. Conclusions

Our exploration of the character of duty, based on Conrad's fiction can be summarised as:

- Commitment, competence – these are the first prerequisites;
- Community, continuity – these help and guide in the performance of duty;
- An apt vocation should be chosen, and embraced as part of one's personal identity;
- Performing the work, taking action, carrying out one's duty – these take on a moral force;
- Self-awareness and responsibility for one's actions help to complete the picture.

Some of these aspects should sit well with IT professionalism. This conception of duty differs in some ways from Kant's formulation, although there also are clear similarities, especially in the requirement to perform one's duty, even (and especially) if the duty is demanding.

How far ‗duty' will become part of the IT professional's lexicon remains to be seen, especially given the IT industry's relative newness, lack of tradition, and pressures towards fluidity of business structure and rapidity of change. However duty is an interesting concept that might provide a helpful ingredient in the debate concerning what it means to be an IT professional.

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AN EXPLORATION OF THE LOSS OF CONTEXT ON QUESTIONS OF ETHICS AROUND PRIVACY AND ITS CONSEQUENCES

William Bonner

Abstract

In this paper I argue that, with respect to issues of privacy, we are immersed in a cycle of reductionism whereby a repeated focus on very narrow contexts and an excessive focus on minimizing the impact of rules derived from fair information principles (FIP) displaces questions of ethics surrounding issues of privacy, and I argue, reflects poorly on decision makers. Decision makers focused on interpreting and adhering to rules based on FIP, without reflecting on the contents of FIP and the context of their development, lose sight of the fact that they still have choices.

1. Introduction

In this paper I focus on observations emerging from ongoing research into the relationship between privacy and uses made of emerging information and communication technologies (ICT), over time. Specifically, each time questions of privacy and ethics emerge around uses made of new ICTs they tend to arise after the fact; in reaction to something that has already taken place. This reaction and the subsequent focus of attention tends to be on the narrow and specific context in which the questions arise and through this focus a very limited conception of privacy is considered.

My ongoing research programme investigates the argument that cycles of reactions to uses made of new ICTs compounds this further, bringing forward an already limited conception of privacy and further narrowing it as actors jockey for position on the actual substance of rules created for the new context in which issues of privacy arise. This, and the subsequence focus on rule interpretation, has two consequences. First, experts around those rules emerge, those that speak for the rules, and as their voices increase the rules become the focus; questions of privacy broadly and ethics specifically are displaced (Bonner, 2007). Second and related, the rules originally set out as minimal expectations for behaviour become the maximum target for decision makers interpreting the rules.

This paper focuses on two things of value that are potentially lost in the process. Firstly, the focus on rules and their interpretation relegates the concept of privacy and questions of ethics surrounding it to the sidelines. The concept of privacy is stripped of its potential, with a narrow focus on the context in which the question arises and the interpretation of rules deemed to address questions of privacy. Secondly, by shifting our focus to specific contexts and limiting our attention to the interpretation of rules, we as organizational decision makers risk stripping ourselves of the realization that we still have choices; that rules dictate minimum obligations and that is all. The rest is discretionary. Taken together, damage is done to the concept of privacy and the role it plays in society as well as perceptions of, if not the actual integrity of, decision makers.

In this paper I focus on fair information principles (FIP) as an example of this observation, articulating and discussing two examples where the focus of attention shifted away from broader questions of privacy and ethics around it towards a focus on rules and rule interpretation. My observations are based on research carried out using Actor-Network Theory (ANT) (Bonner and Chiasson, 2005; Bonner, 2006; Bonner, 2007; Bonner, Chiasson and Gopal 2009). ANT will not play a role here in making my arguments but three basic ANT concepts are used and I will briefly articulate them before proceeding to a short discussion on privacy‘s potential. This will be followed by two examples demonstrating the issue of concern, a discussion, followed by concluding comments.

2. Actor-Network Theory

ANT is a constructivist perspective interested in discovering answers to the ―How?‖ question. If it could have been otherwise and is not, then actions must have been taken that to make it that way (Latour, 1987). If we get to the point where the how and why questions are no longer being asked we

have a black box; the taken for granted and unquestioned. The process and details through which the taken for granted has come to be are enclosed within the black box. My argument is that FIP have become a black box and this has consequences.

ANT's philosophical underpinnings challenge the insertion of divides in time for the damage they do to our understanding. Latour and Serres (Serres, 1995) use the example of a volcano. If we focus on the eruption we lose sight of the continuing pressure of lava under the surface and its likely re-emergence in the future. If we are in a search and rescue effort then none of that matters; our focus is on the consequences of the quake. But if we want to understand an event in time we must recognise it as manifestation of forces at play that existed before the event and may continue beyond the event itself. Inserting divides in time obscures this continuity of tensions and I argue that FIP is the product of such an inserted divide.

Finally, ANT asserts that nothing exists by itself; everything exists in relationships (Latour, 1993). In particular for this paper I want it to be very clear that in talking about tensions around uses made of ICTs I am not referring to technological imperatives; ICTs by themselves do not „cause" anything. Issues emerge only *their use*.

3. Observations

3.1 Privacy: What is it?

I cannot definitively define privacy. Greater minds than mine have tried, but it is clearly not a modern concept. As an historian and privacy scholar observes

> *"To the contemporary notion that we are the first people to want privacy and to be concerned about its preservation is misleading. From at least the fifteenth century the term privacy has been used in the English language to mean the ‚state of being withdrawn from the society of others, or from public interest'" (Flaherty, 1972, p. 10).*

This notion of the need to withdraw is articulated in the seminal article by Warren and Brandeis (1890), "The intensity and complexity of life, attendant upon advancing civilization, have rendered necessary some retreat from the world" (Warren and Brandeis 1890, p. 196). Along the same lines a critical theorist argues, "Can a society which is incapable of protecting individual privacy even within one's four walls rightfully claim that it respects the individual and that it is a free society?" (Marcuse, 1968, p. 245).

These broad definitions have to do with creating and preserving space. This could just be a matter of individual space but it is also a space in which we differentiate our relations with others. Our relationship with families, significant others, close friends, acquaintances and others are defined by differing degrees of space and intimacy accorded to the relationship. This differentiation of space takes the form of territorial space (Shapiro, 1998), bodily space (Finestone, 1997) and the degree we reveal and share personal thoughts and communications to others (Introna, 1997). Thus privacy as a concept has incredible potential and value however different individuals or societies enact the details.

These concepts of privacy as degrees of space and intimacy are not reflected in the definition of privacy that has guided privacy legislation developed over the last twenty or thirty years. That definition has focused on something called informational privacy and is reflected in Westin's oft-cited definition, "The claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others" (Westin 1967, p. 7). Even this limited definition, suggesting a degree of self-determination, is richer than that which has evolved in the modern conception of privacy as reflected in legislation and often invoked in the field of MIS. This will be discussed shortly.

It is this narrowing of the conception of privacy, through a focus on tensions that emerged around different perceptions of an emerging ICT (the modern computer), and the outcome of these tensions that I focus on in this paper. The next section highlights the evolution of fair information principles (FIP) as a technique to address the „privacy" problem that emerged in the context of tensions around the modern computer. I will then show, through a number of examples, where I believe that a focus on this technique has supplemented questions of privacy and ethics, where an appeal to FIP is deemed to address privacy issues regardless of the context in which the issues arise. This will be followed by a discussion of the implications and concluding comments.

3.2 The context of the creation of FIP

FIP have become the black box standard of privacy protection in Canada, Europe, Australia and New Zealand and parts of Asia. US researchers point to their own source for FIP, but as a prominent US MIS scholar notes, ―virtually all American and European privacy legislation is based on a regulatory regime called Fair Information Practices‘‘ (Laudon, 1996, p. 96).

FIP were developed at a time when tensions arose around actual and perceived potential uses of the modern computer in the 1960s and 1970s. Specifically, those who could afford and use these emerging ICTs saw great potential in these technologies to gather and process data. At the same time there were concerns about that same potential; the use of this emerging technology to create dossiers on citizens (Task Force on Privacy & Computers, 1972; Commission on Freedom of Information & Individual Privacy Vol. 3, 1980), particularly in Europe (Flaherty, 1989).

Those interested in employing these emerging technologies were concerned, especially in Europe, that individual countries might respond to citizen pressures and place limits on the use of these technologies. If this was done it would create a patchwork of legislation that might impede the flow of data across jurisdictions.

―Restrictions of those flows (data flows across borders) could cause serious disruption in important sectors of the economy, such as banking and insurance" (Organisation for Economic Co-Operation and Development, 1980, p. 5). Work through the 1970s resulted in the OECD publication entitled, Guidelines: On the Protection of Privacy and Transborder Flows of Personal Data (Organisation for Economic Co-Operation and Development, 1980). The focus of these guidelines was on the potential of the modern computer and the thing that computers process, data.

The OECD document contains within it a number of contradictions. First, while the title includes the word privacy, and the term is used throughout the text, it is never defined and does not appear in any the eight principles that are embedded in privacy legislation and hence rules derived from them. While arguably better than nothing at all, it is misleading to call them privacy principles as they focus exclusively on personal data. Second, even if we could ignore this issue, the document almost guarantees that these rules will never be exceeded.

> *"It is recommended to Member countries that they adhere to these principles with a view to*
> *a) achieving acceptance by Member countries of certain minimum standards of protection of privacy and individual liberties with regard to personal data;*
> *b) reducing differences between relevant domestic rules and practices of member countries to a minimum;*
> *c) ensuring that in protecting personal data they take into consideration the interests of other Member countries and the need to avoid undue interference with the flows of personal data between Member countries;*
> *d) eliminating, as far as possible, reasons which might induce Member countries to restrict transborder flows of personal data because of possible risks associated with such flows." (Organisation for Economic Co-Operation and Development, 1980, p. 22)*

While part a) declares the principles to be minimum standards to protect ―privacy and individual liberties", parts b), c) and d) advocate against creating national *rules* that exceed them in order not to restrict the transborder flow of *data*. In effect, the minimum is also the maximum.

It is important to understand the context of the development of FIP as derived from tensions around potential applications of the modern computer. With an exclusive focus on this context a divide was inserted between privacy and its potential, redefining the concept, creating a potential equivalency somehow between privacy broadly and data handling principles specifically. This is compounded by the fact that these principles only have meaning in practice, when decision makers enact them. My argument is that in decision making contexts the concept of privacy, already narrowly redefined in the prior context leading to the development of FIP, is redefined again in practice when the minimum is further minimised.

What follows are two observed examples where FIP, a black box devoid of the context of its own development, supplanted the ethical complexity of decision making in specific contexts through a focus on the narrow obligations imposed by rules derived from FIP.

The Calgary Board of Education

The Calgary Board of Education (CBE), the second largest K-12 school board in Canada, provided the personal information of K-12 students to a company in California in exchange for hosted email services and the potential to earn a share of advertising revenues earned by service provider. In seeking parental consent the CBE was extremely vague about details behind the request. An investigation and subsequent report by the Office of the Information and Privacy Commissioner (OIPC) of Alberta clearly chastised the CBE for this commercial arrangement as being inconsistent with the mission of the CBE. But the same report also concluded that if the public body (the CBE in this instance) deems the use and disclosure of personal information to outsiders as consistent with its mission (without the offending commercial aspects), the public body does not have to seek consent from anyone; the OIPC or in this case parents (Office of the Information and Privacy Commissioner of Alberta, 2002).

What is striking about this case is that in reacting to the order of the OIPC to cease and desist from any commercial activity using the personal information of students, the CBE spokesperson only talked about the rules.

> *„„CBE spokesman Dwayne Sheehan said that in 1998 the board passed the information along because it needed the advertising revenue to pay for the email accounts. Sheehan said the CBE didn't realise it was breaking the rules of Alberta's Freedom of Information Act (FOIP)'' (Reid, 2002).*

The only other public comment offered by the CBE also reveals this focus on rules. „Our interpretation of the FOIP guidelines was in its infancy, and obviously we've gotten a lot better at doing that now', Sheehan said" (Wood, 2002).

The focus was entirely on adherence to the rules based on FIP. In accordance with this limited focus the CBE has decided that, in interpreting the comments of the OIPC, consent or revealing any information its activities is unnecessary. Since it is not necessary it has become CBE policy not to reveal anything. Nothing in the rules prohibits the CBE from letting students and parents know what information CBE is releasing to outsiders, but nothing makes it necessary either. The minimum necessary has become the maximum done not because the messy ethical issues of this specific context have been addressed, but because the rules make it unnecessary to do so.

Human Resources Development Canada

Human Resources Development Canada (HRDC) is the largest department of the Canadian federal government, the product of the combination of a number of previously separate departments. A dispute arose between the federal privacy commissioner and HRDC over the department's creation of a super database on every Canadian. According to the Privacy Commissioner that database

> *"could contain as many as 2000 elements on an individual including education, marital/family status, language, citizenship and landed immigrant status, ethnic origin, mobility, disabilities, income tax data, employment histories, labour market activities, use of social assistance and Employment Insurance" (Privacy Commissioner of Canada, 1999-2000, pp. 64-71).*

Disagreement over the propriety of this database simmered out of the public eye as the Privacy Commissioner, an ombudsperson, tried to resolve the issue with the HRDC quietly for more than a year. His efforts were unsuccessful and eventually he went to the media with his concerns. The public reaction was strong and the HRDC decided to dismantle its database.

In the Privacy Commissioner's annual report the Privacy Commissioner pointed to a problem that highlights the concerns raised in this paper.

> *One does not have to be a privacy expert to see that this assertion (justification for the database) rests on a restrictive and literal interpretation of the fundamental rights that are at the heart of the Privacy Act. I do not find it satisfactory that the federal government's largest department defends the creation, maintenance and expansion of*

dossiers on vast numbers of Canadians by saying that it meets minimum legal provisions", the Commissioner observed. "Surely a higher duty than that is imposed."" (Privacy Commissioner of Canada, 1999-2000, pp. 64-71).

This defence offered by HRDC decision makers is an example of the concerns motivating this paper, that a focus on meeting the letter of the law, in this case privacy legislation based on FIP, was their only obligation. The Privacy Commissioner argues though that a higher duty is imposed. Apparently Canadians agreed, but it did not appear to be the focus of HRDC decision makers. In their justification they focused on the minimal interpretation of rules based on FIP, something that in an earlier time was already set to be the minimum.

4. Discussion

FIP have become a black box; privacy's representative unburdened by the context of their development. Apparently forgotten is the fact that FIP were never privacy principles. They were created to serve as data handling principles that once satisfied permit the movement of data (Bonner and Chiasson, 2005). They contain within them the inherent contradiction that they are minimum standards that must not be exceeded so as not to interfere with the free movement of data

Unfortunately the latter is the only aspect of the context of the development of FIP that appears to remain, not brought forward in time but subsequently re-created in practice in different contexts since then. In the HRDC example adherence to the requirements of legislation, based on FIP, was the defence raised for actions taken. Issues of the appropriateness of creating all inclusive dossiers on Canadians, including reaching into other departments to access sensitive tax return information, were not the focus. Similarly, when the CBE was forced to publically reveal what it had done, or more accurately when it was revealed for them by the OIPC, the CBE spokesperson framed the issue as one of attempting to understand the new rules and offered the assurance that the CBE was getting better at adhering to the rules. With that and the subsequent decision on the part the CBE to reveal nothing based on an interpretation of new rules, the minimum requirements have become the maximum the CBE is even considering. Broader questions around the ethics and respect for the integrity of students and parents have disappeared.

One might dismiss the generalisability of this argument outside of these specific circumstances on the basis of my only having presented two examples (n=2 argument) and that both of them involve government organizations. The second part of the argument relies on the assumption of a difference between the nature of decision-making in government bureaucratic type organizations and for private profit organizations. Yet my observations are that this difference is more imagined than real. Private sector organizations governed by the profit principle are just as likely to seek to minimise perceived obstacles to action. Whatever the reader decides on this subject I hasten to add that I am not trying to generalise at this moment, just observe and express concern about the possibility.

The employment of the black box of FIP is observable in streams of MIS research as well, through the assumption that FIP can be employed as privacy's representative (Smith, Milberg and Burke, 1996; Liu, Marchewka, Lu and Yu, 2005). In some respects the logic is compelling. At the centre of our field is an artefact that is employed to store, manipulate, transmit and make data available. FIP are data handling principles and the tie in is logical. But, without very serious and expressed qualifications, treating FIP as privacy's representative has the effect of inserting a divide that distinguishes and separates data privacy issues from broader privacy issues; as though they were distinct and separable. Within this same stream of research FIP are granted the status of an ethical standard (Culnan, 1993; Culnan and Armstrong, 1999). But that is something that FIP cannot be. They have no separate and independent existence; they only take shape and substance in their enactment in specific contexts. If they become the focus of decision makers in specific contexts and are interpreted as narrowly as I suggest they are in practice, then ethical considerations disappear.

I see this pattern of a narrow focus on context and the insertion of a further divide within MIS research with what I see as an emerging branch of —privacy" research that focuses exclusively on online activities, a different and somehow separable context again (Awad and Krishnan, 2006; Dinev and Hart, 2006; Malhotra, Kim and Agarwal, 2004). My concern here is reflected in a comment by Hinduja (2004),

"What is appropriate in business ethics offline should be seamlessly transferred to the online milieu, and persons should not need to reassess their perceptions of the practice of corporations simply because of the change of context" ,(Hinduja, 2004).

What makes this statement stand out is that it starts from the premise that privacy and ethics transcend context; that concepts should not automatically change because the specific context in which they are considered is different to some degree.

Employing FIP and then narrowly focussing on specific contexts strips the concept of privacy of its potential; defining it ahistorically and so narrowly that it turns the concept into a caricature. As such, questions of ethics have no place to appear. If we want to keep the questions of ethics visible and our options open we have to critique the narrow constitution of rules that have emerged, the narrow conception of privacy embedded in them, the ways in which they are operationalised and show how it could have been and still can be otherwise.

FIP in practice are rules and rules cannot be a substitute for ethics. Ethics is about making choices and considering alternative courses of action in specific contexts. This is where I fear that we as a society and as decision makers risk losing something extremely important. Firstly, as a society we are potentially losing rights to something that is critically important; the space necessary to retreat to and the space necessary to differentiate and form relationships. The risk is that if actions that might damage these rights and expectations are not prohibited by FIP, and the black box of FIP is all that is considered, then it becomes easier to take actions in specific contexts that over time cumulatively damage these rights and expectations.

Secondly, by limiting our focus to narrow contexts and applying rules without considering or even being aware of their limitations, we as organizational decisions makers risk losing sight of the fact that we still have choices; that rules dictate minimum obligations and that is all. I worry that management and decision makers have lost sight of questions of ethics and the keen awareness that they are part of and not separate from society. As members of society I, like the former Canadian Privacy Commissioner, believe that a higher duty is imposed then I am seeing in practice. Decision makers have a duty to generate alternatives, deliberate on their relative merits and make choices. Further, I believe that decision makers should demonstrate the courage of their convictions and reveal what was considered and substantiate the reasoning for the decisions made, exposing decisions and deliberations to the broad light of day. In the case of both the CBE and HRDC, the decisions and actions that took place did so behind closed doors.

It is somewhat of a perverse paradox that privacy in the sense of not revealing is a right assumed by organizational decision makers while knowingly or unknowingly permit others only a caricature of that same right. In making such critical decisions behind closed doors I feel we, as decision makers, risk losing something; our humanity, our critical thinking, and perhaps our willingness to challenge assumptions and, through that, our willingness and ability to explore other options.

5. Concluding Comments

Some may argue that FIP as it exists in Europe are different from FIP as it exists in Canada. I cannot say for sure. What I can say though is that Canadian legislation is based on FIP and indeed our latest privacy legislation, provincial and federal private sector legislation, was ‗approved' by the European Union as being similar enough to EU requirements to permit the flow of data to Canada. Perhaps they are operationalised differently, which would be in important difference if it was more substantive. I would though ask if perceptions of difference are truly substantial and would also be concerned about the basis of arguments made. Would the arguments be based on facts or based on an evolved comfort with the inserted black box of FIP?

This research is part of an ongoing project exploring the link between tensions that emerge around uses made of new ICTs and their impact on our conception of privacy. The particular focus to this point has been on the modern computer and the use of and reactions to wire tapping technology in the 1950s and 1960s, in Canada. A third leg of the project questions the viability of FIP as a black box, even without considering the issues raised here. FIP were derived at a time when computing was centralised and the vision of the future, with respect to computer technology, was more of the same. As we know, that is not the way computer technology evolved; it evolved towards distributed and

decentralised computing. Can FIP, said to give individuals some control over the data others possess about them, survive even as a black box when personal data has come to be so disbursed?

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CONSENT IN MEDICAL RESEARCH AND DNA DATABANKS: ETHICAL IMPLICATIONS AND CHALLENGES

Maria Bottis and Herman T. Tavani

Abstract

The present paper is organised into two main parts. In Part 1, we briefly describe the process of informed consent, especially as it applies in the context of medical research in general, and (population) genetics/genomics research in particular. Part 2 focuses on some specific challenges that that arise for the traditional informed-consent process in genetics/genomics research because of techniques and practices affecting DNA databanks, including the application of data-mining tools in secondary uses of personal genetic information. We conclude by defending a model that we believe can help to preserve the integrity of the consent process in the context of genetic research involving DNA databanks.

1. Introduction and Overview of the Informed-Consent Process

The principle of informed consent is a standard feature in medical research, including international documents, statutes, protocols, guidelines and other "hard" or "soft" law texts. This principle is ethically significant for participants (i.e., human subjects) in research in that provides both: (a) respect for the person, and (b) protection of the person's autonomy. O'Neill (2002) argues that informed consent is also "ethically important" because it provides a "tough safeguard" through which individuals can protect themselves against both "coercion and deception" (O'Neill, p. 97). In addition to being noncoercive and nondeceptive, O'Neill believes that the consent process, to be adequate, must also be *transparent*. But, in our analysis of O'Neill's critique in a later section of this paper, we question whether this (transparency) condition can be satisfied in current genetic research practices involving DNA databanks.

We have already suggested that there are some good reasons for defending and preserving the principle of informed consent in medical research involving human subjects. However, this principle now faces some key challenges in the context of population genomics research, which depends on DNA databanks and data mining technology. We begin our analysis of these challenges with a brief look at the background of the informed-consent process.

1.1 The Principle of Informed Consent

What, exactly do we mean by *informed consent* in the context of medical research? We first note that the principle of informed consent originates from a strict, two-part relationship: the physician-patient relationship. Also, it originates from a situation where a medical intervention (typically surgery) is sought to be authorised by the patient. In this sense, 'consent' has been the strongest part of the 'informed consent' rule, as it has been the older one (Katz 1977). Since informed consent's inception in *Salgo* (1957), the courts have been slowly accepting and adding new "types" of information necessary for a legal medical intervention. These include information about: the nature and purpose of the intervention, diagnosis and prognosis of treatment, alternative modes of treatment, the particular percentages of success or failure, possible conflicts of interest (*Moore*, 1990), and the possible experimental nature of treatment (*Estrada* 1984).

We believe that the same expansion of information must be offered in the setting of another relationship: *medical researcher-research subject*. Informed consent in the setting of medical research has usually involved patients who are required to take a drug (or a placebo). In this context, the *informed* subject must know the nature and purpose of the research, as well as its consequences and risks. In other words, *consent* must be expressed (or explicit), specific, and documented.

International documents, such as the *Oviedo Biomedicine Convention*, also require that some additional information be given to the research subject – viz., information about:

- any foreseen potential future uses, including commercial uses of the research results, data or biological materials;
- the source of funding of the research project;
- access to the research results in the future.

Article 13 of the Additional Protocol to the Oviedo Biomedical Convention states that this information has to be given in a "comprehensible form" and that the opinion of the Ethics Committee, which necessarily supervises the research, should be also included in this information. Potential participants must also be informed of their right to refuse or withdraw consent at any time, without being subject to any form of discrimination (e.g., to be refused necessary medical care).

It is also important to note that "undue influence concerns," such as misuse of a position of trust, have led to the implementation of some additional safeguards for human subjects who voluntarily participate in research. The Explanatory Report to the Additional Protocol of the Oviedo Biomedical Convention lists three kids of "undue influence": physical coercion, financial incentives, and misuse of a position of trust. In the US, the Federal Regulations provide that the circumstances of consent must give the subject sufficient opportunity to consider whether or not to participate and must minimise the possibility of coercion or undue influence (45 C.F.R. par. 46.116). Additionally, the consent agreement may not include any exculpatory language through which the subject or the representative is made to waive any of the subject's legal rights or release the investigator, the sponsor, the institution, or its agents from liability for negligence.

Is it possible to achieve what some ethicists call "valid informed consent" (Alpert 1998) or "fully informed consent" (O'Neill 2002)? Alpert (p. 93) has argued that two conditions are required for establishing "valid" informed consent in the context of collecting medical data: (i) individuals must "know and understand the nature of the information being released," and (ii) consenting individuals must be made aware of the party or parties to whom the information about them can be released. Similar criteria for establishing valid informed consent are specified in the Office of Technology Assessment (OTA) Report, entitled *Protecting Privacy in Computerised Medical Information* (1993). According to OTA, valid informed consent, in the context of medical records is possible only when individuals are "familiar with the data contained in their records, so that they understand what they are consenting to disclose." This, in turn, requires that patients both: (a) have adequate disclosure of information about the data dissemination process, and (b) are able to fully comprehend what they are being told about the procedure or treatment (p. 70). We consider the implications of these two challenges for the informed-consent process in Section 2.1. First, however, we briefly examine the challenge posed by "genetic exceptionalism."

1.2 The Challenge from "Genetic Exceptionalism"

Many advocates for preserving the informed-consent process in genetic research worry about the highly sensitive nature of personal genetic data vis-à-vis ordinary medical data. For example, some bioethicists argue that genetic data needs additional protection because, unlike ordinary medical data, it is: (1) often "predictive" of a patient's future health status (as opposed to merely used to identify a patient's current medical condition); and (2) able to reveal information not simply about the research subject herself, but about her family members as well. This view is typically referred to in the bioethics literature as the thesis of "genetic exceptionalism" (sometimes also referred to as "genetic essentialism"). Those who support this thesis worry that the misuse of a research subject's personal genetic data could result in that subject's experiencing future discrimination and stigmatization. For example, the person might be denied a job or be unable to qualify for health insurance because of information disclosed in her genetic data.

Those who reject the genetic exceptionalism thesis, who we can refer to an "anti-exceptionalists" (Tavani 2004, 2006) for purposes of convenience, believe that personal genetic data is not necessarily different in kind from many forms of ordinary medical data. For example, they note that much ordinary medical data can also be predictive of an individual's future health prospects and that this data can also reveal health-related information about the patient's family members. However, we do not need to pursue this debate here (between exceptionalists and anti-exceptionalists) to understand why protecting one's personal genetic data is important (even if it is not categorically different from

some kinds of ordinary medical data about an individual). For more information on genetic exceptionalism, see O'Neill (2002).

2. Some Challenges that Arise from the use of DNA Databanks

One challenge for the consent process in contemporary medical and genetic research has to do with a factor that O'Neill calls the lack of transparency, or the "opacity," of consent" (defined above). We will see that the consent process in DNA research involving databanks is "opaque" or nontransparent, in part, because of the secondary uses of that information made possible by data mining. Consider the following scenario: Some research subject, *A*, consents to procedure *B*. Further imagine that *B* entails *C* (and that *A* is unaware of *C*). Does it follow that *A* consented to *C*? O'Neill notes that the consenter may not see that *B* either entails *C* or is either equivalent to *C*. She point out that someone

…. might consent to a medical procedure described in euphemistic and unthreatening ways, yet not see (her)self consenting to another more forthright and equivalent description of that treatment….(She) might consent to chemotherapy, and yet when as a result (she feels) desperately ill and weak may truthfully claim that (she) never consented to anything that would have *this* effect – even if these very effects were described among the normal effects of the treatment. (pp. 43-44, Italics O'Neill)

O'Neill's examples illustrate how easy it is for someone to consent to a particular medical procedure and yet still claim not to have consented to procedures that either are roughly equivalent to or entailed by the original consent agreement.

Although O'Neill believes that this kind of opacity, or lack of transparency, in the informed consent process affects the broader spectrum of contemporary medical research, we believe that it is especially problematic in DNA research involving databanks because of the kinds of subsequent uses of personal genetic information that are made possible by data-mining technology. We will next see how the opaqueness problem is aggravated by the use of data mining in databanks.

2.1 Data Mining and the "Opacity" of the Consent Process

What is data mining, and how does it threaten the informed-consent process used in population genomics research? Data mining (sometimes also referred to as Knowledge Discovery in Databases or "KDD") is a data-manipulation technique that uses pattern-matching algorithms to "discover" patterns in data that would otherwise be nonobvious to the data analyst. For example, a data-mining algorithm might reveal that women who read 19th century British novels have a higher-than-average incidence of breast cancer. So, a new group of individuals based on nonobvious statistical correlations can be generated by data mining technology. For those persons affected by this "new classification," however, their association with such a group may seem totally arbitrary to them, because they could argue that it has no genuine basis in reality. Yet, the statistical relationships revealed by data mining generate new groups and "new facts," such as the "group of individuals that is likely to have or to contract breast cancer because they read 19th century British novels." (Custers (2006) uses a similar analogy in which he envisions a correlation drawn between people who drive red cars and people who have colon cancer.) Furthermore, consider that many members of this (newly discovered/created) group will have no idea that they have been identified as members of it and thus will have little or no recourse when it comes to an individual's right (and expectation) to be able to correct any inaccurate information about them that links them to the "new group."

Another factor involving data mining is that associations such as the one described in the preceding paragraph can result from *secondary uses* of data, which was originally collected and intended for use in one very specific study or project (e.g., in some research study targeting a particular disease). That data, after it has been aggregated, could be used in subsequent applications, which can, in turn, reveal new statistical associations (affecting an individual) that would not have been possible to predict or anticipate at the time the data was initially collected and used. So, if the research subject consented to having her data collected in the initial study, for one purpose – viz., the objectives of that particular experiment – we can ask whether she also consented to have her data used (i.e., mined) in subsequent applications involving secondary uses of her personal data. This controversy serves to further illustrate O'Neill's point about the opacity of the informed-consent process in contemporary medical research (described above).

To see how O'Neill's insight applies to our concern about research subjects in the context of genomics research, consider the following questions. When an individual has consented to give DNA for use in one context, does it follow that she has also consented that her DNA can be used is subsequent contexts? For example, does it follow that she has consented that her information be used in constructing new groups of individuals based on statistical correlations generated from confidential data that is sensitive? And does it follow that she has also consented to having this information cross-referenced with other kinds of information, which could result in adverse judgments being made about her (that put her at significant risk for discrimination or stigmatization)? From what we have seen about the ways that data mining can be used to construct new groups from data derived from contexts in which that data was initially given for very different purposes, it would seem that the process of informed consent has become one that, as O'Neill correctly suggests, is far more opaque than transparent. It would also seem that the kind of conditions required for "valid" or "fully informed" consent are extremely difficult, if not impossible, to achieve in cases of genomics studies involving the use of data-mining technology.

An interesting and corollary issue that also arises in this context is: Who owns the personal genetic data that resides in the researcher's databank? In consenting to allow their personal data to be used in a research study, have the human subjects also consented to give away their data or to grant that it can be used for all possible future applications involving the particular data bank in which it is stored? In one sense, questions pertaining to the ownership of the personal genetic data that reside in data banks are beyond the scope of this paper; however, we believe that this is also an important question for research subjects to consider in the consent process. For a detailed discussion of this concern, especially as it relates to the potential sale of, or to the potential transfer of rights to the information contained in, these DNA databases, see Tavani (2010).

Thus far, we have considered some implications for individuals adversely affected by data mining techniques in DNA databanks. We next consider the significance of genetic data for research affecting entire populations (as opposed to mere individuals.)

2.2 DNA Data Banks and Community Consent Involving Populations

We argue that the use of DNA databanks used for population-wide research purposes has introduced some key challenges for the informed-consent process, as well as some issues that do not fit neatly in what could be called the traditional research paradigm (Rothstein 2007). Initially, one might assume that that an individual's donating some blood or tissue carries no risk of immediate harm to that consenting individual. Indeed, the act of giving a sample of one's blood, hair, or body tissue for research would seem harmless; in fact, refusing to do so might be interpreted as an "antisocial" act that also violates the principle of "solidarity" underlying DNA research. Consider that without these research "materials," there can be no DNA research at all. However, we believe that the act of donating one's tissue, blood samples, etc., for research involving a DNA databank presents some new challenges for the informed-consent process because of both (a) the special nature of population-wide genomic research projects, and (b) the kinds of technologies involved (e.g., data mining). For one thing, the familiar two-part relationship involving researcher and patient is seriously threatened in these kinds of projects. It also raises an important question: What is the nature of a "population's consent"? And this question, in turn, raises two additional questions:

(i) What is it that a whole population needs to know before consenting?

(ii) How can we ensure "fair consent" from everybody involved?

Consider that any harm resulting from "unconsented" and unprincipled research in this area is directed not only against a person, but against an entire population.

Another challenge has to do with the so-called DNA/gene factor; we are not yet sure what it is that we are providing when we donate our DNA for research. For example, is it information about our "entire self" – i.e., our past, present and future? Is it information about who we are now, at the moment of donation, or is it also a "future diary"? (These concerns are related to, but also distinct from, issues affecting genetic exceptionalism, described above.)

These challenging questions gained world-wide attention, when the story of genetic research in Iceland by a private company, deCODE Genetics, Inc., became known. DeCODE, founded by Kari Stefansson in 1996, was granted access to all the health records of the entire Icelandic population as well as to the meticulously maintained genealogical information of all Icelandic citizens. Under an

agreement with the Icelandic government, the statute that enabled this research, the Health Database Act, *presumed* the consent of all patients to release their records to deCODE. Individuals were obliged, therefore, to affirmatively *opt-out* if they did not wish for their records to be given to deCODE (Potts 2002). This opportunity, of course, was meaningless for children, as well as for already deceased and mentally impaired persons. Presumed consent and the opt-out requirement received an international rejection (Andersen & Arnason 1999), while the Icelandic Supreme Court declared the Health Database Act unconstitutional, on the grounds that it breached the right to privacy (Gertz 2004). Following the events involving deCODE, the presumed consent model for genetic research suffered from severe international criticism.

The challenges affecting informed consent in genetic research in general, and population-based genomic research in particular (such as in the case of deCODE), introduce challenges for three distinct models of consent:

- *presumed* consent (the researcher takes the tissues, presuming that the person from whom they originate wouldn‘t disagree);
- *informed* consent (documented by signing pre-drafted forms);
- *community* consent (the ‗leader‘ of a community consents for every member and the members consent, also, for themselves).

We have already examined the informed consent-process in detail, and we have briefly considered the notion of presumed consent. Despite controversies surrounding presumed consent, some have defended this process. For example, Stefansson (2001) argues that traditional epidemiological studies have depended on presumed consent and that the overall quality of healthcare (in Iceland, at least) has been improved because of it. He also believes that overly stringent informed-consent policies can lessen the likelihood that our children will have the same quality of health care in the future that we have enjoyed to date. So Stefansson suggests that there are good reasons for defending the principle of presumed consent, despite his many critics.

Some critics, including Stefansson, also believe *community consent* is needed in any effective scheme involving the collection of medical information affecting a large number of people (as, for example, when conducting a major study that involves an entire population such as Iceland). But Stefansson also agrees that when individuals in that community are asked to donate their DNA samples, informed consent is usually necessary. Anderson and Goodman (2002) make a similar point with respect to the ―weight‖ that should be given to informed consent for collecting genetic data (as opposed to other kinds of medical data) in population-based studies. In reality, a comparison of eight international population-based genetic databases shows that consent procedures range from presumed consent of the entire eligible population to recruitment of volunteers with informed consent (Austin et al. 2003).

Can the informed-consent process used in populations genomics research be revised in a way that meets the challenges posed by the need for ―group-level‖ or ―collective level‖ protection? Goodman describes a category of protection that he refers to sometimes as ―group confidentiality‖ (1998, p.18) and other times as ―collective confidentiality‖ (1996, p. 228). Goodman also proposes a strategy for approaching this challenge. For one thing, he asks whether groups per se have a ―right to confidentiality.‖ Goodman also wonders whether explicit normative policies and laws aimed at protecting group confidentiality would necessarily benefit vulnerable groups and sub-groups. For example, he notes that, ironically perhaps, such policies could have the adverse effect of making it even more difficult for members in those groups to avoid certain kinds of group/sub group stigma. We agree with Goodman that some important conceptual and normative questions need to be answered before we can frame and implement a policy aimed at protecting the confidentiality of groups. Unfortunately, however, he does not provide us with explicit details for how such a policy would be framed (Tavani 2006). We believe that the outlines of an adequate policy may be found in what some refer to as the ―charitable trust‖ model for informed consent.

2.3 The Charitable Trust Model and Informed Consent

The charitable trust model for informed consent in the context of genomic databanks or ―biobanks‖ was first proposed by Winickoff & Winickoff in *The New England Journal of Medicine* in 2003. There, the authors suggested that the legal model of charitable trust, which had been established to

enable other kind of legal relationships and gifts, be applied also in the case of genomic databanks. In this case, the person donating the tissue for the biobank, i.e., the donor, is the settler of the trust and transfers her property interests to her tissue to the bank. The donor-settler appoints a trustee for this property and this trustee is the person/organization that engages in the research. As a trustee, these agents are responsible to ensure protection of the tissue donations, and they bear *fiduciary obligations* – i.e., obligations that are more strict than normal contractual obligations – to safeguard the trust and use it for the benefit of a third party, the beneficiary. In the case of the genomic databanks, the beneficiary is the general public, as it also is in the case of other traditional or classic charitable trusts.

We believe that the benefits or advantages of using the charitable-trust model in this context clearly outweigh the challenges. One advantage is that the very notion of a charitable trust points toward the direction of an "application of altruism," where monetary exchanges and commodification, the standard "plague" of genomics research, do not fit. The idea of a trust also reminds us that giving informed consent by a research subject is, indeed, an act of *trus*t, which builds a trust relationship (Hansson 2005). Additionally, the party conducting the research becomes a trustee, a steward, instead of a potential profit-seeking agency. Winickoff & Winickoff also propose that the architect of the trust provides the donor group with an advisory role in the governance of the trust—therefore, the interests of the donor group will not simply "vanish" after the tissue has been donated. Instead, the project will be supervised by an appropriate internal review board (IRB).

The role of the IRB in this case is similar in one sense to that found in related benefit-sharing theories, where members of the donor group receive something in return for their donation. This "something" can be either: (a) priority of access to newly developed drugs, due to the research; or (b) obligation to offer infrastructure to the community that offered this collective gift, or/and a percentage around 2-5% of the royalties that may accrue form the research (e.g., from patented drugs or diagnostic tests). But the advantage of the charitable trust model, in opposition to the benefit-sharing theories, is that in the first case, the donor group will be able to participate in the very governance of the trust and thus not merely await some distant, although clearly crafted and theoretically sound, benefits, such as the ones mentioned above. In this sense, the donor group, the community (the Icelanders, the Tongas, the families affected by the Canavan disease etc.) will be given an active role throughout the conduct of the research, while the interests of the general public, as the beneficiary, are also taken into account from the very beginning.

Critics of the charitable trust model maintain that it would face substantial challenges in overcoming various financial and organizational difficulties that a trust might typically present, as well as difficulties in resolving potential conflicts-of-interest and privacy issues (Otten et al. 2004). Certainly, efficiency in running a databank is a major factor towards its success, and we often assume that for-profit models are more efficient than others (even in so sensitive areas, presumably distanced from a pure market approach, such as medical research). However, we oppose returning to a for-profit model, which would easily reinforce the strong, current privatization trend in genetic research. Alternatively, we argue for the need to insert (legal and financial) features of efficiency into a charitable trust model for a biobank, where necessary. Doing so, may help us to achieve a reformulation of the "gift culture" in the biobank settings, safeguarding the ideal of altruism and public benefit, while also enabling a mechanism that does not work against market logic. Moreover, the model not only satisfies the (now) acknowledged benefit-sharing principle (which, simply stated, gives life to the idea that *people* as are important to research as the tissues they offer), it also ensures accountability (Hayden 2007). The model also operates under the assumption that the donor group remains throughout the project not only acknowledged, involved and protected but also that the donor group is a "co-governor" of the research project. The charitable trust model aims not merely to "include people", but to "include them well" (Strathern 2000). We believe that this model takes us a long way from where we started – i.e., when a person donated the tissue and then, for all practical reasons, just "disappeared."

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IT‘S NOT WHAT YOU KNOW IT‘S WHERE YOU‘RE FROM: A CASE FOR SOCIAL JUSTICE IN THE INTERNATIONAL FLOW OF KNOWLEDGE WITH SPECIFIC REFERENCE TO AFRICAN SCHOLARS

J. J. Britz and S. R. Ponelis

Abstract

In the globalised world the movement of scholars facilitates the global flow of knowledge and supports the pillars of the knowledge economy. But not all academics are born equal: African scholars, whether resident in Africa or elsewhere in the world, face significant barriers with regard to travel due to visa requirements. We view justice as one of the most important virtues regulating human behaviour in the global knowledge society. We argue therefore that the international community has a moral and legal responsibility to create a more open and fair structure that should support the freer flow of knowledge between African scholars and their counterparts in Europe and North America. Based on our moral analysis we develop a set of moral guidelines and we propose an ‗academic travel card‘ for African scholars that should meet the criteria of social justice. However, the intention of our paper is not to provide clear-cut answers to all the questions relating to the international movement of people, but to open the debate following our claim that we need to rethink, from a social justice perspective, the international movement of particularly African scholars and their ability to share knowledge globally.

1. Introduction

The global migration of people is an authentic sign or the times we are living in. The global workforce, amongst others, includes many who are skilled and come from rich educational heritages. They seek new opportunities to share their knowledge in the newly formed global communities; this includes the many international scholars that travel around the world attending conferences in order to obtain feedback and input to their work prior to publication. However, not all academics are born equal: for example, conferences, particularly international conferences, held in African countries are few and far between and often not attended by many academics from outside of Africa, which necessitates these academics to travel more widely to conferences in Europe and North America. However, no African academic (travelling on a passport from an African country), even with impressive credentials, can merely get on an airplane to attend such a conference, not only because of geographic and financial reasons, but also because of political reasons. Most European countries, as well as the USA and Canada, have strict visa requirements for most African countries. There is enough evidence to suggest that many of these people are in many cases not treated with respect and dignity (Friedman, 2005; Gindin, 2006; Shabani, 2000, Williams 2003). Although technology makes it possible to make presentations virtually, not being physically present does limit the opportunities for knowledge sharing and exchange – an important component of such gatherings and one of the reasons conferences continue to be held and attended in spite of the current economic climate.

From a legal and moral perspective one can question the way in which international scholars, in particular from the developing world, are being treated by their host countries. To put this in practical terms: why should scholars from Africa, just because of their country of origin, be restricted in many ways to travel to Europe to attend conferences while the same does not apply to their counterparts from countries like the USA and Canada? This state of affairs seriously hampers development and creativity that will benefit humanity by limiting the ability to learn from one another and to share knowledge. Thus it is a matter of social justice, not only because of the limits placed on international travel (irrespective of the reasons given as justification) but also because of the impact that this limitation imposes on human development. The global movement of people demands a fresh look at the interpretation and application of social justice – particularly as it pertains to the rights of nation states and the right of freedom of movement of scholars to share their knowledge on global platforms.

The intention of our paper is not to provide clear-cut answers to all the questions relating to the international movement of people, but to open the debate following our claim that we need to rethink, from a social justice perspective, the international movement of particularly African scholars and their ability to share knowledge globally. As Robinson (2004:190) correctly argues: "With globalization has come the growing sense that we are all responsible in some way for helping promote and protect the rights of our neighbours whether they live on the next street or on the next continent."

2. The research problem and content

It is this moral imperative that prompts our research question which specifically focuses, from a social justice perspective, on the political hindrances that many African scholars face in their efforts to attend and participate at international conferences in Europe and North America. In using Amartya Sen's capability approach we argue that the global sharing of knowledge between scholars should be regarded as one of the 'basic capabilities' (Sen, 1993) since it does not only create opportunities for the development of Africa, but it is also instrumental to our freedom to achieve human well-being. The strict travel arrangements by most European countries and the USA and Canada for African scholars form part of what Sen (1993) refers to as the social and structural constrains that influence and restrict global human development and well being.

We argue therefore that the international community has a moral and legal responsibility to create a more open and fair structure that should support the freer flow of knowledge between African scholars and their counterparts in Europe and North America. We view justice as one of the most important virtues regulating human behaviour in the global knowledge society. We therefore use it as a normative instrument to argue our case for a fairer structure that will allow Africans more flexibility to travel and at the same time acknowledging the rights and responsibilities of the nation-state towards it own citizens (for example national security, human trafficking and disease control) but also towards global citizens (allowing scholars more from African countries more freedom of movement). Based on previous research by Britz (2007), we identify and use five categories of social justice in our analysis. These are:

- Justice as recognition according to which the moral dignity of fellow beings necessitates equitable and fair treatment with respect to freedom of movement.
- Justice as reciprocity that requires fundamental fairness with respect to exchanges between academics as a group and in particular that the same rules and norms will apply in similar situations.
- Justice as participation that requires the creation of equal opportunities for scholars to exchange their knowledge at international conferences.
- Justice as enablement which demands from society at large to enable the self-enablement and self-determination of individuals.
- Justice as contribution that supports our contention that society should be structured in such a manner so that scholars are able to make a productive contribution to their own and the broader global society.

Based on our moral analysis we develop a set of moral guidelines and we propose an 'academic travel card' for African scholars that should meet the criteria of social justice. According to this, such a card should be agreed by all participating countries and as an expression of global justice it should be embedded in international rules and regulations that will allow African academics the same basic rights of freedom of movement, freedom of expression and freedom to privacy as their counterparts in Europe and North America. We deliberate also on the different rights and responsibilities of both the nation-states as well as African scholars regarding the use of the proposed travel card.

The paper is structured in the following manner: first, we emphasise the importance of the exchange of knowledge that contributes to human development and show it to be a moral concern. Following from this, we elaborate specifically on the problems that African scholars experience in this regard whilst at the same time seeking to strike a fair balance between rights of nation-state and the rights of individuals to freedom of movement. We make use of both empirical evidence as well as statistical data in support of our argument. In the third part of the paper we analyze the abovementioned issues from a social justice perspective and in the final part of the paper we developed a set of moral

guidelines and propose an „academic travel card‘ for African scholars that should meet the requirements of social justice as argued in the previous part.

3. Importance of the exchange of knowledge for human development

The movement of scholars facilitates the „global flow of knowledge‘. Knowledge in this context refers to what people know, their intellect, experiences and judgments and how it is applied to make decisions (Farradane, 1979, Britz, 2007). It is in other words human-bound and can also be translated as human capital. The investment in and development of human capital by means of education remains on of the most important factors that facilitate global development and economic growth. Societies are for their own survival and development dependent on high quality human resources.

In a definition attributed to The World Bank a knowledge economy is defined as an economy where „organizations and people acquire, create, disseminate, and use knowledge more effectively for greater economic and social development" (Barquin, 2007). In such an economy there is a greater dependence on knowledge, information and high skill levels, and a greater need for ready access thereto by both the business and public sectors (OECD, 2005). A knowledge economy rests on four pillars:

1. An economy that provides incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship.
2. An educated and skilled population that can create, share, and use knowledge well.
3. An efficient innovation system of enterprises, research centres, universities, and other organizations that can utilise the growing global knowledge base, assimilate and adapt it to local needs, and create new technology.
4. Information and communication technologies (ICT) that facilitate the effective communication, dissemination, and processing of information" (The World Bank, 2009).

In their Report on Knowledge for Development, the World Bank argues that it is not only access to knowledge that is important, but also the ability of people to assign the correct meaning to the knowledge accessed. This requires education as is evidenced by pillars 2 and 3 of the knowledge economy. Africa as a continent does not compare well to the G7 and Western Europe in the 2009 survey as shown in Figure 1.

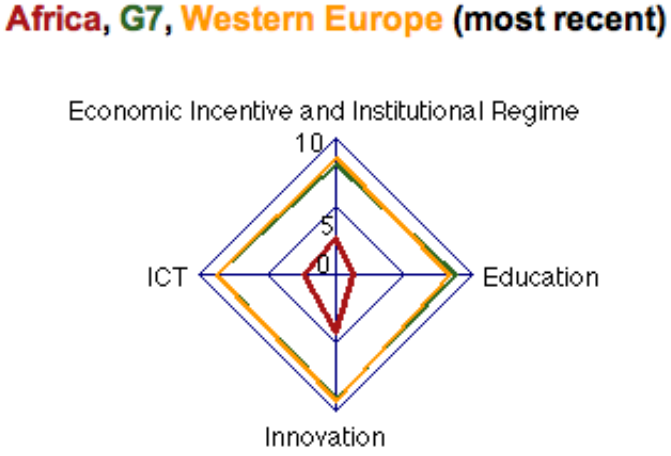

Figure 1: Africa, the G7[13], and Western Europe[14] measured on the 4 knowledge economy pillars (KAM 2009)

The Knowledge Assessment Methodology (KAM) was designed by the World Bank‘s Knowledge for Development Programme to „proxy a country‘s preparedness to compete in the knowledge economy using 109 structural and qualitative variables. The comparison is undertaken for a group of 146 countries, which includes most of the OECD economies and more than 90 developing countries." These variables serve as proxies for the 4 pillars of the knowledge economy. Based on the definition of a knowledge economy, the World Bank‘s *Knowledge Index* (KI) „measures a country‘s ability to

13 Canada, France, Germany, Italy, Japan, United Kingdom, United States

14 Austria, Belgium, Cyprus, Denmark, Finland, Greece, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland

generate, adopt and diffuse knowledge. ... This is an indication of overall potential of knowledge development in a given country." Methodologically, the KI is the simple average of the normalised performance scores of a country or region on the key variables in 3 of the 4 knowledge economy pillars, namely, education and human resources (pillar 2), the innovation system (pillar 3), and the means of access thereto: information and communication technology (ICT) (pillar 4). The participating countries were measured and ranked in 1995 and again in 2009 according to their KI score. Figure 2 shows the global KI scores of the most recent 2009 study.

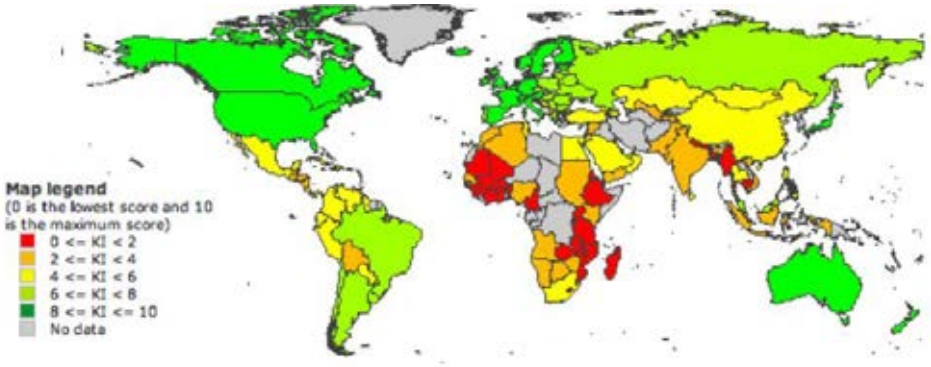

Figure 2: Map showing global knowledge index (KI) scores

Africa does not compare well to the rest of the world, even when compared to emerging nations in Latin America. In order to further illustrate the level of disparity let us focus on a subset of African countries, the South African Development Community (SADC). SADC comprises 15 member states: Angola, Botswana, the Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe (http://www.sadc.int/). Whether evaluated according to absolute score or weighted by population, the top 10 countries did not change from 1995 to 2009 although the order of countries changed. For the 13 countries in SADC (no data was reported for the Democratic Republic of Congo or the Seychelles), the situation is somewhat different. Of the 13 countries only three improved their position, Mauritius and Mozambique moving up one and two places respectively and Angola jumping 18 places. Although encouraging, if one where to consider the basis from where this improvement occurred it is less so, and even more concerning that 9 countries slipped further down the list by as much as 21 places as shown in Table 1. Of course, this slippage shows that most SADC countries are not performing well relatively to other countries with respect to the 3 pillars measured in the KI.

Top 10 countries:	1 Sweden 2 Denmark 3 Netherlands 4 Finland 5 Norway	6 Switzerland 7 Australia 8 Canada 9 United Kingdom 10 United States
SADC countries:	67 South Africa (-21) 84 Mauritius (+1) 102 Botswana (-11) 103 Namibia (-10) 109 Zimbabwe (-13) 111 Swaziland (-17) 119 Angola (+18)	125 Lesotho (-11) 126 Zambia (-15) 133 Tanzania (0) 135 Madagascar (-11) 140 Malawi (-10) 142 Mozambique (+2)

Table 1: KI scores of top 10 and SADC countries

Clearly these African countries can benefit from sharing in the knowledge and expertise of the consistently performing top countries in order to increase their capacity with respect to the pillars of the knowledge economy. Closely related to importance of the free flow of knowledge is the right of access to and communication of information. According to Habermas (1989), access to information is a fundamental and necessary pre-condition for personal development as well as socio-economic and political participation. Building on Habermas‘ points of view we argue that a clear case can be made

that access to information is a prerequisite for development in the era of globalization and for becoming true knowledge and information societies.

Acknowledging such a right not only allows access to the ideas of others, but opens up the opportunity to participate in global information-based socio-economic and political activities. The denial of access to information is therefore no longer merely a denial of access to the ideas held by others, or oppression of the freedom of expression; it will also marginalise people's participation in various economic, political and socio-cultural activities. It touches the very heart of the modern information era (Lor and Britz, 2006). This is also the reason why Hamelink (2003) argues that we should move beyond information and knowledge societies towards communication societies. It is therefore an imperative that human rights needed to be re-evaluated to reflect these developments.

The argument that access to knowledge and information is instrumental to human development not only implies the protection of these rights, for example, in a constitution and by means of legislation, but also ensuring the enabling thereof. One can indeed argue that nations have a moral obligation and legal responsibility to create an accessible information infrastructure together with a legal regime that will allow fair movement of academics as well as access to information needed for development and education.

The main reasons for academic travel are to attend conferences and, to a lesser extent, participate in faculty exchange programmes. Research papers presented and discussed at conferences represent the cutting edge in an academic discipline(s). Faculty exchange programmes provide participants with the opportunity to teach or conduct research for one semester or a full academic year at an overseas university. These programmes aim to promote the international exposure of academic staff in order to bring about the exchange of expertise with their counterparts abroad and to promote collaborative research. If academics do attend conferences they might not be staying as engaged in their fields as they should be. In addition, conferences provide opportunities to network that promote collaboration and also serve to generate new teaching ideas and material. As a result, students are also denied the benefit of up-to-date information in their fields of study. As such, the ability to freely attend conferences of peers and participate in exchange programmes is an important instance of access to knowledge and information for human development of both the individual and his/her broader community as it directly and indirectly contributes to pillars 2 and 3 of a knowledge economy.

There are many factors that can impair the freedom of movement of academics from all parts of the globe, not just Africa, to travel of which lack of funding is probably the most common. But are there factors that specifically inhibit or prevent African scholars from undertaking academic travel? Before analyzing the freedom of movement and access to information for development for African academics from a social justice perspective, the next part seeks to answer this question is examined in more detail.

4. African academics and freedom of movement

Since ICT is the fourth pillar of a knowledge economy, let's consider the distribution of conferences listed by the International Federation for Information Processing [15] (IFIP) in 2009 (http://www.ifip.or.at/cal_even.htm) as an illustrative example. As shown in Table 2 an overwhelming 65% of the conferences were held in Western Europe and North America. Only 3 conferences were held in Africa: 2 in Cape Town, South Africa and 1 in Cairo, Egypt. Unfortunately participation lists that would allow for analysis of author and presenter affiliations at these conferences were not accessible.

Choosing a conference location depends on many variables: attractiveness of location, proximity to majority of participants, venue cost, amongst others. One concern with holding international conferences far away from the majority of expected conference participants is that not enough participants will register to attend thus leaving the conference organisers with the financial liability and presenters without an audience, which is an understandable concern.

[15] IFIP is an umbrella organization for over 48 national societies and academies of science working in the field of information technology. It is a non-governmental, non-profit organization. Its offices are located in Austria.

Regional grouping (as used in The World Bank's Knowledge for Development Program‘s KAM)	Number of IFIP conferences held in 2009	Percentage of total
Western Europe	26	35%
G7	23	31%
Latin America	9	12%
Europe and Central Asia	6	8%
East Asia and the Pacific	4	5%
Middle East and North Africa	4	5%
Africa	2	3%
South Asia	1	1%
Total	**75**	100%

Table 2: Distribution of IFIP 2009 conferences according to World Bank regions

Academics situated in Africa can expect significant international travel in order to attend and present at international conferences. Already in 1990 African academics recognised the importance of freedom of movement in *The Kampala Declaration on Intellectual Freedom and Social Responsibility* (1990). In Section A of Chapter 1 on fundamental intellectual rights and freedoms 2 articles are relevant:

- —Article 4: —Every African intellectual shall enjoy the freedom of movement within his or her country and freedom to travel outside and re-enter the country without let hindrance or harassment. No administrative or any other action shall directly or indirectly restrict this freedom on account of a person's intellectual opinions beliefs or activity.
- Article 6: Every African intellectual has the right to pursue intellectual activity, including teaching, research and dissemination of research results, without let or hindrance subject only to universally recognised principles of scientific enquiry and ethical and professional standards.”

Although these rights are considered fundamental they are not absolute. It must be recognised that this freedom may be restricted on grounds of public health, morality, or in circumstances of clear, present, and imminent danger to the nation and its independence. Indeed, every country has the sovereign right to decide who may or may not enter its territory. In order to make an informed decision individuals are required to apply for a visa prior to entering a country.

A visa is a document issued by the consular officials of a country granting permission to a traveller to enter the country to fulfil a specific purpose such as holiday, business, or study. The purpose of a visa on the one hand is to ensure proper screening of applicants to strengthen border security while also allowing entry of citizens and legitimate foreign visitors in a more efficient manner. Embassies and consulates are authorised to grant visas to prospective travellers, normally in their country of residence prior to departure. Appropriate documentation must be submitted to these authorities prior to a visa being issued. Visas provide immigration officers with the necessary information to ensure that applicants are admitted for the correct purpose and period. Possession of a visa, however, does not guarantee automatic admission to a country. It only authorises the holder to report to an immigration officer at a port of entry of the country for the purpose of being examined as to his/her ability or otherwise, to comply with the (entry) requirements.

In order to obtain a visa, a prospective traveller needs to submit a visa application at the consulate, embassy, or diplomatic mission of their intended destination. This in itself presents a hurdle: just setting up an appointment and obtaining application forms can be a challenge. For example, the United States requires that applicants purchase a personal identification number (PIN) for ZAR 86 (about USD 12) for 9 minutes in order to phone the Visa Information Telephone Service to make an appointment telephonically or a PIN for USD 10 to access the Visa Information Internet Service to make an appointment online (which includes 2 chances to reschedule the appointment). The PIN must be purchased either at a local chain of retailers or by Visa or Mastercard over the phone.

Once an appointment is scheduled, applications must be submitted in person for biometric and interview purposes. If one lives in close proximity to the consulate, embassy, or diplomatic mission this does not imply significant travel cost or time away from regular duties but it can result in

significant direct and indirect costs beyond the visa application fee (which is by no means assured to be issued.) Apart from the requirement for personal submission, significant documentation is required. This includes, but is not necessarily limited to:

- Passport valid 6 months after intended return date
- Passport photograph (different sise requirements)
- Round trip itinerary with dates and flight numbers
- Proof of sufficient funds for duration of the stay
- Travel insurance
- Confirmed accommodation
- A letter of employment from employer
- A letter from the host in the destination country
- Proof of property and ties to country of residence to ensure return

Additionally, for faculty exchanges longer than 6 months a police clearance certificate and a medical examination are also required. Canada, for example, requires a full physical examination, a large chest X–ray and a radiologist‘s report, a blood test (VDRL or similar test), urinalysis (sugar, protein, and blood) and an HIV test.

Some of these documents are easier to obtain than others. A particularly thorny issue is the proof of sufficient funds. This can take various forms such as traveller‘s checks or a bank statement but can be problematic. Not all academics can obtain advance funding from their employers and thus need to purchase traveller‘s checks or show sufficient funds on their own. Sometimes a letter from the employer confirming that sufficient funds will be available is accepted but this is at the discretion of the issuing officer. One of the author‘s Euro-denominated, signed traveller‘s checks exceeding the stipulated daily allowance were deemed unacceptable by the Embassy of Finland because the purchase date wasn‘t recent. The reason given was that the officer could not be sure that the checks would in fact be used as subsistence in Finland but that, traveller‘s checks purchased just prior to the visa application would have been acceptable. This stipulation was not documented as a requirement.

Proof of property and ties to ensure return is another thorny issue. The nature of documents that are acceptable varies on a case-by-case basis and it is difficult to know beforehand whether the documents will be deemed sufficient. However, if any documentation is found unacceptable or insufficient then the applicant will be required to reinitiate the application process by making another appointment. For those travelling long distances this is a disastrous outcome and can result in the applicant giving up the process. In the earlier anecdote, the author had to return with a letter from the university confirming that funding to the required amount for the trip would be provided.

Visa applications should be submitted well in advance of the expected departure date: the recommendations to SADC members vary between 1 to 3 months for US, United Kingdom (UK), Canada, and Schengen visa countries[16]. Given appointment availability, this means that to ensure timely issue of the visa the process should be started by as much as 6 months in advance. To secure funding, academics are normally required to present and not just attend a conference. Few conferences, however, are able to confirm acceptance that early.

Whilst the US generally issues long-term visas for academics (5 or 10 year validity) that reduces the burden on the scholar, other countries such as the Schengen countries generally require the entire visa application process to be repeated for each visit. Even after enduring and overcoming all this, the individual can still be refused entry at the border at the discretion of the immigration official. Apart from limiting research and career advancement, restrictions on travel can also be embarrassing to such scholars by, for example, at the last minute having to withdraw and not being able to present their papers (which also causes a headache for conference organisers.)

It is clear that African academics face disproportionate challenges, financial, political and time-wise, to attend conference held outside the borders of the country on which passport they travel. This

[16] The Schengen visa is the result of an agreement by several European countries (Austria, Germany, Belgium, Denmark, Finland, France, Greece, Iceland, Italy, Luxemburg, Norway, Portugal, Spain, Sweden, The Netherlands) to standardise the visa process and to allow the visa holder to travel to any (or all) member countries using one single visa. Although Schengen visa allows the holder to travel freely within the Schengen countries, it is limited to a maximum stay of up to 90 days in a 6 month period. The Schengen visa should be apply for at and issued by the country that is considered the main destination.

situation is very real. For example, Scholars at Risk (SAR), an international network of institutions and individuals working to promote academic freedom and to defend the human rights of scholars worldwide, provides assistance to scholars on a broad range of issues including restrictions on travel and restrictions on information exchange. With partners at the Network for Education and Academic Rights (NEAR), SAR facilitates international workshops intended to build bridges between the higher education and human rights communities, with the goal of developing joint approaches to protecting scholars and universities. In spite of the Kampala Declaration in 1990, African scholars are still facing challenges with respect to exercising their freedom of movement. At a conference sponsored by SAR and NEAR in Ghana in April 2009 it was reported that restrictions on travel/freedom of movement can inhibit work and that ―difficulty obtaining visas e.g. Schengen visas to attend conferences or meetings with colleagues can hamper progress in an area of research" (Summary Report, 2009). It is also important to note that this experience is not unique to African scholars. Many organizations such as National Association of Foreign Students Advisers (NAFSA) and the Emergency Coalition to Defend Educational Travel (ECDET) see travel restrictions as an infringement upon all academic freedom. In particular, organizations such as these are actively seeking the lift of academic travel restrictions between the United States and Cuba.

One can indeed ask the question to what extend does new legislation based on the boundaries of nation states wrongly exclude those who are entitled to fair representation and movement as well as fair access to information that will allow equal opportunities and participation in the different socio-political and economical activities (Hamelink, 2000)? According to Fraser (2006) we are confronted with new forms of political injustice, which she refers to as ―political misrepresentation". People are wrongly being denied not only cultural and economic, but also educational participation in the global arena. In the next part of the paper we will focus particularly on how these two issues (the flow of knowledge and the flow of information) challenge the current interpretation and application of social justice.

5. Part 3. Analysis from a social justice perspective

Social justice requires from us not only the creation of equal opportunity for all to be educated, but also the creation of a global structure/system that will allow the fair and less restricted movement of people enabling them not only to learn from one another and to be able to create new knowledge but also to share it to the benefit of humanity. What we advocate is therefore not only intellectual freedom, but also the freedom of intellectuals to move around the globe. Issues relevant to our moral concerns regarding scholars on the move include:

- Scholars are often times profiled based on their country's economic status leading to sometimes being refused visas or more scrutiny;
- Names of people can be confusing and ending up on a no-flying list can cause major travel problems;
- Feeling of insecurity and social and cultural isolation; and
- Political marginalization.

Fraser (2006), Stiglitz (2004), Hamelink (2000), Habermas (1993) and Lötter (2000) all argue, based on the impact of globalization, for the need for a moral consensus, based on social justice, that must have at least in some sense universal recognition and acceptability. Stiglitz (2004), the former president of The World Bank, is calling in particular for ―…an alliance for creating a global society with more social justice" (2004:207). However, universal acceptability will only be achieved if it is based on a common voice and agreement of understanding and interpretation by all affected parties. According to Habermas (1993:x) norms are only valid if they are agreed upon by all affect parties. Miller (1999) furthermore argues that ideally this must be expressed by means of a constitution, rules and laws reflecting the commonly agreed values. As an expression of social justice this will allow people to shape their lives in democratic way.

Globalization, however, and in particular the global flow of information and knowledge seems to be in many ways incompatible with this ideal. This is especially true if the political dimension of globalization is seen as about the establishment of a set of globally acceptable rules that must act as a kind of universal constitution, which goes beyond any parliamentary challenges (Gindin, 2002). The question then follows: how can we make it compatible? Should we change the definition of

globalization, or shrink our ideals or reframe the very foundation of social justice as we know it today? The problem, according to Gindin (2002), is that we cannot change the reality of globalization with its international markets driven by advanced capitalism by retreating into the past. Neither can we as he puts it "...kept on defining social justice outside of the walls of globalization" (Gindin, 2002). How do we then relate the national to the international? More specifically, how do we internationalise the struggle for social justice as it pertains to the transnational flow of knowledge and information?

This changing spheres of social justice poses therefore a challenge not only to the application of justice but also to its very nature. Lötter (2000:200), in his analysis of social justice, correctly makes the point that in the era of globalization it would not only be wrong, but also inappropriate to distinguish any more domestic justice from international justice. Due to modern information and communication technologies the world has become flat where the "walls came down and the windows went up" (Friedman, 2005:48). In this dematerialised and digitised world time and space are virtually no more constraints for human communication as well as political, economic and cultural activities. It is however not only virtual communities that are mushrooming around the globe. People travel more than ever before. The global need and growing demand for the creation and communication and sharing of information and knowledge pose therefore a new challenge to the interpretation and application of social justice. We are confronted to redefine the nature, scope and application of justice, since the boundaries between local and global justice have become blurred and they have indeed become interrelated concepts.

Fraser (2006) in particular makes a compelling argument that the very grammar and frame of social justice need to change in the new globalised world. Her main point is that the nation state, as well as the Keynesian-Westphalian way of structuring society, which has been the political, economical and cultural framework for justice, has lost its aura and appeal in the last 20 years. Globalization changed the way people interact and the socio-economic and political lives of people continuously overflow territorial borders. Decisions made in one state by politicians and business people (for example visa restrictions for travel) affect people living in other states more often. This led to the creation of asymmetric power relationships and as Fraser (2006:253) puts it: "(t)he result is a new sense of vulnerability to transnational forces." The problem is therefore that the Keynesian-Westphalian way of structuring society is no longer an appropriate way to think, frame and apply social justice as it relates in particular to global knowledge and information flow.

Although justice is still based on the principle of the equal moral worth of all and still requires social arrangements that should allow everyone an equal opportunity and still asks the same questions namely how much injustice can be permitted it must now be interpreted and asked within a different framework and no longer based on the premises of the nation-state paradigm. In the nation-state paradigm the fair distribution of benefits and burdens were relatively clear. This framework of justice is now being in dispute. The question now becomes how a globalised society should be arranged that permits all to be recognised according to their moral worth and that will allow a fair and just movement of labour and flow of information thereby creating equal opportunities for all. It is clear that in the new era of globalization many people suffer forms of information injustice as it relates to the various global economic, socio-cultural as well as political activities. This is not only because of the injustices itself, for example the oppression of freedom of expression, but also because of the meta-framework of justice, which are firmly rooted in the nation-state model. Reframing justice has become in itself an ethical challenge in the information age.

The grammar of political justice needs to change to accommodate the change in boundaries. We need to redefine justice that more accurately reflects the new post-Westphalian paradigm. Such a new framing of justice should ensure fair representation of, and distribution and recognition to all people effected by a given global social arrangement or institution/structure. The criteria for political, economical and cultural justice should not be anymore determined by geographically proximities but by involvement in social settings that effect them. Fraser (2006:262) argues furthermore, and we quote: "In general, globalization is driving a widening wedge between state territoriality and social affectivity."

This leads to the ethically relevant question: how could one find a proper balance between the national and economic interest of nations and the right of people to travel and learn from others as well as the right to access information? This question has a specific bearing on the current global debate on movement of people. There seems to be a general agreement on the fact that these are serious moral

issues. Lacking is however an agreement on how to reach a moral consensus that enjoys at least some level of universal acceptance (or other word). In the next section we propose a potential approach and suggest a possible solution.

6. Part 4. Way forward

To summarise: the problem for academics from Africa is that ideology, economic interest and perceptions have been given disproportionate weight against their international human rights. National pride and own economic interest have translated many times into legal barriers for these scholars. Friedman (2005:205) correctly asked the question: ―Which do we keep, and which do we let melt away into air so we can all collaborate more easily?" We agree with Rawlsian philosophers such as Pogge (1989) and Barry (1999) who calls for a sort of global difference principle according to which social inequalities are justifiable if the practices that allows them also improves the lot of those that are the worst off in the world (Nielsen, 2002:245).

As identified earlier, the problem we need to address is the apparent autonomy of politics from morality. There is this apparent deontological difference that allows countries to be unfair and for presidents to overrule the justice system. What we need is a cosmopolitan rule of law (Ferarra, 2007:56) that will ask for international accountability toward the fair and just treatment of scholars. This will ensure that the relationship between politics and morality are effected in a positive manner. Pogge (1992) argues for a form of moral cosmopolitanism and by that he means that every human being has a global stature as an ultimate unit of moral concern that he translates into human rights. The focus is on the fundamental needs and interests of all human beings. In dealing with the international travel of scholars we don't need to move towards a world-state but towards both a centralised and decentralised model – a kind of second level decentralization which is away from the now dominant level of the state (Pogge, 1992:58). One can indeed move towards a horizontally dimension of sovereignty. This implies that we will have to move away from the idea of absolute sovereignty. The focus should be on openness and not on closure – in the words of Waltzer (1981) we must avoid creating petty fortresses. One should look into a ‗knowledge-society' (scholars creating and sharing knowledge) as a collection of states that endorse the same principle of knowledge as a common good that can contribute to human well-being.

Our social justice analysis is certainly not based on the assumption that we are moving towards a global society with one political entity and where we will all enjoy equal political rights and privileges based on a world citizenship. Ferrara notes that the global economic, political and cultural trends are powerful but these are ―.just factual occurrences that could be compatible with many different ways of responding to the challenge they pose for the nation-state" (2007:55). The idea is therefore not to propagate for a world-state.

What we argue for is more a normative reflection based on social justice on the ability inability of international scholars, including researchers and academics to travel and allow them to share their knowledge globally more freely. It touches the very heart of human freedom, dignity and respect and is based on the premises that knowledge is fundamental to human development and human well-being. Justice could easily become a travesty of justice if we do not address the current limitations on the global flow of knowledge. Social justice and human freedom as it pertains to the global flow of knowledge cannot be defined and argued from a standpoint of a nation. We need a global societal infrastructure based on the principle of social justice to regulate the global flow of knowledge. The core should be constituted in social justice and human rights (Rawls, 1993; Habermas, 2001).

One possible solution is a global knowledge treaty that regulates the movement of scholars. Such a treaty must enjoy global legitimacy reflecting principles of justice that in the words of Rawls must be acceptable as reasonable and rational (1993:217). Acceptability can be reached by means of moral consensus. A starting point might be to choose states that endorse human rights to respect equal treatment of scholars (similar to the Berne Convention on intellectual property). A practical implementation would be an ‗academic travel card' that would function as a global visa. Universities and research centres and institutes will vouch for the scholars and documentation supporting the academic nature of the travel should still be presented at the port of entry.

7. Conclusion

Improved freedom of movement for African scholars will not necessarily increase their attendance of conferences and participation in faculty exchange. Such attendance and participation will not by itself improve their Knowledge Index performance of their countries of origin but the lack of attendance and participation is symptomatic and its increase can contribute to improving the knowledge economies in African countries. We furthermore argue that the current situation with respect to African scholars' freedom of movement is socially unjust and propose an _academic travel card' as a substitute for regular tourist visas as a possible solution required to reduce this burden.

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ETHICS, AMBIENT INTELLIGENCE, AND THE EMERGENCE OF CYBORGIAN SOCIETIES

Terrell Ward Bynum

Long Abstract

Predicting the future of society is a risky activity typically left to fools and sages. Nevertheless, this presentation will contain outright predictions about the future of society and the future of ICT-related ethical issues. It will presuppose James Moor's "policy vacuums" account of the nature and importance of information ethics, and it will assume the truth of Norbert Wiener's prediction that cybernetic machines will play an increasingly important social role as time goes on. Most importantly, it will take as a central assumption Wiener's prediction that machines and living organisms, increasingly, will be merged together to create entities that are part biological and part mechanical. Today, such beings are often called "cyborgs" (cybernetic organisms).

According to Wiener, all animals and some machines are cybernetic entities that take in information from their environment, then process that information in ways that empower them to react to their environment and adjust themselves to it. Such information processing activities include, for example, perceiving, recognizing, categorizing, remembering, calculating, inferring, deciding, acting, and so on. In the past, some philosophers have assumed – mistakenly, I believe – that only humans (and perhaps angels, devils and gods) can engage in such "sophisticated" activities as categorizing, recognizing, inferring, deciding and acting. In this presentation, I will assume that all humans, many animals, and some machines can engage in such activities. I also will assume that "aspects, parts and pieces" of such information processing activities can be electronically instilled into objects and organisms that did not have them in the past – thus, creating "ambient intelligence".

Given the above-described assumptions, I will argue that today's "information societies" are rapidly evolving into societies in which humans, other animals, and machines – even buildings, clothing, furniture, roadways, and other objects – will be interrelated and coordinated by ambient intelligence technology to create increasingly complex "cyborgian units". Thus, when virtually everything interacts and communicates with everything else, and the difference between "online" and "offline" essentially disappears, then individual persons, particular animals, certain machines and other entities will be electronically united and coordinated to create powerful "cyborgian units" and thereby achieve previously unattainable goals. In such a society, a person or an animal or a machine or an object could function simultaneously as part of many different cyborgian units; and those units could also be combined to generate even larger and more sophisticated "meta-units". Finally, all such units and meta-units working together could constitute an entire society – becoming, quite literally, a "cyborgian society".

In the coming cyborgian societies, the above-described units and meta-units will utilise capacities and qualities of many different entities to bring into existence a staggering number of new possibilities that could not have been realised in the past. The result will be innumerable "policy vacuums" (to use Moor's apt turn of phrase) that cry out for new laws, new rules of behaviour, and new standards of good practice – new "policies" to assure that cyborgian societies will be ones in which justice and ethical behaviour are encouraged and preserved.

BORN TO BE WILD: USING COMMUNITIES OF PRACTICE AS A TOOL FOR KNOWLEDGE MANAGEMENT

Valérie Chanal and Chris Kimble

Abstract

This paper looks at what happens when Communities of Practice are used as a tool for Knowledge Management. The original concept of a Community of Practice appears to have very little in common with the knowledge sharing communities found in Knowledge Management, which are based on a revised view of 'cultivated' communities. We examine the risks and benefits of cultivating Communities of Practice rather than leaving them 'in the wild'. The paper presents the findings from two years of research in a small microelectronics firm to provide some insights into the wild vs domesticated dichotomy and discusses the implications of attempting to tame Communities of Practice in this way.

1. Introduction

This paper is concerned with what happens when groups known as Communities of Practice are used as a tool for Knowledge Management. Recently there has been a noticeable move toward the development of what are termed knowledge sharing communities, which has been linked by some to the failure of more traditional IT based approaches to sharing or distributing knowledge. Communities of Practice, it is argued, can provide the solution to this problem.

The term Communities of Practice was first coined as part of a theory of situated learning by Jean Lave and Etienne Wenger almost 20 years ago in their book "*Situated Learning: Legitimate Peripheral Participation*" (Lave & Wenger, 1991). Since then, Communities of Practice have also become the focus of attention in the field of Knowledge Management. Seen from the Knowledge Management perspective, ICT tools deal with the more easily captured explicit knowledge, while Communities of Practice provide the solution to the management of the more problematical tacit knowledge, which, because it cannot be transferred directly, is a source of competitive advantage (Nonaka, 1994).

In his book "*Cognition In The Wild*", Hutchins (1995) uses the term 'wild' to refer to human cognition in its natural setting; that is, a situated and socially constituted activity as opposed to the artificial setting of the laboratory. Drawing a similar distinction, we describe a shift from the Communities of Practice described in the early works - communities that are essentially 'in the wild' - to the cultivated and controlled groups in the later works - in effect, communities that have been domesticated. In this paper, we ask if the risks and benefits of cultivating Communities of Practice bring more benefits than leaving them 'in the wild'.

To answer this question, we will first review some of the literature on Communities of Practice to show how the concept has changed and to delineate the distinction between wild and domesticated communities. We then continue with a review of the literature relating to Communities of Practice and Knowledge Management. We end the literature review with a summary of the challenges that are faced when Communities of Practice are created as part of a Knowledge Management initiative within a host organization.

The empirical section of the paper will use the findings from research carried out in a small microelectronics firm in France, e2V, over a period of two years (Cappe, 2008). We present the results from two experimental Communities of Practice that were created within the company, and in doing so, provide some additional insights into the wild vs domesticated dichotomy. We conclude by examining the risks and benefits of treating Communities of Practice in this way; a discussion of the implications of attempting to tame Communities of Practice and an indication of how future work in this area might be developed.

2. Communities of Practice - The Evolution of an Idea

The term Community of Practice has been used in a variety of ways. Adopting the approach of Cox (2005) we will contrast the approach in the early works, where Communities of Practice are seen as emergent and creative groups, to that of later works, where they are seen as groups that can be cultivated to serve the needs of a host organization.

2.1 Communities of Practice as Emergent and Creative Groups

In "*Situated Learning: Legitimate Peripheral Participation*" (Lave & Wenger, 1991), Lave and Wenger outlined an alternative to the behaviourist theories of learning that were dominant at the time. Their description of Communities of Practice provides an account of how situated learning takes place through being enacted in practice. Learning and practice mutually shape one another in a continuous and iterative social process, i.e. they are "*mutually constitutive*" (Lave & Wenger, 1991, p. 177) . The communities they describe have no fixed structure and change gradually over time with the ebb and flow of changing membership. Lave and Wenger's view of learning focused on its socially negotiated nature. Learning is seen as part of the process of socialization into a community: a newcomer only becomes a full member of the community through gradually learning its practice, language and conventions. Membership creates a sense of identity both in the eyes of the outside world (through being associated with the community) and within the community (through the degree to which one's skill and knowledge is recognised by others in the community).

Lave and Wenger (1991) use the concept of Legitimate Peripheral Participation (LPP) to explain how members move between the core and the periphery. Legitimation and participation together define different ways of belonging to a community, whereas peripherality and participation are concerned with identity in the social world. Brown and Duguid (1991) illustrate this by using the stories told by the Xerox tech-reps to illustrate how, through the telling and re-telling of these stories, the tech-reps become a "*community of interpretation*" (Brown & Duguid, 1991, p. 47). When viewed in this way, the development of the community can be viewed as an ongoing performance: an improvisation that is enacted and re-enacted by the members of the community as they go about their daily activities. Thus the learning that takes place in Communities of Practice is not just situated learning but *"generative social practice"* (Lave & Wenger, 1991, p. 35) that can change lives.

For example, based on observations of Alcoholics Anonymous meetings, Lave and Wenger describe (1991, pp. 79 - 84) how the practice of an Alcoholics Anonymous meeting is effectively the creation of an identity of a 'Non Drinking Alcoholic'. In Alcoholics Anonymous meetings, members stand up and tell stories of their past lives for others in the meeting. These stories act a model of the behaviour of an alcoholic. The hope being that members who have yet to come to terms with their own alcoholism will find so much of their lives in these stories, that they will ask if they too are alcoholics. Thus, for newcomers, the members' stories are not simply a description of the life of an alcoholic, but provide a means to reinterpret their past and create a future in terms of their new identity of an alcoholic.

2.2 Communities of Practice as Cultivated and Constrained Groups

The more recent works on Communities of Practice, such as "*Cultivating Communities of Practice*" (Wenger, McDermott, & Snyder, 2002), are aimed primarily at practitioners; here the emphasis is on ways to manage the community and the role it can play within an organization. Wenger, McDermott and Snyder state explicitly "*... we have concentrated primarily on the ability of Communities of Practice to steward knowledge inside organizations*" (Wenger et al., 2002, p. 219) as "*... they do not merely manage knowledge assets: they create value in multiple and complex ways*" (Wenger et al., 2002, p. 215).

In these later works, Wenger abandons the notion of social communities based on LPP and adopts a different view of Communities of Practice. This new vision is based on the notion of sense-making in organizations and the concept of dualities, which he describes as, *"... a single conceptual unit that is formed by two inseparable and mutually constitutive elements*" (Wenger, 1998a, p. 66). He describes the forces that motivate the community in terms of the tensions that exist within and between dualities, and identifies four such dualities: participation-reification, designed-emergent, identification-

negotiability and local-global. Of the four, the participation-reification duality, with its close links to Knowledge Management, has been the focus of the greatest interest.

While some link the participation-reification duality to notions such as Nonaka's tacit and explicit knowledge, such comparisons can be misleading. For Nonaka, tacit and explicit knowledge are seen as distinct forms of knowledge, although one may be 'converted' to another through a cycle of socialization, externalization, combination and internalization known as the SECI model (Nonaka, 1994). For Wenger however, the tacit/explicit dichotomy is a false dichotomy, because all knowledge is formed simultaneously through both participation and reification: each is reflected in the other.

Finally, these new cultivated communities have lost the autonomy and freedom that was present in the earlier descriptions of communities 'in the wild'. This later view of Communities of Practice sees them as groups that can be intentionally cultivated by providing appropriate managerial inputs. For example, Snyder and Briggs note that while Communities of Practice are still essentially informal structures "*sponsors and stakeholders have important roles to play*" (Snyder & Briggs, 2003, p. 7). Communities of Practice are now simply "*a different cut on the organization's structure*" (Wenger, 1998a) that arise out of a need to accomplish a particular task in the organization.

2.3 Communities of Practice and Knowledge Management: The Challenges

As we noted previously, Communities of Practice have long been the focus of interest among sections of the Knowledge Management community. Developments in Information Technology, coupled with awareness of the importance of organizational knowledge, have led to the development of a variety of Information Systems to manage knowledge. However, while IT has proved successful at managing some types of knowledge, the hard to capture tacit knowledge that Nonaka (1994) argues is the basis for competitive advantage, remains anchored in individuals. Much of the literature dealing with this area is written from the viewpoint that Communities of Practice can provide a suitable environment to share or exchange knowledge between different groups in an organization (Zboralski, 2009).

Although it is possible to make conceptual links between Communities of Practice and the management of tacit knowledge, the Communities described by Lave and Wenger (1991) seem ill-suited to the task. Wenger, McDermott and Snyder (2002) provide an alternative view of Communities of Practice that is more amenable to this viewpoint, but it is not without its problems. Wenger notes that, "*Communities of Practice give you not only the golden eggs but also the goose that lays them* (but) *the challenge for organizations is to appreciate the goose and to understand how to keep it alive and productive*" (Wenger & Snyder, 2000, p. 143). Similarly, Brown and Duguid note that attempts to control or organise Communities of Practice will only succeed in disrupting them (Brown & Duguid, 1991, p. 49). Examples of this can be found in empirical studies such as Gongla and Rizzuto (2004) who note that if an organization 'spotlights' a Community of Practice, *"... the community may remove itself completely from the organizational radar... pretending to disperse, but in reality continuing to function outside of the organization's purview*" (Gongla & Rizzuto, 2004, p. 299).

In the next section, we will present results from two experimental Communities of Practice that were intentionally cultivated in a company. In particular, we will look at the extent to which organizations are able to instrumentalise Communities of Practice and at the risks they run when attempting to do so. We ask, in terms of desired strategic outcome of managing tacit knowledge, does the instrumentalisation of Communities of Practice risk killing the goose that lays the golden eggs?

3. Case study: A Process of Cultivating Two Communities of Practice

The data for this study was collected between January 2005 and December 2007 in e2V Grenoble, a subsidiary of the e2V Group, consisting of 480 employees, of whom 250 were highly qualified engineers and managers. The main activity of this subsidiary is the design and testing of microelectronics systems for the medical, telecommunications, automotive and aerospace markets. The company is organised into separate business units, each of which has their own marketing, design, engineering and quality control activities. The methodological approach can be characterised as "*recherche ingénierique*" (Chanal, Lesca, & Martinet, 1997). This approach is similar to action research, in that it is concerned with the researcher's active involvement in the processes of organizational change; however, it is distinguished by the creation of a "*chercheur-ingénieur*"

(researcher-engineer) who designs a tool to support their research, builds it and acts as a moderator and evaluator of its implementation.

3.1 The Failure of the Traditional Approaches to Knowledge Management

An initial field study, in the form of a diagnostic examination of the existing systems used for Knowledge Management, was undertaken in 2005. The study focused on the four main tools used by the management of the company to manage and retain knowledge.

1. An intranet system for the distribution of technical knowledge
2. A document management system for tracking issues related to quality
3. A 'dual ladder' system of promotion for technical experts who do not normally take management responsibilities
4. A phase in the quality management process termed "*retour d'expérience*" (REXP)

The results of the study were not encouraging for a company that believed it was actively managing its knowledge.

The intranet aimed to provide basic information throughout the company, such as the technical description of products, learning guides, directories and so on. However, this was not widely used as people found it difficult to apply the abstracted, canonical knowledge it contained to other contexts. The document management system was not much used outside the group of people who produced the documentation. The technical experts, although having a specific and unique role within the organization, where not often consulted by those outside of their normal working environment. Finally, project leaders were required to fill in a retour d'expérience (REXP) form that was supposed to help others to capitalise on the experience that has been gained from each project. However, only 20 % of the projects ever returned a correctly documented REXP form. The results of the study highlighted the limits of traditional Knowledge Management tools to facilitate knowledge sharing; the management of the company rethought its position and began to look for solutions that were more practice-based. By way of an experiment, they hired a student who had just completed her masters' degree with the company, and was now starting her PhD, to act as a Knowledge Manager. It is her work (Cappe, 2008) that forms the bulk of the data presented in this paper.

Cappe carried out more than 70 interviews with engineers to identify specific practices and areas in need of knowledge sharing. Her study revealed a general need to share knowledge across the organization. Using a set of basic criteria to characterise a Community of Practice, she identified two categories of people, who would, in her view, benefit from this approach. Two Communities of Practice were created: one for project leaders and one for scientific experts. The previous study had helped to identify people who would be both highly motivated and be seen as having the legitimacy / informal authority to bring in others to who would participate. The experiment also required the support of the management of the company, and consequently a steering committee was set up to oversee the experiment.

3.2 The Experimental Communities of Practice

Below, we will briefly provide some contextual / background information on the two communities, before presenting our results.

The Project Leaders

The experiment to create a Project Leaders Community of Practice involved 8 full time and 20 part time project leaders in the company. All 28 shared a common area of work, although most of them belonged to different business units and had few opportunities to meet.

Three potential brokers were identified, and in a preliminary meeting before the official launching of the experiment, they all expressed their wish to improve the sharing of knowledge. Following an initial meeting, where project leaders were given feedback on the diagnosis phase of the research, 20 people agreed to participate in the experiment. Seven meetings were organised in the first year (2005) and ten in the second year (2006) with an average participation of around 15 members per meeting.

The Scientific Experts

Under the company's dual ladder promotion policy, it had assigned expert status to 18 people who had specific technical expertise that was crucial to the success of the company. Despite the fact that each expert had a short presentation on the company's intranet, the majority of them knew nothing about the other experts in the organization.

As for the project leaders, a first meeting was organised with three potential brokers and it was suggested that the Vice President of Strategy and Business Development (a member of the executive committee) should act as a broker. During this first meeting, all three experts confirmed the need to improve mutual knowledge and knowledge sharing.

Fifteen experts decided to join the community, although some of them expressed doubts about the value of the experiment. They decided to start with the objectives of getting to know each other better and working towards the wider acknowledgment of expert status within the company. Four meetings were organised in the first year, but only one in the second year.

4. The Actions Taken by the Two Communities

In this section, we will present some examples of actions taken by the communities. We will show how these actions led to the communities renegotiating certain rules with the managers of the company. Our observations are organised around the following two themes:

1. The practice of the community, i.e. data was drawn from the minutes of the meetings and from direct observation of groups.
2. The evaluation of the experiment by the members themselves and by the executive committee, i.e. data was collected in interviews conducted at the end of the study.

4.1 The Project Leaders Community of Practice

During the first meetings, the members defined the objectives of the community: a benchmarking of project management methods, a sharing of experiences and proposals to improve practices. After the steering committee had approved these objectives, the members began to share experiences about how they led projects and how they coped with day-to-day difficulties. A common problem was that changes to technical requirements during a project frequently led to tensions between the project leader and the marketing department. The marketing department felt under pressure from the customer to agree to changes to a product's requirements without changes to the initial cost and without incurring any delay. However, any change in the requirements had an impact on the overall management of the project. Although the cost and delay of re-evaluations was allowed for, the tension between these two departments tended to lead to a drift away from the initial objectives of the project.

During these sessions, it appeared that there was a particular difficulty related to the production phase. The engineer in charge of production did not participate in any of the upstream phases and so was not able to indicate the constraints faced during production. The proposed solution was that there should be a new milestone called 'start of industrialization'. The community asked the Director in charge of quality to participate in a meeting to discuss this issue with them. After some discussion, the principle of adding this milestone was approved. The job description files of the product engineers were modified to take into account this new milestone. This had a positive effect on the motivation of the group, who were able to see the results of their actions expressed in the official project management processes of the company.

4.2 The Technical Experts Community of Practice

In their first meetings, the experts presented summaries of their activities and domain of expertise. The informal discussions had revealed problems concerning the definition of an expert's duties and the time that they could devote to these duties. An example of this was that, if experts asked for an account number to charge for the time that had been dedicated to a particular project, they would need to explain the precise nature of their duties and justify the amount of time that should be allocated to it. For the experts, the need to go through this process each time they were consulted highlighted the need for some form of official recognition of the nature of their role in the company. The community decided to focus on this issue and to try to improve the visibility of the expert's role within the organization. A second example concerned a proposal that was put forward by the experts to create a

library of standard technology modules. Such a project would require both time and financial resources; however, the steering committee decided it was not a priority and refused to allocate the necessary resources. The lack of support for this proposal led to a disengagement of the members of the community and, in year 2, only one meeting took place.

In contrast, a different episode of the life of the community showed how support and recognition from the organization could lead to improved motivation within the community. Six months after the launching, the expert's community received a request from the executive committee to draw a map of key knowledge domains within the company in order to prepare a long-term strategic plan. During this work, some important strategic points were highlighted, such as the possibility of merging certain manufacturing processes. This contribution by the community led to the executive committee redefining and enlarging the formal role of the experts, which had previously been limited to technical problem solving. This had a positive effect on the motivation and the cohesion of the members, and the experts who had not initially participated in the community, finally decided to join.

5. The Evaluation of the Two Communities of Practice

The previous section has illustrated some of the positive aspects of the two experiments of cultivating Communities of Practice. They contributed to the sharing of knowledge and practices across the traditional organizational boundaries, however they also generated tensions. These tensions are, in our view, rooted in the distinction between wild and domesticated communities. We will now review the appraisal of these experiments by the community participants and the managers, which will help to illustrate this.

5.1 How the Participants Evaluated the Communities of Practice

At the end of our study, the members of the Project Leaders Community of Practice had participated in seven meetings as a group of individuals, four meetings as a sub-group and had had regular informal exchanges with each other. They felt that this had greatly improved knowledge sharing and created a feeling of trust. They realised that they were not the only ones to face the type of problems they had in their day-to-day practice of project management.

The perception of the members of the Technical Experts Community of Practice was less positive. Ten out of the fifteen regular members felt that nothing had changed. However, observation of their activity during the first year showed that certain technical problems were solved thanks to the cooperation of experts who had not previously worked together and two new patents could be attributed directly to collaboration between experts.

At the end of the experiment, the members of both communities expressed a wish to continue to work together as a Community of Practice; they also expressed the hope that management would take more account of any future proposals that they made.

5.2 How the Company Evaluated the Communities of Practice

The steering committee and the executive committee considered the outcome of the experiment to be positive and the experiment to be satisfactory in providing an answer to the problems of Knowledge Management that had been identified. They recognised that the informal sharing of knowledge could improve practice, but at the same time, also felt that they should be able to measure and evaluate the outcomes; in other words, they wanted to have control over what the communities produced.

The Project Leaders Community of Practice had identified some of the limits of the formal organization. By collectively highlighting problems with existing ways of managing projects, the group had pushed the organization towards a more coherent approach to managing a portfolio of projects. In an echo of Brown and Duguid's tech-reps, they acted *"... to protect the organization from its own shortsightedness"* (Brown & Duguid, 1991, p. 43).

The steering committee was appreciative of the input of the experts' community into the strategic planning process and, in addition, a number of interdisciplinary seminars were organised that contributed to the sharing of knowledge within the organization. The executive committee considered this community to be a valuable resource. However, this recognition also came with a desire to exert more control.

6. Discussion and Conclusion

In this article, we have tried to assess, both theoretically and empirically, the implications of the domestication of Communities of Practice. We started by highlighting the shift within the theory related to Communities of Practice: from a view of natural, emergent and creative groups sharing a common practice to a technique for Knowledge Management. We now return to our original question: by cultivating Communities of Practice, do companies risk, in Wenger's terms, killing the goose that lays the golden eggs?

6.1 The Benefits of Instrumentalising Communities of Practice

Our results show that, for both communities, both the participants and the executive committee of the company considered the initiative to have had a positive effect on knowledge sharing. It contributed to the crossing of existing organizational boundaries and an improvement in collective problem solving; it even led to some innovations. Although they faced similar problems, it is unlikely that the either of two Communities of Practice we looked at would have emerged naturally; we believe that a certain degree of instrumentalisation or cultivation was necessary.

Benefits Related To Learning Dynamics

In our view, outputs such as the new procedures for project management and the mapping of knowledge domains, were effectively boundary objects (Star & Griesemer, 1989) that allowed different groups with diverse interests to work together without needing to establish a formal consensus or specify a set of shared goals. Wenger (1998b) characterised boundary objects as possessing modularity, abstraction, standardization and accommodation. All of these characteristics are displayed in the outcomes described above. They are *modular*, for example, the strategic mapping presented different domains that could be used separately by different technical departments. They are also *abstract* as they abstract away some specific details in order to make the mapping useable by others. In addition, they are *standardised*, for example, project management procedures were described in a standard way so that the different participants in a project would know how to deal with them and finally, they were flexible enough to *accommodate* the practices of various departments such as sales, marketing, engineering, etc.

It appears to us that while the interactions between these communities and the steering committee allowed for the production of a type of knowledge that could be used outside the boundary of the community, the level of control applied by the organization also had the effect of impeding the type of learning associated with emergent or natural Communities of Practice. This created a paradoxical situation where these domesticated Communities of Practice were expected to be both creative and constrained. They found it almost impossible to improvise and produce new ideas or new practices as part of their ongoing stream of activity, because almost everything they wanted to do had to be negotiated with the executive committee. We believe that because these Communities of Practice were formalised and under the constant supervision of the steering committee, they offered no space for what is sometimes termed "*bricolage*" (Jouvenet, 2007).

In summary, we have argued that wild communities produce, more local learning and creativity, contributing to improved local practice through a daily sharing of experience. Domesticated communities, on the other hand, can enhance organizational learning across boundaries through the production of boundary objects but lack the space for improvisation and creativity. To benefit from these communities, we believe that organizations need to allow some autonomy and freedom from routines in order to allow these communities to develop and evolve. This was not the case in the company in our study.

Benefits Related To Identity Construction

A positive effect that we observed from the point of view of the participants was related to the construction of a professional identity; this was particularly the case in the expert community. Expert status had only recently been created in the company and the people who were designated as experts also had other functions; it was not clear for them, or for others, what it meant to be an expert.

This is not an example of identity in practice as described by Wenger, where identity arises out of the interplay of participation and reification (Wenger, 1998b, p. 153). Participation in these domesticated communities was low and most of the activities were devoted to reifying existing practices, e.g. through defining sets of common rules. However, Wenger (1998b, p. 173) also

describes other modes of belonging: *alignment* (coordinating our energy and activities in order to fit within broader structures), *imagination* (creating images of the world and seeing connections through time and space by extrapolating from our own experience) and *engagement* (active involvement in mutual processes of the negotiation of meaning).

We believe that the community of experts contributed to the creation of a collective identity primarily through the first two types of belonging: alignment and imagination. At first, the experts tried to find some common perspectives. As noted by Wenger (1998b, p. 187), alignment requires the creation and adoption of broader discourse, which is based on reification. It is what the experts did by first trying to better define their status and the content of their duties as experts. In a second phase, when the group was asked to provide a mapping of domains of scientific knowledge, they engaged in a work of imagination. For Wenger, imagination refers to a process of creating new images of the world and ourselves. Consequently, the engagement of the experts in these communal activities created a reality in which they were able to act and construct a shared identity.

This observation suggests that a low level of participation in these communities can be compensated for by other types of belonging, such as alignment and imagination, which can contribute to the construction of an identity. This process is close to that of the Alcoholics Anonymous meetings described by Lave and Wenger (1991). The members do not share the practice of drinking; rather, they try to align their understanding of what it means to be a drinking alcoholic in order to become a non-drinking alcoholic.

6.2 The Risks of Instrumentalising Communities of Practice

Based on the results of the case study, we can put forward three types of risks associated with the instrumentalisation of, and overly zealous attempts to control, Communities of Practice.

Communities That Hide

We noted previously that it is suggested in the literature that, when a community is over-managed, it may disperse and disappear from view, while still continuing to function 'underground' (Gongla & Rizzuto, 2004). This phenomenon is well-known in the sociology of organizations: people need a space within which they have autonomy and will seek to find ways to protect or extend it (Crozier & Friedberg, 1977). Something similar to this was observed in our expert community. In year 2, it almost ceased to have formal meetings although some of the members continued to pursue 'informal' relationships. Thus, the first risk of cultivating communities is that attempt to hide themselves in order to protect their autonomy.

Communities That Wither And Die

We can offer a complementary interpretation of this. As we have suggested, the balance between participation and reification is different between wild and domesticated communities. There is more participation in wild communities, with the risk that not enough knowledge is reified into boundary objects, and there is more reification in domesticated communities, with the risk of killing spontaneity, creativity and the desire to participate. Thus, the second risk of domesticating Communities of Practice is that they will decline and die, not because they face the unwelcome attention of management, but because they are not fed by the participation that nurtures an on-going practice.

Communities That Go Into Hibernation

Finally, there is a third possibility. As we noted earlier, there are different types of belonging to the community and different levels of participation. In domesticated Communities of Practice, people need constant encouragement to participate. Thus, in the expert community we observed that when a project, such as the request for a mapping knowledge domains within the company, occurred experts' participation increased, but when their projects were rejected, it fell. Similar observations of communities that form, disappear and then reform have been made elsewhere (Ribeiro, Kimble, & Cairns, 2010). Consequently, the third risk of cultivating domesticating Communities of Practice it is not that the community will die outright, but that it will go into hibernation and need to be revived.

6.3 Conclusions and Further Research

From a practical viewpoint, our study has indicated that the domestication of Communities of Practice can bring some benefits, e.g. in terms of learning dynamics and identity construction, but also

that it presents some risks, concerning the continued existence of such communities and the problem of how to delegate sufficient autonomy to maintain the motivation of the participants.

We must assume that the benefits observed are contingent to this situation. To some extent, we will have inevitably produced a Hawthorne effect. If you put people together, who did not communicate before and who share an interest, whatever the protocol, you obtain some positive results and improvements in the knowledge sharing process. We might therefore formulate the following hypothesis to explore the implications of out work: "*Do wild communities have more to contribute to an organization than domesticated communities?*"

Wild communities have the potential to produce learning for as long as there is a shared practice, but the challenge is to go beyond the boundaries of the community and link this with the rest of the organization. On the other hand, the domestication of communities could be seen as a first step in bringing people together in order to start some form of exchange of knowledge. We have observed this phenomenon in our case, with some experts and project managers starting to communicate and work with each other outside the community. Thus, perhaps paradoxically, a measure of the success of this type of community would be that it would disappear. At present, we do not know if this collaboration resembles Communities of Practice that are 'in the wild' or are simply a series of bi-lateral relationships.

A second element of context that must be borne in mind is the need for this particular organization to follow a set of extremely rigorous quality procedures. According to Benner and Tushman (2003), quality management procedures are coherent with exploitation but not exploration and innovation. We might expect that in another type of company, perhaps one that is more innovative and less structured, the results of this experiment would have been different. Comparative studies in different types of environment would need to be carried out to ascertain whether the type of company and its culture has any effect on the benefit that can be obtained from the creation of artificial Communities of Practice.

Finally, from the theoretical viewpoint, we believe our work has contributed to a better characterization of the distinction between a wild and a domesticated community. As has been noted by others (Lindkvist, 2005) the term Community of Practice has been stretched to cover a multitude groups and settings including what would normally be viewed as task groups or teams. We think that it leads to unnecessary ambiguity to use the same concept for both wild and domesticated communities because they are different in nature. In the wild community, participation is at the core; organizational learning only occurs if there is a sufficient level of reification (e.g. through the production of boundary objects) and if the goals of the community are aligned with what might be termed the best interests of the organization. In the domesticated communities, reification is central. The issue then becomes how to obtain and maintain enough participation so that what is reified can be used in the practice.

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ETHICS OF ENHANCEMENT: A DEBATE OF "WESTERN" PHILOSOPHY

Gonçalo Jorge Morais da Costa, Tiago Filipe Rodrigues da Fonseca, and Nuno Sotero Alves da Silva

Long Abstract

Already massive change is happening due to emerging technologies. In fact, some of this convergence is happening organically, as the evolution of interdisciplinary science, a systems-approach and the necessity of sharing tools and knowledge is bringing separate disciplines together (Canton, 2002).

The dictatorship of reductionist perception, too long the unwritten law of modern science, is changing dramatically. An example of this fast innovation, inter-science coordination and action is through the deployment of convergent technologies that allow human enhancement.

However, an important question arises: which are the technologies that allow human enhancement? Nanotechnology, Biotechnology, Information Technologies and Cognitive Science (NBIC) represent a truly interdisciplinary environment to allow human enhancement (Roco and Bainbridge, 2002), being an example implantable microchips which due to nano know how, can communicate with the body's cells and transmit data on to a computer. So, transhumanism can be considered an international intellectual and cultural movement supporting the use of science and technology, which imposes the following levels of discussion: the concept of enhancement and, the ethics of enhancement.

Enhancement is in its essence improving or adds new capacities to the human body. In spite of its concise definition, it is defined as an ambiguous concept which can mean better and more, but also something that most people may think to be less desirable and that should be avoided (Bood, 2003). The negative evaluation of enhancement appears in the first half of last century due to the appearance of eugenics. However, the difference seems to rely on the "old" eugenics versus the "new" eugenics on free choice and autonomy (liberal eugenics) (Agar 2004). Nonetheless, the basic idea is the same, namely the wielding out of undesirable physical and psychological traits.

So, enhancement dimensions can be understood in terms of four distinctions or tensions, namely (Bruce, 2007):

- enhancement as a change of state or a change of degree;
- permanent or reversible enhancements;
- external or internal enhancement technologies;
- enhancement as opposed to therapy.

In order to get a better understanding of the moral value of enhancement, we need to discuss also the concept of therapy. Therapy concerning enhancement technology is often seen as something "good", while enhancement is frequently something negative. Such answer is related to the medical paradigm, and even if drawing a sharp line between therapy and enhancement was possible, we would still face the problem of knowing what counts as an enhancement. In order to diminish the lack of uncertainty, we plead three arguments that describe an enhancement in spite of the potential critics that possibly will arise due to the individual notion of human limits or limitations (see for example, Nordmann, 2007):

- certainty- the physical, psychological and cognitive characteristics of the human body are enhanced;
- consistency- the outcome of such "biological manipulation" is similar to an "environmental manipulation". There is no relevant moral difference between them;
- similarity- if we accept treatment and disease prevention, we should accept enhancement. The goodness of health is what drives a moral obligation to treat or prevent disease.

Moreover, a transhumanist discussion must take off from where religion stops, because it is only an axiom (Nooteboom, 2009). Transhumanism should facilitate, rather than disintegrate, the deeper

meanings of religion and spirituality. In that sense, to promote a debate concerning the ethics of enhancement we need to focus our attention into two levels of arguing:

- western and eastern religious systems (Lustig, 2008; Zoloth, 2008; LaFluer, 2008; Kirkland, 2008);
- and, western and eastern philosophical systems (Leon and Kass, 2001; Sandel, 2002; Fukayama, 2002; Habermas, 2003).

In conclusion, the answers to obtain in this manuscript are: what is NBIC? Which are its applications in human enhancement and ethical dilemmas that arise? And, if is possible to achieve a global or ~~"~~western" spiritual/ethics concerning transhumanist society?

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WHY LINK KNOWLEDGE MANAGEMENT, ORGANIZATIONAL CULTURE AND ETHICS: ANALYSING EMPIRICAL INQUIRY

Gonçalo Jorge Morais da Costa, Mary Prior and Simon Rogerson

Abstract

This contribution is a result of an ongoing PhD research project, which intends to approach personal versus organizational ethical issues and social dilemmas in organizational knowledge management. Therefore, the key purpose is to illustrate the conceptual frameworks that explain these trends, as well as to expose the empirical results concerning data collection first stage (pre-tests and pilot studies). For that, the paper is divided into three main sections: knowledge management (levels and dimensions); framework design (levels); empirical findings (research design, data collection methods and diagnosis); and, results comparison: a new "light"!

1. Introduction

The technical progress enabled by modern science brought a development from industrialization to the knowledge-economy. Nevertheless, Manuel Castells (2004) suggested labelling this society as the "network society", because the economic and informational global networks are a critical novel circumstance.

Due to explained scenario, research in knowledge management (KM) has gained an incredible swiftness since its origin as evidenced by extensive existing literature (Ponzi and Koenig, 2002). A great deal of this literature refers to the discussion how knowledge it is changed and streams throughout the organization, or whether relies on individuals or organizations (Von Krogh *et al.*, 2000); or else, it argues the technologies that sustain it (Markus *et al.*, 2002). Nevertheless, the *status quo* of knowledge society, leads to a necessary discussion concerning the ethical issues and social dilemmas (Costa *et al.*, 2008a; 2009; (1)).

Likewise, the network society consents that individual's become sources of social power, even in new organizational realities. In conclusion, this contribution aims to highlight and summarise the empirical results concerning data collection first stage, which is typical of ongoing PhD research projects, in order to answer to the following research hypothesis: why link KM, organizational culture and ethics?

2. Knowledge management

Literature is rich concerning KM definitions; nonetheless, in order to present an indulgent argument the authors acknowledge Brelade and Harman (2003): KM is the acquisition and use of resources to create an environment in which information is accessible to individuals and in which individuals acquire, share and use that information to develop their own knowledge, as well as are encouraged and enabled to apply their knowledge for their benefit and the organization.

Levels

Personal knowledge management (PKM) is not an original proposal; although, its endeavour is to symbolise how individuals manage their personal knowledge. The gap regarding "common" KM perception is that, it is potentially better suitable to clarify individual stimulus and behaviour, even within organizational environments. In addition, it has being acknowledged by numerous experts (Sinclair, 2008), despite Polanyi's (1958) previous use.

Higgison (2005) defines it as managing and supporting personal knowledge and information that is available, significant and valuable to the individual; networks preservation, contacts and communities; making life easier and more enjoyable; and exploiting personal capital. As a result, it can be bounded to the topic of personal information management (PIM), specifically the work of Jones and Bruce (2005) concerning personal space of information. This notion implies all informational objects that are, at least ostensibly, beneath that person's control (although not inevitably exclusive) (Efimova, 2005).

Concluding, PIM focuses on supervising all the information surrounding an individual, i.e. merely encoded knowledge. PKM refers to embrained, personified and encoded knowledge, i.e. simply tacit knowledge.

On the other hand, organizational KM is concerned with the exploitation and development of knowledge assets about organizational objectives (Abell and Oxbrow, 2001), as well as knowledge transfer within and between institutions (Peters, 2001). Therefore, it intends to connect four critical analytical arguments: knowledge acquisition, information distribution, information interpretation and organizational memory (Cram and Sayers, 2001). Hence, according to Carroll *et al.* (2001) organizational KM involves original roles and responsibilities, organizational policies, and supervising a new workplace culture accomplished by implementing the following strategies: communities of practice, knowledge repositories, expertise directories, peer assistance and best practice replication.

Organizational dimensions

Culture

Despite culture‘s multidimensional nature and complexity, the authors agree at some extent with the definition of Okunoye (2003), because it synthesises culture as: heritage, social learning, behavioural patterns, a belief, information, and physical environment. Beyond this assumption, the author evolves Hofstede‘s (2001) work, promoting the following definition: culture is a set of basic assumptions formed from a collective programming of the mind, resulting from the social interaction of people and groups in society. Moreover, his definition incorporates global and local diversity that characterises contemporary society.

Yet, regardless the refreshing contribution the authors believe that some important critics are in order: is a ―spherical‖ concept (metaphorical symbolism for perfect and constant), and therefore does not reproduces the existing challenges that KM enables; does not recognise that organizational variables have a fundamental impact in KM (Holsapple and Joshi, 2000), in which collective versus individual behaviour generate tensions; does not assign the technological dimension which characterises the network society (multiple triangular overlaps‘). Organizational solutions like communities of practices and virtual communities imply complexity and trust in order to promote knowledge sharing (LaBelle, 2008).

Technology

Knowledge management systems (KMS) are technologies that support KM in organizations, being a significant element of organizational procedures. Despite this argument, the Reader ought to comprehend that unlike organizational initiatives may highlight diverse effects; and naturally, the bond of KM to technology is claimed by Alavi and Leidner (2001) as a priority.

Nevertheless, KMS main stream literature has been approaching: specific technical features and functionalities, as well as design; empirical studies as regards to knowledge transfer between users and systems; decision support systems for KM; or, still their generational evolution. Additionally, the existing perspectives of KMS simply emphasise technical issues or else, cost/benefit analysis, which ethical guidelines for design are under scrutiny by the Association for Computing Machinery (ACM) code of ethics, or the auditing system SODIS (Gotterbarn *et al.*, 2008). However, ethical issues concerning the relationship of users with the technology remain purely neglected, becoming a vital sense of ethics to minimise the risks associated with the implementation of KMS.

Ethics

According to the authors of this contribution it is possible to conclude that ethics is simultaneously transverse and a unifying element. Regarding the concept itself, some philosophers use the term ―morality‖ and ―ethics‖ interchangeably, and others formulate a distinction (Pojman, 1994). Hence, it is reasonable to underline both perceptions: the non-unitary pleads that ethics embraces ―common good‖, and moral regulates our actions in order to achieve it (Stahl, 2002); and, the unitary acknowledges an equal meaning for both concepts (Rossouw, 2002). Even so, a conceptual inference is not sufficient to discern on a latent issue, because our first ideas must be considered moral abstract intuitions and need ethical legitimacy, which moral convictions will accept or not (Stahl, 2008). Despite this argument, the author points out that an ethical justification is considered acceptable under the general principles of reflection. Moving forward, the authors agree with the non-unitary perception which is further supported by the work of Rachels and Rachels (2007). For these authors the minimum conception of morality is, at the very least, the effort of a person‘s conduct by reason, in spite of

giving equal weight to the interests of each individual who will be affected by his decision (individual ethics).

3. Framework design

To approach personal versus collective tensions within organizational KM and its influence regarding strategy, it is reasonable that the framework engages two analytical levels: individual behaviour within these organizational contexts; and an organizational, in which managers observe the strategic consequences of organizational ethical or unethical behaviour.

Levels

Level 1

Literature reports several studies concerning ethical decision making in organizational contexts (Kelley and Elm, 2003), and two core concepts seem to arise: moral intensity (MI), and moral sensibility (MS). According to Jones (1991) MI refers to the degree of issue-related moral imperative within a circumstance. This author still argues that MI encompasses six components: magnitude of consequences, social consensus, probability of effect, temporal immediacy, proximity, and concentration of effect. Thus, when MI is high, the individual introduces ethical principles in its decision; nonetheless, when it is lower the opposite outcome occurs. Furthermore, Jones (1991) defines MS as the individual cognitive process, which is related to moral intent (Frey, 2000). So, this level will enable behavioural criterion regarding decision making which were initially developed by Smith and Kendall (1963), and subsequently applied to organizational realities (Cardy and Selvarajan, 2004). In addition, in an inferential sense will be used geometry, and trigonometry.

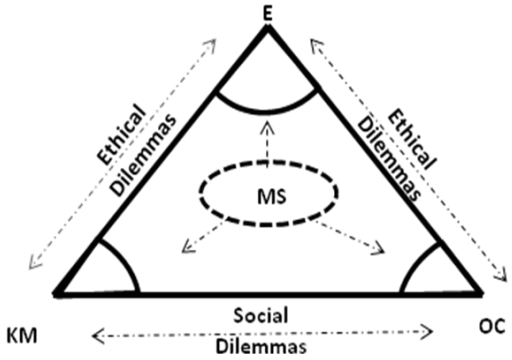

Figure 3. Individual decision making framework

As figure 1 illustrates, the equilateral triangle is the initial form in order to reflect an individual that values equally ethics, knowledge management (knowledge sharing) and organizational culture (trust). If, an individual values differently the three variables the triangle will become scalene; and, a right triangle for an individual that values most one variable (90 degrees angle), and equally the other two. Therefore, higher value for two equivalent variables and less weight on the remaining one indicates an acute triangle. As a final remark, the authors point out two important arguments: figure 1 acknowledges an individual that defines his organizational role as neutral. To represent individuals that are influencers or followers, the triangle becomes greater or slighter with the purpose to demonstrate their possible influence; despite Tales corollary, the aim is not to measure the angles value but to interpret individual‘s behavioural complexity.

Level 2

Instead, this level will be not intensely explored due to paper format limits, as well as a result of continuous scrutiny in other publications (Costa *et al.*, 2007; (2)). Yet, is a novel contribution for learning organization literature because it gathers methodological instruments of four research fields: business strategy; maintenance management; e-learning; and ethics.

4. Empirical findings

Research design

This research project unites descriptive and explanatory assumptions, because descriptive investigation is utilised when the research problem is notorious, although the researcher is not entirely conscious of the circumstances (Zikmund and Zikmund, 2000), as well as explanatory research can be applied when a study aspires to describe certain facts from dissimilar perceptions (Yin, 1994).

The epistemological option that permits subjectivity and questioning in its end results is a mishmash of interpretative and critical theory. Interpretive study looks for significance in context- the theme ought to be set in its social and historical background, so the Reader can notice how the existing situation emerged (Klein and Myers, 1999); although Sandberg (2005) enquiries about the output of this approach. The awareness of social reality is an imperative "building block" of critical research that can be encountered in several narratives of critical research (Hirschheim and Klein, 1994).

An embedded multiple-case study (Yin, 1994) was assumed, as well as Myers (1997) procedures as regards to case study method. In addition, grounded theory has its roots in social sciences (Chenitz and Swanson, 1986), specifically in interpretative tradition of symbolic interactionism (Benoliel, 1996). Grounded Theory or as it was initially titled "The discovery of grounded theory" (Glaser and Strauss, 1967) recognises that a conceptual framework theory is engendered from data rather than preceding investigations, as well as the researcher can adjust data collection during the research development, that is, the researcher drops artificial leads or asks additional incisive questions as required.

Data collection methods

Burns (2000) argues that interviews are an oral exchange, in which an interviewer strives to extract information, values or opinions from a further individual, namely semi-structured interviews. Furthermore, questionnaires may assume multiple forms as for instance: web questionnaires, which implies filled in by whom is questioned, and mixing multiple choice and ask for agreement questions (Macionis and Plummer, 1998). Therefore, data collection methods entail a combination of interviews (five key members within each organization) and questionnaires (workers). Despite this argument, Yin (1994) suggests that interviews and questionnaires acknowledge various perils, leading to a necessary pilot study with pre-testing, which is consistent with the sensitive nature of the research project.

Diagnosis

Pre-tests

The pre-test procedure (questionnaires only) happened through February 2009, and included the subsequent sampling conditions: 50 individuals from diverse professional and educational settings. The expectations concerning integer and influence of each focus faction was: top management (30%), middle management (30%), and operational management (40%), in order to promote a high level of reliability; and, at least five years of professional experience, and working in learning organizations (constraints). Subsequently, the objective was to draw pre-tests questionnaires, and for that each enquiry presented a box for remarks and suggestions, with the purpose to assure reactions about question content, generated feelings (comfortable or uncomfortable), and if their reply was truthful and genuine. The following step is to report the existing questions, its category, as well as its aim of analysis (see table 1):

In order to grasp the methodical actions as regards to pre-tests outcomes, it is compulsory to refer three milestones: comments and suggestions content analysis (expressed individual's observations, as well as assembled and categorised them in broader categories through grounded theory); answers content analysis (highlighted a qualitative analysis for all queries, although each set of questions had a divergent mishmash of methods. Multiple choice questions were revised through a statistical/numerical inference regarding a generic and group analysis; and, ask for agreement questions were legitimated through a blend of grounded theory and hermeneutics); and, frameworks versus results (detailed the interface among pre-tests results and the frameworks).

Nr	Question	Class	Aim of Analysis
1	Organizational position: top manager, middle manager or worker?	MC	To understand which organizational perception is being covered
2	What you value most? (order from 1 to 3 your options)	MC	To perceive individual behaviour of managers and workers
3	How you mainly define your organizational role?	MC	To recognise the level of influence of managers and workers inside organizational culture
4	Do you consider that workers may express themselves and have free access concerning the organizational body of knowledge?	MC	To identify possible ethical dilemmas concerning organizational knowledge processes
5	Do you consider that worker‘s autonomy, dignity and privacy are recognised into the organizational body of knowledge?	MC	To identify ethical dilemmas concerning personal knowledge management
6	Do you consider that your personal experience is organizational intellectual property?	MC	To understand ethical dilemmas concerning personal knowledge management
7	Do you consider that knowledge creation, management and sharing into the organizational environment are fairly rewarded?	MC	A not faire compensation may undermine cooperation, therefore knowledge sharing can be seriously affected
8	Do you consider that workers who do not proceed to knowledge creation, management and sharing are fairly sanctioned?	MC	To perceive the relationship between behaviour and knowledge sharing
9	State what is meant to be a fair compensation or a fair sanction regarding knowledge creation, management and sharing in an organizational environment?	AfA	Allows the perception of possible contradictory answers regarding the two previous questions
10	In your opinion, does the organizational code of ethics or conduct clearly demonstrate the possible dilemmas concerning the process of knowledge creation, management and sharing, particularly at an individual level?	AfA	Allows a personal perception concerning existing organizational codes
11	Do you consider that employees feel that exists a culture of trust in the organizational environment?	MC	To comprehend the level of confidence concerning organizational culture is a key issue
12	Do you consider that a culture of trust is vital to allow knowledge creation, management and sharing into the organizational environment?	MC	Given the learning organization dimensions it is vital to realise this relationship
13	Do you consider that top management and workers feel confident in their mutually organizational relationship?	MC	To be aware of possible tensions concerning managers and workers
14	Do you consider that organizational values represent a culture of trust in the organizational environment?	MC	To grasp how organizational codes generate trust
15	In your opinion, in which ways can a culture of trust be promoted in the organizational environment? And, how could you individually generate trust in the organizational environment?	AfA	To understand how each focus group values trust
16	Refer if you consider that ethical decisions may change according to the role and the context of knowledge creation, management and sharing. And, in which way such decisions affect organizational trust?	AfA	A key question to understand individual decision making, as well as ethical intensity
17	In your opinion, does the organizational code of ethics or conduct allow a transparent relationship regarding all the stakeholders?	AfA	To realise how the framework responds
18	Practical examples (for managers only)	MC and AfA	Two practical examples in order to allow managers present and justify their personal beliefs

Legend: MC- multiple choice; AfA- Ask for agreement

Table 1. Pre-tests characteristics

As a result it is possible to acknowledge four primary conclusions:

- sampling settings- objectives complied, although a minor topic was noticed: two respondents had minus than two years of professional experience, which was deemed as inconsequential given the sample features, as well as the fact that pre-tests do not act as *modus operandi*;
- remarks and suggestions content scrutiny- the queries engaged a high level of trustworthiness, which was expressed by trivial corrections in questions 2, 5 (which give origin two separate queries), 6, 8, 10 and 15;
- queries content analysis- the results pointed out that the ethical issues and social dilemmas referred in Costa *et al.* (2008a) exist;
- framework versus end results- justified the need for new frameworks, which involved a highly optimistic retort.

Pilot studies

Pilot studies analysis (questionnaires and interviews) have happened during June 2009, and also encompassed sampling conditions: 25 per cent of the population inside a single learning organization (A). The intention about sample reliability was to get an equivalent weight regarding pre-tests focus groups (top management: 30%; middle management: 30%; operational management: 40%); at least five years of professional experience, and working in the learning organization (constraints).

Beyond the previous conditions, the authors had performed two interviews outside company A in order to fine-tune the interview protocol: one to a former human resources manager within a different learning organization (B); and, to a middle manager inside a non-learning organization (C). Afterwards, the interview to top manager of A endorsed a comparison with the questionnaires results in order to achieve a higher level of confidence and reliability. In addition, the systematic actions concerning their analysis were again analogous to pre-tests.

Subsequent to the pilot studies analysis, four main issues were emphasised:

- sampling conditions- sample sise and restrictions were fully accomplished. Even so, the authors report that the population of A were around 100 workers, being produced 28 questionnaires from which 25 were legitimated;
- comments and suggestions content analysis- no revisions were introduced;
- answers content analysis- once more the responses reported the existence of ethical issues and social dilemmas;
- frameworks versus results- parallel conclusions were obtained.

At the present time, a deeper analysis is being done and more results will be presented.

Rigor and liability

The mixed decision is defensible throughout the following argument: if the researcher asserts to acknowledge in-depth insight into an event, it might choose a diminutive however informative example. Otherwise, the researcher might also utilise a mere inferential numerical analysis to enumerate the results (Creswell, 2003), which justifies the authors choice. Nonetheless, the statement —numerical analysis" naturally leads to a philosophical, cultural and even psychological concern (Alaranta, 2006) due to practical problems that multiple methods impose. Therefore, the authors have decided to shed some light regarding the motives that justify their belief: questionnaire —design", answers reliability verification, answers content analysis, and philosophical argument.

The questionnaires —design", its sections (participant profiling, KM and organizational culture) and queries characteristics (multiple choice and ask for agreement), aimed to comprehend individual ethical behaviour and its impact within a system, which is similar to qualitative and numerical approach of Ńuc *et al.* (2004). To verify answers reliability, the authors have drawn a table that compares respondent's data profiling (organizational position, what you value most and organizational role) with their answers (close or open) of each section, as well as simultaneously both sections to observe possible contradictory opinions and beliefs (interpretative flexibility) (Doherty *et al.*, 2006). For queries content analysis, the authors followed the claim of Strauss and Corbin (1998: 178) that: —the adaptation of grounded theory will include its combination with other methodologies including phenomenology and hermeneutics", meaning that grounded theory can interact as the missing link in interpretative research (Goulding, 1998). Concerning the philosophical argument, the authors acknowledge abduction (equal to infuriation of a cause in order to explain a consequence), which

admits several explanations along with some incorrect results (Zait and Zait, 2009). Despite all these arguments, the authors are aware that "non-main stream" data analysis is a challenge regarding rigor within a PhD research as pointed out by Bowen (2005).

5. Results comparison: a new "light"!

Despite the outstanding results, the authors decided to highlight simply the queries that demonstrated major dilemmas, due to paper format limitations. For that, the line of reasoning to justify a plausible comparison between pre-tests and pilot studies is the following one: comparative numerical analysis (multiple choice questions); comparative answers content analysis (ask for agreement queries); and, pilot interview content analysis.

Nr.	Pre-tests	
	Managers	**Workers**
5	87% (usually, often and always) stated that workers autonomy, dignity and privacy were recognised	74% declared rarely
6	over 60% (usually, often and always) claimed that personal experiences were organizational intellectual property	75% argued never and rarely
7	for 80% (usually, often and always) workers were well compensated	combining never or rarely, it represented 85%
8	50% stated usually or often for a fair sanction	70% (never or rarely) referred the inexistence of a fair sanction
13	around 75% (usually, often and always) were mutually confident	60% claimed rarely
Nr.	**Pilot Studies**	
	Managers	**Workers**
5	100% (usually, often and always) argued that workers autonomy and dignity were acknowledged	39% claimed rarely
6	100% (usually, often and always) assured that workers privacy was recognised	24% argued rarely
7	100% (usually and often) claimed that personal experiences were organizational property	61% stated never and rarely
8	100% acknowledged usually a fair compensation for workers	62% of the workers referred unfair reward
9	50% (usually and often) referred that existed a fair sanction	100% (never and rarely) of workers pointed out a non-fair sanction
14	75% (usually, often and always) were mutually confident	60% stated rarely

Table 2. Inferential analysis

Nr.	Pre-tests		
	Position	**Remark**	**Analysis**
9	Managers	*"justa compensação não assenta em princípios meramente economicistas, mas também de reconhecimento (...) A justa sanção é algo de difícil definição"*	the recognition of compensation dimensions; faire sanction as something intangible
9	Workers	*"quando alguém recebe algo em troca do seu trabalho por ter conseguido um feito com relevância para a organização (...) Justa sanção quando alguém é penalizado"*	Acknowledged reward dimensions, and once again demonstrated how intangible is faire sanction
Nr.	**Pilot Studies**		
	Position	**Remark**	**Analysis**
10	Managers	*"Justa recompensa surge através de factores monetários e não monetários. Justa penalização corresponde a não ter direito"*	demonstrates again the recognition of reward dimensions; however the absence of sanction, entails workers perception
10	Workers	*"(...) objecto de trabalho raramente é recompensado seja por estimulo oral seja por valores compensatórios (...)*	the confirmation of numerical analysis, leading to a dilemma

Table 3. Answers content analysis

Following the data analysis method the authors present an example with reference to answers content analysis (table 3). Translation was not executed to avoid lost of sensitive meanings.

Plus, it was observable in both analyses (inferential and content) that middle managers balanced their answers: about autonomy, privacy, or personal experiences had similar responses to managers; however, as regards to fair compensation and sanction, or mutual trust tended to reply workers perception. Going further, it is time to emphasise the organizational pilot interview, as well as to expose the authors' perception pertaining to some key remarks.

Issue	Quote	Analysis
Autonomy	*"pessoas que entraram muito jovens (...) estabeleceram muitas relações pessoais para além das profissionais (...) há uma mistura da autonomia com a privacidade (...) diser que é um perigo"*	the thin bond between autonomy and privacy and its identification
Privacy (social network)	*"a curto/médio prazo a empresa tem intenções de monitorizar"*	organizational technologies can enhance privacy issues
Personal experiences	*"projecto piloto (...), banco de ideias, em que estimula as ideias (...) mas cede a propriedade à organização"*	personal versus organizational knowledge management engages a difficult trend, and is bounded to autonomy, dignity, privacy, and even fair compensation
Fair compensation	*"tudo depende do impacto e das próprias pessoas em causa"*	it illustrates individuality, raising several ethical issues, like equity
Mutually confident	*"não esperaria um número muito elevado de mútua confiança, (...) da parte dos colaboradores para a gestão"*	managers recognition that organizational trust is extremely difficult to cope, leading to a serious social dilemma
Ethical decisions (organizational role)	*"tem que haver coerência (...) pela comunicação"*	interesting that ethical decision making is bounded to communication; however, and behaviour?

Table 4. Pilot interview content analysis

As a final remark, the authors claim that pre-tests and pilot results exposed fundamental key findings, and their purpose (to fine-tune the research protocol) was completely achieved.

6. Conclusion

Despite the nature of this contribution, ongoing research project, it is feasible to identify several remarkable findings. For that, the authors will acknowledge a parallel argument between the research question versus: literature; research design structure, data collection methods, and framework response; empirical findings; and, authors' perception concerning future case studies. The pressure between individual and collective possibly hinders knowledge creation, managing and sharing in organizations, and also enables ethical issues and social dilemmas, contradicting laboratory testing and observations of everyday life. On the other hand, research design structure appears to reply positively, specifically the mixed option concerning data collection and analysis, as well as the framework. Moreover, the empirical outcomes reveal a considerable amount of ethical issues and social dilemmas within organizations which managers do not comprehend or disregard, leading to an important belief by the authors: these "old" and "novel" dilemmas will be confirmed into the case studies. In conclusion, comments as regards to these topics will be welcome during the presentation.

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NETWORK TOURISM: A FALLACY OF LOCATION PRIVACY!

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Abstract

This contribution aims to discuss if "locational" privacy in tourism is a fallacy! Nevertheless, the authors inform that the reason for this debate is 21st century tourist distinctive characteristic, constantly "wired" through ICT, leading to serious ethical issues as regards to personal privacy. Therefore, this paper is divided into five core sections: background (tourist, and ICT for tourism and tourist); control (etymology, the thin bound concerning security, and control and personal data); privacy (the concept, evolution, and dimensions); empirical evidences (overview, crime scene investigation, and keen exhibits); and finally, discussion (act 1 and act 2).

1. Introduction

Travel and mobility are prominent features of contemporary society and economy, which is justified by 924 million tourist arrivals in 2008 (World Tourism Organization, 2009), being these tourists important consumers of services, including information services, and demonstrating tourism tendency toward IT (Staab and Werthner, 2002). Moreover, preliminary reports of the World Tourism Organization claim that despite the financial crisis in 2008 tourism has grown 6%, which 2009 figures seem to contradict (World Tourism Organization, 2009). Even so, the estimates for 2010 are roughly one billion international arrivals. Therefore, as global trend tourism engages a key role in economics, representing in 2007 over 745 billion dollars (World Travel and Tourism Council, 2007).

However, the aim of this contribution is not to promulgate an extensive outlook regarding the economic performance of tourism, but to question if "locational" privacy in tourism is a fallacy? The praxis for this debate is a consequence of three interactive analytical dimensions: the optimization of travelling experiences by tourism agents, so that tourists avoid unwanted experiences (Kansa and Wilde, 2008); "wired" tourists that require constant available information for daily leisure activities, as well as to identify socially significant locations (Eagle and Pentland, 2006); and, tourists societal control (Nelson, 2009). From the trade-off between new approaches to capture and analyze tourist's mobility (Wolf, 2004), societal control for security reasons (Mesjasz, 2004), as well as tourists informational needs, it is possible to conclude that within the inner core of this quandary are privacy issues.

2. Background

Tourist

According to 19th century historical records, "tourist" was predominantly used in an English context, referring to *those who went to England*! Nonetheless, the classical definition of travelling and recreation has been extended in order to include business and other purposes (Oxford English Dictionary, 2008). Moreover, tourists are typically interested (among other things) in the destinations climate, culture, or its nature.

Despite the previous definition, 21st century tourist involves a distinguishing characteristic: it is always "wired" to the surrounding world (network tourism) through multiple ICT platforms (mobile phones, wireless networks, GPS, location-based services, etc.), leading to the concept of virtual tourist. According to Carlvik and Jonsson (2001: 273) "it is a group of people between 14 to 35 years old that "travels without travelling", and that uses systematically ICT" (observe for example www.wiredtourist.com). Furthermore, this continuous exploitation of ICT occurs during touring life cycle (Hawking *et al.*, 2005): planning (location enabled information sharing processes); touring (digital delivery of location based information); reminiscing (after the tour experience and can involve information sharing).

As a result, in each stage it is possible to locate tourists 24 hours a day through equipment and software (Heikkila and Silven, 2004), leading to serious ethical issues relating to personal privacy.

ICT for tourism and tourists

Traditionally, tourism industry has been a leading adopter of innovative technology, which the 2003 Tourism Highlights Report (World Tourism Organization, 2003) have identified four trends: low-cost airlines were rapidly expanding; the Internet dictates information collection and tour booking; the dawn of non-organised touring; the development of "do-it-yourself" travel. From these trends it is possible to acknowledge that information dissemination and exchange are the main inputs for travel industry, which eTourism technologies need to deal (Martini, 2000). Nonetheless, ICT consequences with reference to tourism go far beyond in each phase of touring life cycle:

- planning- communication with prospective clients is often performed through phone, e-mail, chats, or even Skype. Moreover, regional portals allow to access content regarding touring (Jakkilinki *et al.*, 2006), despite the differences that first and second generation tourism portals encompass: dynamic information generation (Kohli and Armstrong, 2006);
- touring- a focus-group survey executed in 2001 by Gartner (Gracia, 2001) in the United States pointed out that over 60 million individuals received location-based advertising messages in exchange for coupons or discounts;
- reminiscing- occurs after the tour experience and can involve sharing of information including recommender systems (Sharda, 2010).

Although, given the overall argument of this paper it is required to debate the potential range of potential Local Based Tourism Systems (LBTS) appliances (Hawking *et al.*, 2005):

- location specific portals- endow expert resources and information to potential tourists about location based service. An example is the Alps website (www.tiscover.com/);
- tourism tracking- a considerable group of technologies can be referred, namely GPS tracking to support tourists in isolated locations (observe for example www.geeps.com/); or, integrated software to acknowledge pedestrian-centric content that enables people to orient themselves and navigate efficiently by foot, public transportation systems, or by car, being an example Rich Map Engine (www.decarta.com/products/mobile_rich_map_engine.htm);
- position based tourism information- the most common application is commentary multilingual systems for exhibitions in museums, national parks, and tours vehicles (an example is www.equator.ac.ik); or, Radio Frequency Identification (RFID) technologies that allows tourists to retrieve information regarding diverse products, receive information concerning hotels and restaurants, etc. (a gigantic and comprehensive application of this technology is the city of Singapore);
- location based recommender systems- provide individualised tourism advice at any stage of the touring lifecycle, being GeoNotes an example.

In conclusion, the newest interaction between tourism and ICT involves the adoption of mobile devices, wireless networks, ubiquitous computing, user-friendly interfaces and location awareness, leading to the promise of personalisation and localisation of tourist activities (Nova, 2004). Nonetheless, despite Berger *et al.* (2004) claim that LBTS are positive and perhaps extraordinary for inherent mobility in tourism, which Kanellopoulos and Kotsiantis (2007) value chain analysis enhances; the truth, is that pose unforeseen serious ethical issues relating to personal privacy (for further detail see empirical evidences).

3. Control

Etymology

From the etymological roots of control, it is possible to acknowledge that is a "power" that directly determines a situation; a relation of constraint of one entity (thing or person or group) by another, or, the state that exists when one person or group has power over another (Online Etymological Dictionary, 2001a).

The thin bound concerning security

In a descriptive connotation, security and its components, reproduce the affairs between an object (subject) and its environment, which is consistent with the dual analysis of Introna (1999): externalisation and internalisation of the subject concerning surveillance. Nevertheless it is imperative to understand that security is normative, an emotionally loaded idea (Mesjasz, 2004). Any endeavour to elaborate an inclusive meaning for security is of course useless, given its extended meanings. In fact, typically security is categorised in: a traditional meaning (security as a characteristic of state); a broader sense (referring directly to a phenomena occurring in international relations, or, security as a public good); and, a universal sense (human security).

Likewise, taking into account an etymological debate a dual outlook arises: the Latin expression is *secures*, meaning safe or secure. Adding the noun *cura* (care), security becomes a quality or state of being secure, or free from danger. This is analogous to Cycero argument: the absence of anxiety upon which the fulfilled life depends (Liotta, 2002). The subsequent explanation is bounded to the word *securus*, which originally meant liberation from uneasiness, or a peaceful situation without any risks or threats. Nevertheless, the linguistic perception of security is often shaped by cultural elements leading to more interpretations (Morgenthau, 1960). Furthermore, modern surveillance is typically performed through electronic means, leading usually to privacy violation (Brey, 2005). This scenario is a consequence of information retrieval through computer networks, which configure a lack of integrity concerning personal data (Floridi, 2006). Therefore, despite the most widely accepted analysis refers that security and privacy represent more or less a zero-sum logic (Burgess, 2008), the truth is that security regulations imply power relationships and their ethical assumptions (McRobb and Stahl, 2007).

Control and personal data fluxes: a political stance

The issue of personal data protection in modern society is best understood throughout an overview of the laws that regulate personal data security worldwide. The concept of an information society is integrally connected with information and data exchange (Castells, 2000). Despite the various categories of influence and confidentiality, the authors approach personal data of citizens (tourists) that use ICT for each phase of the touring life cycle, as the leading issue of this debate.

In the international sphere it is possible to distinguish a so-called ―community”- a group of countries related to each other by more focused ties. Moreover, a regional and functional criterion can be underlined in order to understand these communities: the first group gathers countries that belong to a certain geographical location; the second classifies countries which share common interests (e.g. NATO). As a consequence of this division, universal norms are obligatory for the whole international community, and regional norms are specific for the ―community”; although, these overlaps often indulge legislative gaps that could undermine personal data privacy. In spite of this possibility, the important acts that impact personal data protection are detailed:

Resolution 34/169 UN General Council from 17 December 1979- this document in article IV deals with problems about personal data protection. It contains the collection of directives for officers of the law and government personnel that treat in a daily basis personal data. This data can be only accessible for their official functions, as well as for legal purposes.

Recommendation of the OECD Council from 23 September 1980- this advice of the OECD Council does not an obligatory character. It is basically a collection of recommendations of the OECD Council regarding solutions that national legislators present as regards to personal data protection in international casus. Nonetheless, the authors paid particular attention to the impact of international exchange of information on global economic development.

Resolution 45/95 UN General Council from 14 December 1990- this is a document containing casus regarding computerised data bases regulation. Once again, the resolutions proposed are not legally binding, because they are simply a collection of proposals regarding guarantees which should be provided in national decrees with regards to computerised storage and propagation of personal data. Among the proposals are setting up conditions for access data by the person involved, as well as security and guarantees against discrimination.

General Declaration of the UNESCO from 11 November 1997- following the fundaments of this document, there is a need to respect the uniqueness of each person and the differences between people

(article 2d). Therefore, any genetic data which allows specific person identification needs to guarantee confidentiality (article 7). It is also declared that genetic data is protected regardless the purpose for their collection (e.g. scientific or, medical research), which conditions are foreseen by law. Additionally, regulates personal data for basic legal acts in European laws.

Directive (EC) nr 45/2001 of the European Parliament and Government from 18 December 2000- this document contains laws regarding individual protection for personal data processing, and free flow between social institutions and organs (article 1). The purpose of this act is to guarantee an effective application of individual‘s basic rights and freedoms, as well as the easy flow of personal data between Member Countries. Furthermore, the UE has set concrete laws specifically concerning decrees and procedure on data storage and propagation. The overseeing institutions are responsible for meeting out specific sanctions for law infringements, and setting up the European Council for Data Protection.

Directive 2002/58/EC of the European Parliament and Government from 12 July 2002- this directive obliges member countries to guarantee equal levels of protection for basic human rights and freedoms, and in particular the right to personal data privacy in electronic communications. It also obliges them to guarantee the free flow of these data in the community. The regulations of this directive widen and complement the resolutions of Directive 95/46/EC. Aside from this, the regulations of Directive 2002/58/WE guarantee the protection subscribers interests that have legal rights concerning data. This legal act deviates from the earlier Directive 97/66/EC from 15 December 1997 in the matter personal data privacy processing and protection within the telecommunications sector.

Directive 2000/31/EC of the European Parliament and Government from 8 June 2000- this directive regulates the rights and responsibilities of service providers and consumers as commonly understood in an information-based society. Then, teleinformation services should be transparent and respect consumer‘s privacy through some special principles for personal data protection. This protection, aside from general principles, imposes that data processing (with certain exceptions) must account consumers consent. For that, data should be limited to the minimum requirements for ensuring contract validity, as well as the user should have the right to remain anonymous or, to use a pseudonym in contracting these services.

Directive 95/46/EC of the European Parliament and Government from 24 October 1995- this is an important document that contains the definition of basic terminologies for personal data, and principles of gathering, collecting, storage and access to data. This document also defines the principles and conditions for legal consent in personal data processing, as well as the legal rights of individuals.

Resolution A/RES/406(XIII) of the World Tourism Organization from 1 October 1999- article 8, number 3 refers explicitly the right that tourists and visitors should benefit the same rights as the native citizens when visiting the country concerning personal data confidentiality, namely when stored electronically.

4. Privacy

The concept

From the Latin adjective *private* suggests *set apart or, belonging to oneself*; which acknowledges an additional word: *privare* (to separate, individual) (Online Etymology Dictionary, 2001b). Nevertheless, there is little agreement in academic literature about the definition of privacy, because it is certainly a mysterious concept. For example, for Warren and Brandeis (1890: 205) is right ~~to~~ be let alone”, or to Stahl (2004) is the right of informational self-determination.

Some authors like Etzioni (1999) point out two sorts of privacy: informational privacy and decisional privacy. So, an important critic is in order: Etzioni (1999) seems to acknowledge autonomy rather than privacy, which is at some extent explained by Floridi‘s (2005) ontological interpretation of informational privacy. To Floridi (2005) exist two interpretation theories regarding informational privacy: the reductionist, and the ownership-based. The reductionist declares that informational privacy worth relies on a multiplicity of objectionable consequences that may be caused by its breach; and, ownership-based states that informational privacy needs respect because each person‘s rights to physical security and property. As a response to this limited analysis, the authors introduce the work of

Allen (2003). Anita Allen divides the concept into four dimensional categories: informational (information that forms one's private domain); physical (one's right to self-determination); decisional (it basically means freedom from government or other outside interference with personal life); and proprietary (deals with property interests about the human person).

In conclusion, the elusive perception of privacy derives from the different people's interests: it may be related to control personal information; to physical control; to obtain autonomy; to engage personal development; or even, to safeguard a degree of secrecy (Kemp and Moore, 2007). Despite these arguments one truth is acceptable: privacy is extremely important for a society (Rachels, 1975).

Evolution

ICT development and adoption have been affecting cultural values and promoting an intercultural dialogue between Western and Eastern societies (Collste, 2007). However, it is necessary to shed some light over this intercultural "umbrella" given the existent dissimilar perspectives regarding privacy: a unique conception as a consequence of intercultural dialogue; and, an opposite perspective.

Authors like Ess (2005; 2006), Hongladarom (2008) or, Nakada and Tamura (2005) have demonstrated that intercultural dialogue has proven to be fruitful, allowing a cultural understanding through the analysis of similarities and differences. As a consequence, a universal concept for privacy will be achievable. On the other hand, Brey (2007) declares the concept of privacy is inexistent in Eastern cultures, due to their social construction as a collective culture, which at some extent the work of Orito and Murata (2007) supports.

Therefore, an important question arises: which perception could help the authors to understand tourist's personal privacy? This is important because travellers exist worldwide, and it is reasonable to understand if their perception of privacy can promote different issues as regards to locational privacy. To the authors the answer is quite simple: only the mishmash of both conceptions translates positive and complementary results. In spite of this scenario be achievable, is again the authors' opinion that these perceptions are acknowledging different analytical dimensions (Stahl's matrix conversion) (Stahl, 2002):

- the unique conception- is on a "normative/theoretical" level. This claim is supported at some extent by the work of Himma (2008). In his work, *The intercultural ethics agenda from the point of view of a moral objectivist*, Kenneth Himma points out that moral objectivism provides a superior foundation for the normative debate for intercultural information ethics;
- the opposite perspective- is on a "descriptive/practical" level. This is suggested for example through the work of Mizutani *et al.* (2004).

Therefore, for a positive and comparable theoretical diversity it is required that firstly both perspectives entail the normative level and afterwards to understand practical implications of this diversity, in order to permit an inclusive answer.

Dimensions

In accordance to the International Telecommunication Union (2005), informational privacy acknowledges three domains that simultaneously are distinct, but necessarily related: technical (underlines design issues related to such areas as network security and user interface design); regulatory (outlines privacy as regards to data protection and related statutes and regulations); and, sociological (considers privacy as a social issue related to cultural practices, ethics, and institutions). However, regardless the policy analysis exist a continuous tension between personal privacy and societal control. This is a result of privacy be a crucial human basic right (Rogerson, 1998), which can be under an intrinsic or instrumental scope. Thus, privacy not just permits us to develop healthy interpersonal relationships, but also a requirement for democratic state (Stahl, 2007).

5. Empirical evidences

Overview

Despite the previous sections it is necessary to address an important issue: how can we define locational privacy? And, which are its features? For Saha and Mukherjee (2003), is considered as an essential component for the development and delivery of context-aware services to mobile and nomadic users. To Danezis *et al.* (2005), is a set of data that describes an individual's location over a period of time. The time and location resolution vary with the technology used to collect the data. Even so, the authors will follow Blumberg and Chase (2007) definition: ability of an individual to move in public space with the reasonable expectation that their location will not be systematically and secretly recorded for later use. Hence, locational privacy engages two critical dimensions: locational awareness, and technology. According to Duckham and Kulik (2006) locational awareness concerns the utilization of information with reference to an individual's current location to grant additional relevant information and services to that individual, being a specific type of context-awareness. In fact, the concept context overloads an individual's physical, social, physiological, or emotional circumstances (Schmidt *et al.*, 1999). On the other hand, given the research aim of this contribution technology encompasses LBTS applications, as for instance for: navigation (directions, traffic control); information exchange (travel and tourist guides); tracking (people, vehicle or product tracking); advertising (advertisement alerts); and, social networking (locating friends, instant messaging).

Crime scene investigation: a metaphorical analysis!

To become a serious detective is fundamental to observe and analyse carefully a crime scene in order to obtain keen evidences (following subsection). From the overall argument, is feasible to proclaim that location-based experiences extend digital media out into the physical world (Benford, 2005); and, the multiple contexts and LBTS appliances configure a Janus perspective (Floridi, 2006), because in spite of allow real time access to information and content, allow collect field data, and promote experiences personalisation; the truth is that, seriously endanger tourists locational privacy due to a constant flux of personal data throughout multiple platforms. This crime scene is perfectly illustrated in literature:

- LTBS potential- Girardin *et al.* (2008) combined data from Flickr to understand the areas of tourist's concentration, their temporal signatures and activities; and, Hinze and Voisard (2003) demonstrate the potential of Event Notification Systems;
- locational privacy issues- applying privacy on the dissemination of locational information (Marias *et al.*, 2006); and, privacy concerns in location based services (Gadzheva, 2007).

Even so, the authors introduce some keen empirical exhibits to allow a reliable investigation.

Keen exhibits

Exhibit A- Olympic Navigator was a locational based service to support tourists during the Olympic Games of 2004, which positively possessed a policy concerning personal data. The system created a pseudonym, which was given a public key through cryptography to enable a strong authentication, confidentiality and integrity. Likewise, the policy entailed an authorization to maintain tourist's data during five days. The problem relied on a basic algorithm, Trivial Secret Sharing, that secretly allowed tracking the different tourist pseudonyms, and it was not stated into the personal data policy. Therefore, it was possible to track tourist's location!

Exhibit B- during a recent stay in United Kingdom, one of the co-authors has received a text message by its global mobile operator alerting that his choice concerning the local operator was not under the umbrella of its international calls. From this information the Reader may consider odd or inappropriate this example; however, it becomes relevant after novel information: the text message also referred which were the local operators in the co-author geographical position! Finally, the co-author stresses out that his personal experience happened on January 25, 2010.

Exhibit C- another critical example happened during the same stay: on January 26, 2010 the co-author received a call by the global operator support concerning a pending administrative issue. Again, at a first glimpse it seems a non-problematic issue; yet, it was the co-author intention to notify the global operator not to charge this call because it was abroad. Although, amazingly before this announcement the global operator have informed the co-author that this call would not be charged given its current geographical location!

Exhibit D- through continuous informal meetings with a major producer of electronic and communications systems, one of the co-authors have concluded that plentiful hotels misuse personal data that is collected, when travellers use their networks. Moreover, after analysing several hotels websites it was denoted that most do not have privacy/confidentiality policies.

Exhibit E- LandLoc is software for mobile devices that permits a user to choose landmarks for an object: building, shop, a park, etc. Afterwards, the software creates a three dimensional electronic representation of the physical space, and presents the best solution through the triangulation of user‘s location, chosen landmarks and topography of the region. The following step is to act like a GPS using mobile network, meaning that is possible to track permanently the tourist during its trajectory.

6. Discussion

Act 1: preparing the –ease”

As mentioned above, locational privacy and data protection denotes social and ethical grounds. Privacy issues entail location profiling, tourist tracking, and information relevance; LTBS social implications occur through mainly during touring and reminiscing phases. So, the right to secure locational privacy is critical and to achieve it literature acknowledges several formal models and technologies. Examples of formal models are: visibility classification scheme (Jarvinen *et al.*, 2002), and anonymisation model (Shin *et al.*, 2008); and, for technologies are: semantics-aware obfuscation (Damiani *et al.*, 2008), and location sensor networks (Gruteser *et al.*, 2003). Moreover, personal data fluxes through digital networks (including LTBS) are monitored and secured through the Echelon system (Bierzanek and Symonides, 2005), which can be bounded to the claim of Etzioni (1999) that an individual‘s right to privacy is somehow conferred by the society; and, therefore leading to a necessary future debate about individuals and institutions moral obligations.

Act 2: the –eourt‘s” decision

Following Hawking *et al.* (2005), LTBS market stakeholders assume three basic categories: infrastructure providers (hardware, software and network infrastructure providers); tourism providers (include travel agents, airlines, itinerary providers, hospitality providers, vehicle rental providers and various government agencies); tourism content providers (act as content enablers connecting providers and tourists); and, consumers (tourists that seek out for information). In spite of this scenario all stakeholders have moral obligations, which imply responsibility and its conditions as an answer to ethical problems (Stahl, 2004). To acknowledge these moral obligations Duckham and Kulik (2006) work pertaining to strategies for protect locational privacy are the key to unlock the –eourt‘s” decision:

- regulatory strategies- encompasses the development of rules to govern fair use of personal information;
- privacy policies- are trust-based methods for forbid certain uses of location information. Whereas regulation aims to provide global or group-based guarantees of privacy, privacy policies aim to provide individual privacy;
- anonymity- concerns the dissociation of information about an individual and its actual identity. The most common form of protection is to associate an pseudonym;
- obfuscation- demeaning locational information quality, with the aim to protect it. However, Duckham (2008) demonstrates that after 100 simulations its reliability diminishes 30 per cent.

On the other hand tourists are willing to share information, although with who and until what extent are the fundamental queries? According to Olson *et al.* (2005) it is possible to cluster peoples‘ sharing willingness into categories; nevertheless, is extremely difficult to determine what is an achievable and desirable level of access by others regarding wired tourists locational information (future research scenario). Likewise, it is the authors‘ opinion that locational privacy does not symbolise the

complexity and interaction between global and local systems (stakeholders, technologies and regulations). Therefore, glocal privacy emerges as a new buzzword.

7. Conclusion

From the overall arguments of this contribution it seems reasonable to claim that the authors have proven that locational privacy resumes the trade-off between traveller's mobility, societal control for security reasons, and tourist's informational requests; besides, it resumes a statement or an argument based on a false/invalid inference (fallacy). In spite of these claims it is crucial to shed some light over the following thoughts: it is required an empirical shift concerning privacy normative horizons; personal locational information (PLI) concept needs a further and incessant debate; LTBS design seems to neglect or claim for eureka in control mechanisms regarding PLI, and for that generate unique privacy issues; it is remarkably complex for individuals (tourists) be in control of his location data, as well as to understand until what extent service providers exploit this information; national and international agencies must engage a serious debate concerning locational privacy specificity, in order to evolve the existent laws.

Concluding, in *Mandragola* Machiavelli's comic play, it is possible to feel the spirit of modern science without any of its apparatus. Additionally, in his *Discourses on Livy* lead us to wrap up that to secure and perpetuate the republic (society) is essential to adhere to a new formula: lower moral standards improve society chances of be secure and achieve better results. In fact, locational privacy issues seem to replicate this idea which is exceptionally dangerous for individuals. Therefore it is required an urgent debate and countermeasures, otherwise the panoptic effect of Bentham will become a reality.

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WHAT IS QUALITY WEB-BASED CAD (COMPUTER AIDED DESIGN) TRAINING?

Richard Cozzens

Abstract

In this paper, I review the findings of Phase I of my research which findings were presented at the Ethicomp2008 conference.[17] As a result of Phase I of my research, I concluded that I needed to define "Quality Web-Based Training for CAD" in greater detail. In this paper, which is Phase II of my research, I address the question "What is Quality Web-Based CAD Training?" I answer this question by presenting a brief history of how I got involved in web-based training for CAD, discuss how I determined the importance of this particular question, and briefly review the results of my Phase I research. Next, I attempt to answer the question (Phase II) with literature review and some results of my action research. Finally, I close the paper summarizing my conclusions and comment on the future of quality web-based training

1. Introduction

This paper is a continuation of my research in the area of web-based CAD training. Phase I of my research was "Feasibility of Web-Based Training for CAD" presented at the Ethicomp2008. This paper is organised in the following order: 1. Introduction, 2. Overview of this Research, 3. Methodology Process, 4. Conclusion and Future Direction followed by References. Section 2 (Overview of this Research) describes the main motivation behind my research.

2. Overview of this Research

In this section, I discuss the various studies conducted in this field of study, including a history of this research and a discussion of both Phase I and Phase II of this research.

2.1 Workbook to Website

In 1997, I attended my first COE (CATIA Operators Exchange) conference in San Diego, California. At that conference, I learned that the Dassault Systemes (the developers of the CATIA CAD software) was releasing a new version of CATIA, Version 5. Version 5 was going to be a total rewrite of the source code. As a result of this announcement, I realised that there was going to be a need for training new designers as well as retraining existing CATIA users. In 1999, I attended another COE conference in Palm Springs, California, along with about 1,200 other CATIA users, where I had a first look at the new version of CATIA V5 (Version 5). As the crowd was impressed by the rehearsed presentation, it was then that I realised the magnitude of the future training requirements with the introduction of this new product. This new version of CATIA changed the interface as well as the approach to solid modelling and the design process. The users had to learn a new program and change their design process.

Southern Utah University (SUU), along with a handful of other original IBM HEAT (Higher Education and Training) members, received their first copy of the CATIA V5 software (release 3) during the last part of February 2000. We had CATIA V5 loaded on our slow clunky machines that barely met the minimum spec requirements. We (SUU) started a class that semester using the CATIA V5 Software that was wrought with many difficulties. Our machines did not have the operating capabilities to run a complex program that had so many bugs. Systems crashes were a regular occurrence in each class. SUU was the first school to actually offer a class using CATIA V5. During this timeframe, Dassault Systemes was too busy trying to fix the software bugs and was not prepared with training on their new product CATIA V5.

[17] See "Effectiveness of Web-Based Training".

During this process, I converted my CATIA V4 Curriculum to enable me to use the materials in the CATIA V5 Class. At this point, I felt it would be beneficial to write a book to meet the training needs for CATIA V5. This was my first solution to solving the training and re-training problem. Stephen Schroff from the Schroff Development Corporation agreed to publish and market the book.

The book was released in the fall of 2001 and was an instant success because of the overwhelming need for training material for the program. The popularity of the book provided me an opportunity to go to companies and universities as a trainer and/or consultant. All of this training required a great amount of travel. I could not meet all of the requests for in-house training because of my teaching obligations at Southern Utah University. At this point, I began to research how I could teach the class virtually. At the same time, SUU started to promote the use of WebCT in the university classes. I began to further address the learning needs of CATIA V5 users by developing an online version of my book using WebCT and was able to pilot it with my concurrent high school classes. As the course progressed, I kept adding to the curriculum and moved from traditional assignments in the text to video lectures and PowerPoint Presentations.

WebCT proved to be a successful learning format for the university, but I was not able to directly apply usage of this tool directly to industry training. I did, however, create a "CATIA V5 Workbook" website that provided online training to people in industry. This site gave me the method of collecting valuable information about web-based training. This website gave me the opportunity to try new ideas. The success of my book and the website provided me with opportunities to publish my research findings. I shared my research data with many companies and teachers offering CATIA V5 Training. Not long after the deployment of my online training, many competitors began to offer a web-based training option. Many companies, such as "Get It" training and "CATIA Companion" training, used the ideas I presented in my research. The training market exploded because not only did CATIA V5 users need to learn the program, but all the traditional experienced designers needed to be retrained using CATIA V5.

2.2 Explosive Growth of Web-Based CATIA V5 Training

In the year 2000, there wasn't even a CATIA V5 Workbook or any kind of standard training curriculum. In the year 2003, I moved some of the written curriculum to WebCT. I started creating training video and other curriculum material for the WebCT course I taught at Southern Utah University. In 2004, I offered the WebCT course to a rural high school class through WebCT as a high school/university concurrent enrolment class. The students had to learn everything from the material that was available to them on WebCT. This was a true stand-alone distance learning course. The course did have its short comings but it did meet the minimum objective which was to deliver the information to the students. Using the knowledge that I gained through the stand-alone course, I launched the CATIA V5 Workbook website. In the beginning, the site was basic, consisting of Power Point Presentations and video of the lectures. I continued to add additional features such as exercises, scoring rubrics and lesson objectives. I was also able to collect research data such as what features the users liked and disliked and what type of users were connecting to the site, including teachers, students or practitioners. Data was collected from the 1,500+ users to help improve both the functionality of the website and curriculum. This data was shared with Dassault Systemes and other COE members. The CATIAV5Workbook.com [18]was the first web-based training site. In 2005, several other professional training companies started offering some form of web-based training. The cost of this type of training was cheaper than face-to-face training, yet it was still expensive and limited in scope and sequence.

2.3 Shift in the Web-Based CAD Training Market

In the year 2001, a CATIA V5 Workbook or any kind of standard training was non-existent. By the 2005, there was an abundance of Web-Based CAD Training companies. The training companies grew, the amount of curriculum increased, and the technology for web-based training improved. Since 2007, the market for this training has shifted slowly, yet dramatically. The number of companies has declined slightly, but the biggest shift was in the volume of business the companies were experiencing. The volume has declined significantly. The data found in this research was recorded from observations

[18] http://www.CATIAVTWorkbook.com

and conversations only. Listed below are some of the reasons mentioned for this reduced volume in web-based CAD training:

- The need for retraining the experienced CAD users to the new version of CATIA created a bubble in the training market and that bubble has now passed.

- Dassault Systemes has created and made some web-based training available with the purchase of the software. The quality of Dassault Systemes web-based training curriculum has improved since the original development of CATIA V5.

- The market has been flooded with free tutorials, training videos and exercises on home grown sites as well as websites such as YouTube.com19.

2.4 Summary of the Research History

My motivation for this paper started with an attempt to supply needed training material to the students, instructors and practitioners so they could learn CAD in the most efficient method possible. My attempt to do this has been a journey because of the continuous advances in technology; starting with a book moving to WebCT, to my own web site CATIA V5 Workbook.com and now to YouTube. Phase I of my research answered the question as to the effectiveness of Web-Based CAD Training. In Phase II, I will provide a definition of and explore the characteristics of Quality Web-Based CAD Training.

2.5 Overview of Phase I Research

In this section, I give a brief outline of the various studies in the context of web-based training for CAD. In this section, I discuss/review the advantages and disadvantages of Web-Based Training as presented in the Ethicomp2008 paper ―Feasibility of Web-Based Training for CAD (Computer Aided Design).”

The data collection process has been and will continue to be a learning process. What was learned from all this data? The primary purpose of collecting all the data was to meet the objectives listed in the Phase I paper.

Objective 1--Advantages and Disadvantages of Web-based Training

The first objective was to find the advantages and disadvantages of web-based training. This was accomplished using several different methods. One of the biggest disadvantages of web-based training is the absence of the personal (real-time) interaction between the teacher and students. In a significant number of the surveys, participants believed this disadvantage could be minimised by insuring the web-based training had e-mail access and a chat/forum access between the teacher and students. Most experienced educators agreed that it is difficult to replace face-to-face teacher/student contact in a virtual teaching situation.

Objective 2—Feasibility of Web-based Training

The second objective was to determine the feasibility of a web-based CAD training course. Again, previous research helped meet this objective. The existing research and collected data do not clarify the effectiveness of web-based training particularly for CAD. There were standards to measure its effectiveness. The degree of effectiveness was acceptable because it was being used. If the effectiveness of web-based training was not acceptable, the market would die. With the effectiveness meeting an acceptable level, along with economic advantages, research proved that web-based training was effective enough (feasible) to continue development.

Objective 3—Lessons Learned about Web-based Training

The third objective was to use the lessons learned from existing web-based training courses and apply them to a CAD training course. The research and the collected data located in the Phase I research contain invaluable information on making the most effective and useful web-based CAD training course.

Previous research and the newly collected data do suggest that there is nothing that can completely take the place of first-hand classroom interaction between the teacher and students. This is hands-

[19] http://www.youtube.com

down the most effective teaching situation. The advantages and disadvantages have been clarified in the phase I data.

The exiting research was used to guide the development of a web-based training course. The collected data are being used to update and revise the web-based CAD training course. The web-based training course started with just video training. Since then, exercises, models, chat and forums have been added. Testing and certification will soon be added.

Not everybody favours web-based training, but when it economically makes sense, a certain portion of the potential customer base will use it.

Comparing the instructors and students opinion on what components should be included in a web-based CAD course was significantly different. One of the reasons for this is that the instructors have developed the methods that work for them and are more apt to continue to use the same processes. The instructor could view web-based training as a threat to his/her job, importance and/or overall security. Students are more open to new ideas as long as it gets them the information they want, the training.

Another interesting bit of information is how many instructors and others surveyed were self-taught. My experience with CAD would lead me to believe that the great number of self-taught users is due to the lack of quality training material, and particularly for a student‘s affordable training. This number will decline as more and more material is made available to users and the market becomes more competitive.

The existing research has been documented. The current data has been collected and analyzed.

Objective 4— Perceived/Real Ethical Issues Facing Web-Based Training

Although there were some unexpected ethical issues facing web-based training, the issues were really no different than the ones facing the traditional classroom. The real challenge was resolving these issues. The required technology for web-based CAD training course is available. The technology that web-based courses use is just a tool. Just like any other tool it can be used correctly or incorrectly. A majority of the students, instructors and administrators indicate that these challenges can be overcome with careful planning, development and management of even a web-based CAD training course.

Phase I-- Conclusion

The interpretation of the information discussed in the previous sections is that it is not for everyone and not for every subject, but if selected correctly, planned, developed and managed it could be not only an effective teaching tool for CAD but also a powerful teaching tool for a CAD course. A web-based CAD training course has huge potential because it has all the characteristics of other successful web-based training courses. The students can work through the curriculum online, do the homework at home and submit the work online. I was also able to discuss and enhance my awareness about various issues regarding CAD training from my research. Although it has become an ‗accepted‘ and valid method of training, interviews revealed concerns about web-based training for CAD related to both quality and price of the training.

2.6 Updated Literature Review

Since the initial data (Phase I) was collected, technology, curriculum, student and teacher perception and philosophies, a mature and/or shifting in training market and the overall economy have changed or altered. In the Phase I conclusion, Cozzens (2008) stated that despite some disadvantages, over- all, Web-Based CAD Training can be effective. With all these changes, I wanted to address the same questions to see if these changes improved the effectiveness of Web-Based CAD Training. Phase I data came from surveys taken on the CATIA V5 Workbook.com website. Phase II data has come from several different sources including the following:

- A book titled: The Online Learning Idea Book (Shank, 2007)
- I Get It CATIA V5 Training20
- Practical CATIA Training21
- A book titled: Designing Web-Based Training (Horton, 2000)

[20] http://www.myigetit.com/home/home.aspx

[21] http://www.practicalcatia.com/

Most Web-Based CAD Training sites now provide certificates for the participants. In Table 1, I used the I Get It CATIA V5 Training website to demonstrate the certificate as well as the other items listed in the Table. I included an additional feature to the bottom of the Table I titled ―surfing/skimming". I added this component to the list because Kamp (2007) believed that it was important enough to consider, he stated ―Forengineering education a helicopter view is desirable. But it is hard to teach and surfing the internet is insufficient. Where educators dream of dedicated software to assess complexity ‗at a single glance', students imitate this seeking after efficiency."

Web-Based Component	**Phase I Disadvantages of web-based CAD training**	**Phase II Disadvantages of web-based CAD Training**
- No existing certification	None existing	- Most paying sites now have certificates (I Get IT CATIA V5 training)
- Limited Technology and resources	True	- Improved but still dependant on location/user
- Communication	True	- Matter of opinion
- New Way to procrastinate	True	- Still requires a motivated learner (Artino and Stephens (2009) stated ―To succeed in autonomous online learning environments, it helps to be highly motivated, self-regulated learner.")
- Course management	True	- Improved by technology
	Advantages of web-based CAD training	**Advantages of web-based CAD Training**
- Communication	True	- Good/improved with technology
- Dissemination of information	True	- Good but improved with technology
- Student management	True	- Good but improved with technology
- Grading	True	- Good but improved with technology
- Accessibility and flexibility	True	- Good but improved with technology
- Cost efficient	True	- Greatly improved - (Practical CATIA Training. This website clearly states that it has most affordable price and is offering discounts)
Surfing/Skimming	Not included in phase I	- Depends on Training sites.

Table 1: Comparison between Phase I and Phase II

3. Methodology

3.1 The Process

This information was obtained using action research. Action research is the best method because it allows you to design a plan, put the design into action, observe the results of the action, reflect on what you observed/learned. This is a continuous process until you are able to come to some sort of conclusion. This process is exactly what I have been doing starting with Phase I and continuing to Phase II.

My plan was to experience and document as many as many different types of CAD Training as possible. The Training had to have at least some web-based component in the training. The ideal situation would to survey several different participants that participate in all the same training.

Although this would be the ideal situation for collecting data, it was not financially possible. Table 2 lists the different components use to compare the different training options.

The action portion of this research was to purchase, attend/participated and complete each type of training option listed in Table 2 and document the differences between the different web-based components.

Over the past year I have attended or participated in seven different types of training as listed in Table 2. This experience has given me the opportunity to observe the advantages and disadvantages between the types of training.

Documenting Phase II of this research has allowed me the opportunity to reflect on the different types of training and the advantages and disadvantages of each. Table II contains the components being compared between the different types of training.

This is a continuous process, reflecting on the findings will help plan the next needed action and start the process again.

Online Components	**Class Room Training**	**CATIA V5 Companion**	**I Get it**	**Practical CATIA Training**	**CATIA Forum**	**YouTube**	**SUU eLearning**
Training Cost	$1,200.00	Comes with software	$2,800.00	$1,200.00	Free	Free	Tuition
Travel Cost	$1,500.00	None	No	None	None	None	None
Certification of Quality (Guarantee)	Yes	No	Yes	Yes	No	No	Some
Table of contents (Training road map)	Yes	Yes	Yes	Yes	No	No	Yes
Instruction (Lecture/Video)	Yes	Some	Yes	Yes	Some	Yes	Some
Documentation (Electronic/hardcopy)	Yes	Some	Yes	No	No	No	Yes
Power Point (over view)	Yes	Some	Yes	No	No	No	Some
Examples (Tutorials)	Yes	Yes	Yes	Yes	Some	Some	Some
Definitions and Terms	Yes	Yes	Yes	Some	Some	Some	Yes
Interactive exercises with feedback	Yes	Some	Yes	Some	No	No	Yes
Exercise flexibility	Yes	Yes	No	Yes	Yes	Yes	Some
Exercises (Key)	Yes	Yes	Yes	Yes	Some	No	Yes
Tests (assessments)	No	No	Yes	Some	No	No	Yes
Access to Instructor E-mail (Questions)	Yes	No	Yes	No	No	No	Yes
Grade	No	No	Yes	No	No	No	Yes
Certificate	Yes	No	Yes	No	No	No	No
Did I meet Learning Objectives?	Yes	Some	Yes	Yes	No	Some	Yes
Allows Skimming	No	Yes	Limited	yes	Yes	Yes	No

Table 2: Findings of Phase II

GoEngineer Training: [22]This was a Face-to-Face class held December 20 through-23, 2009 in San Diego CA. The class was face–to-face with documentation and exercises. This was a high quality class that contained every training component listed in Table 2. This training was very expensive not just for the training but for the travel and hotel.

22 http://www.goengineer.com/

CATIAV5 Companion: This is an online tutorial that comes with the CATIA V5 software. I used this to help find answer to specific questions about CATIA V5. I used it over the past year. It is a sequential tutorial but does allow surfing. There is a lot of information but it is difficult to follow. The program has license requirements and is difficult to load and run.

I Get IT Training: This is purchased online class. It is pure online class. I have used several training modules over the past two and half years. It is very high quality but very expensive. The program is also very limiting, you have to complete lesson on video, exercises and test prior to moving on. This makes it very difficult to skip to a particular section. You cannot surf or skim to the area that you want to learn, you are locked into their prescribed sequences. Once you pass a particular section, you can no longer access the section.

Practical CATIA Training: This class was a purchased DVD that you loaded on the computer. It did require the internet to down load the license key and password. Over the past two years, I have been using this site and going through the modules one by one. The training consisted mostly of video lectures and some exercises. The video was high quality. The course was reasonable priced. The ability to surf to a subject of interest or skim numerous subjects at a time allows a great deal of flexibility. This flexibility could be a problem for a non motivated learner.

CATIA V5 Forum: This was found by just Googling a CATIA V5 Question and or training. There are a lot of different sites at this level and the quality varies a lot. The information is spotty and inconsistent but easy to access and free. There are some sites that require a membership and registration. I did not sample any of these sites due to time constraints.

You Tube: The quality and amount of information is spotty but over all there is an amazing amount of quality information available. For CATIAV5 this training is not organised or sequential. If it is just information you are seeking and you are a motivated learner, this is a powerful resource. If you are looking for structure and sequence this type of training would not meet the learner‘s needs.

SUU eLeaning: This is a class I teach at SUU using Blackboard (Fundamental of CATIA V5). The information is a summation of a survey I gave my class the Fall Semester 2009. All 14 students valued the web-based portion of the class for the following reasons:

- Calendar of lecture and assignments
- Homework requirements (along with a scoring rubric)
- Electronic method of turning in homework
- Instant access to the grades
- Electronic book (cost efficient)
- Access to reference material (training video).

4. Conclusion and Future Direction

In this paper, I have covered a history and a development of web-based CAD training for a period of about 12 years. During those 12 years, data has been collected which is represented in Phase I and Phase II of this research. I have compared the findings between Phase I and Phase II in reference to the main components of web-based training. I have attended and/or participated in seven different types of CAD training all in an attempt to define ―Quality CAD Web-Based Training?” Although I have a better idea of what a quality CAD Web-based Training might look like, I have learned the definition directly relates to your learning objective. If you are looking for structured, planned and sequenced training quality will look different than someone looking for quick specific bits of information. With this said, all types of training will share the same basic root of components that will help determine its quality. Further research will be required to help define quality, based on the learning objective.

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ENGAGING THE STUDENTS OF TECHNOLOGY IN AN ETHICAL DISCOURSE IN THE INFORMATION AGE: THOUGHTS OF WIENER AND GANDHI.

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Abstract

This paper is about making the ethical discourse relevant to the students of technology in the present age of information. Information ethics is already a part of the present day engagement with information technology at all levels. This encourages us to carry forward the ethical discourse further by bringing in the moral thoughts of Wiener and Gandhi. Both Wiener and Gandhi lived in the age of technology, but both rebelled against it for basically moral reasons. Wiener is the founder of cybernetics and communication science, while Gandhi is a humanist and moralist and a crusader for freedom of humanity. Both agreed, however, that human freedom needs check on the inhuman use of technology. That is, both shared the philosophy of human dignity and value which demand a "human use" of technology. In this paper we explore the possibility of a humanistic ethics for information technology on the basis of moral thoughts of Wiener and Gandhi and wish to present the vision of the human civilization which underlies their thoughts.

1. Introduction

Ethical considerations had been of importance to mankind much before the accelerated development of technology commenced some two hundred years ago. These ethical considerations were part of liberal education of a citizen as lessons in character building. But, with progress in technology, greater emphasis in education shifted to specialised (engineering) knowledge and lessons on character building were abandoned. It was hoped, as articulated by Introna, that 'the traditional sources of moral knowledge such as religion, the state and the family' would take care of character building. But these sources themselves are 'becoming elusive as the nature and legitimacy of these institutions are being challenged and transformed' (Introna, 2002). Feeling this absence, a few decades back, courses in engineering ethics have been started. These courses have been 'formed by two primary influences: the code of ethics of engineering societies and regulatory boards and the so called "disaster cases" such as the *Challenger* and *Columbia* accidents' (Harris, 2008). These influences have led to the development of "preventive ethics project" which has been accomplished primarily by promulgation of negative rules. Harris has pointed to the limitation of these negative rules and has argued that 'virtue ethics is a more appropriate vehicle for professionalism'. Further, Harris has argued that 'the ethics of virtue is often elaborated in terms of a relatively extended description of a virtuous person' (Harris, 2008). Accordingly, the portraits of two virtuous persons, Norbert Wiener (1894 -1964) and Mahatma Gandhi (1869-1948) have been portrayed in this paper. The choice has been made keeping in view that Wiener is considered as one of the founding fathers of Information and Communication Technology (Bynum, 2008) and Gandhi was a master communicator to the masses and intelligentsia alike (Parel, 2007). He achieved this without the help of state-of-the-art technology and succeeded only because the power of his message of non-violence and self-control was very meaningful.

2. Engagement with Information Technology: The Scope for A Moral Discourse

Information Technology is many-faceted and multi-dimensional. It has pervaded a large part of human society through the use of mobile phones, computer, internet and other devices of communication The social utility of information technology can hardly be overstated since it has unified mankind in no uncertain terms by bringing the human beings closer. The present day culture of globalization is no less due to the rise in information and communication technology.

But information technology is not an unmixed blessing. Like any other technology, it has its negative uses which may harm mankind. That is why there is always the need of building a moral boundary around information technology to safeguard it against inhuman and immoral use.

Information technology when wrongly used can immensely harm the interest of the humanity. It must be emphasised here that no technology is above humanity and no human activity is without a moral basis. That is the reason why a moral discourse is necessary for making the good use of technology possible.

What is a good use of technology? What are the criteria of such a good use? These questions need to be answered in the proposed moral discourse. For this we need to probe into the very nature of Good itself as it has been done by moral philosophers. *Prima facie,* that is morally good which fulfils the criteria of being acceptable to the large community of rational beings. Thus goodness is related to human acceptability under the strict conditions of its increasing the human happiness or well-being (Aristotle 1984; Bynum 2006). Such a view of ethics ensures that a moral society consists of rational beings that have the capacity to make moral decisions and judgments in furthering the well-being of all human beings.

The good use of technology must therefore fulfil the conditions of being useful in increasing human happiness or well-being. The ultimate goal of a society is to enhance the happiness of the community of human beings: so a good technology is one that increases happiness and a bad technology is one that decreases that happiness. If this is the foundation of information ethics, then it can make information technology morally useful to the human society.

The moral discourse proposed for information technology must be based on the following principles:

1. The principle of human freedom and justice
2. The principle of human dignity
3. The principle of compassion and benevolence

These principles are the fundamental moral rules which can guide the human beings in their use of information technology.

3. Wiener and the Good Use of Technology

Norbert Wiener (1954) makes a strong case for a moral reasoning in the use of technology, especially of information technology. He is aware that the enormous advance in communication technology has its adverse impact on the human beings and on their moral and spiritual well-being. He writes:

Thus the new industrial revolution is a two-edged sword. It may be used for the benefit of humanity, but only if humanity survives long enough to enter a period in which such a benefit is possible. It may also be used to destroy humanity, and if it is not used intelligently it can go very far in that direction (1954: 162)

That the new technology can both benefit and harm humanity cannot be denied. Wiener wants that it be used for the benefit of humanity rather than for its destruction. It is in this spirit that he makes a strong plea for an ethics that makes us aware of the ―social dangers of our new technology and the social obligations of those responsible for management to see that the new modalities are used for the benefit of man, for increasing his leisure and enriching his spiritual life, rather than merely for profit and the worship of the machine as a new brazen calf" (Wiener 1954: 162). The moral vision underlying this plea is that of a well-ordered society in which human beings live in harmony and have the utmost spiritual well-being.

Wiener's moral vision consists in promoting a society of human beings all assured of freedom and dignity and of elimination of injustice by the State and other powerful agencies. He is wary of the situation in which man is powerless and cannot ensure his own dignity against the political forces. He warns of such a situation when he writes:

We are running the risk nowadays of a great World State, where deliberate and conscious primitive injustice may be the only possible condition for the statistical happiness of the masses: a world worse than hell for every clear mind (Wiener 1954: 180).

Such a situation can be warded off only by ensuring that the society does not become draconian because of its industrial and technological prowess. In such a situation the control over mankind will be exercised by the rich and powerful through the use of machines. The machine –based society is likely to have the ―growing military and political mechanization of the world as a great superhuman apparatus working on cybernetic principles" (Wiener 1954: 182). The future of mankind is at stake if such a ―superhuman apparatus" takes over the fate of mankind.

Wiener's moral theory can be that of human flourishing (Bynum 2006) because of his emphasis on the human well-being as central to his vision of man and society. Anything that hinders flourishing is definitely bad or evil for him. It is in this connection that Bynum (Bynum 2006: 163) has brought out Weiner's four principles of justice, namely:

THE PRINCIPLE OF FREEDOM - Justice requires "the liberty of each human being to develop in his freedom the full measure of the human possibilities embodied in him".

THE PRINCIPLE OF EQUALITY- Justice requires "the equality by which what is just for A and B remains just when the positions of A and B are interchanged".

THE PRINCIPLE OF BENEVOLENCE - Justice requires" a good will between man and man that knows no limits short of those of humanity itself".

THE PRINCIPLE OF MINIMUM INFRINGEMNET OF FREEDOM - "What compulsion the very existence of the community and the state may demand must be exercised in such a way as to produce no unnecessary infringement of freedom".

These four principles embody Wiener's ethical theory so far as the new information age is concerned. In an age of increasing interference in the human freedom and dignity and thus in human flourishing, it is imperative that the human society is morally committed to increasing human happiness rather than decreasing it.

4. Gandhi and Technology with a Human Face

Like Wiener, Gandhi had many misgivings about the age of technology which he considered to be a part of modern civilization. Gandhi (1938) considered modern civilization soulless and without moral foundations because of its origin in human exploitation and the degradation of the human values by rampant use of machines at the cost of man. Gandhi writes:

I am clear that whilst this machine age aims at converting men into machines, I am aiming at reinstating man turned machine into his original estate (Gandhi 1966: 157).

Thus Gandhi aims at reversing the civilization based on machines into a civilization based on human values such as freedom, justice and dignity. It is the human autonomy that is the aim of civilization according to him.

Gandhi sees in the machine age the spiritual decadence of the human race because machines directly hurt the human soul by supplanting the human labour. Human beings are replaced by the machines and thus they lose their dignity in competition with the machines. However, Gandhi is not against the machines as such but against the craze for the machines which has dominated our civilization. Gandhi writes:

How can I be when I know that even this body is a most delicate piece of machinery? The spinning wheel itself is a machine; a little tooth-pick is a machine. What I object to is the *craze* for machinery, not machinery as such. The craze is for what they call labour-saving machinery. Men go on 'saving labour' till thousands are without work and thrown on the open streets to die of starvation (Gandhi 1966: 93).

It is thus the human concern which made Gandhi object to the craze for machine and for rapid industrialization. He believed that because of the use of heavy machinery thousands of human beings are thrown out of employment and thus left to starvation.

Gandhi's passionate defence of human freedom and dignity is underlying his harsh judgment on the present state of machine-civilization. He believed that the machine age is not conducive to the spiritual growth of the human race because it makes human beings wretched and miserable due to mass poverty. He writes:

I do want growth, I do want self-determination, I do want freedom, but I want all these for the soul. I doubt if the Steel Age is an advance upon the Flint Age. I am indifferent. It is the evolution of the soul to which the intellect and all our faculties have to be devoted (Gandhi 1966:84).

Gandhi conceived of a true state of human civilization in which human freedom is achieved and man is freed from all kinds of slavery. The freedom of the human soul is the goal of mankind according to him.

5. The Wiener-Gandhi Dialogue on the Future of the Human Civilization

Can the human civilization survive if there is unbridled growth of the machine age and the consequent misuse of technology? This is the question which Gandhi and Wiener have addressed in their own ways. For Gandhi, the civilization of the modern West is basically a machine-civilization which needs to be re-evaluated and replaced by a more human civilization, not based on aggrandisement of wealth and power. In Hind *Swaraj* (1938: 81), he writes:

Machinery has begun to desolate Europe. Ruination is now knocking at the door of the English gates. Machinery is the chief symbol of modern civilization; it represents a great sin.

This indictment of modern Western civilization might appear too harsh, but what Gandhi means by it is that too much mechanization of the society cannot but have its impact on the moral and spiritual life of the people. What Gandhi resents in modern Western civilization is its lack of moral and spiritual foundations. He considers this civilization a curse, a disease and a sin because it does not contribute to the moral and the spiritual growth of mankind. For him, civilization promotes the moral and the spiritual well-being of the society. Gandhi defines a true civilization in the following way:

Civilization is that mode of conduct which points to man the path of duty. Performance of duty and observance of morality are convertible terms. To observe morality is to attain mastery over our mind and our passions. So doing, we know ourselves (1938: 53).

In view of this, it is understandable that Gandhi does not consider the modern Western civilization as reaching the moral standard set by him. It is not that everything in this civilization is wrong, but the fact that it does not promote happiness of the people is a sign of its spiritual decadence. Gandhi is not alone in saying so, as he is inspired in this regard by Tolstoy, Carpenter, Thoreau and other Western thinkers in condemning Western civilization of the modern times.

Wiener, on the other hand, is born in Western Civilization and has contributed to the development of Western technology. Yet he is a rebel against this civilization like Gandhi. His attack on the civilization is not as radical as Gandhi‘s, but it cannot be denied that he has made humanity the highest value above everything. Wiener believes that humanity must prosper because of the advancement in science and technology. Science and technology are a means rather than an end according to him. That is the reason why he says that technology must not disturb the moral fabric of the human society and must not subvert our moral life. That is, we must secure our system of values against the threat from the new machine civilization which is ruthlessly pursuing the value of power. In this context, it is worth noting that Wiener had amply contributed to technology that led to decisive defeat of the Axis forces in World War II. Be that as it may, at the end of the World War II, Wiener was thoroughly disillusioned with the unethical behaviour of the war administration. He rebelled against the American State as is obvious from the perusal of a letter ―A scientist rebels!” written to the Atlantic monthly (Wiener, 1947). In this letter, Wiener mentions his refusal to communicate one of his work to an engineer from Boeing working on guided missiles and ‗not to publish any future work … which may do damage at the hands of irresponsible militarists‘. For this refusal he was hounded by State and in this mood he wrote the book ―The Human uses of Human Beings” (Wiener, 1950, 1954) where he propagated his view of ethics.

Wiener‘ ethics speaks of the human good and the good of the whole universe. This good can be realised only by means of promoting human welfare. No human society can thrive only on the success of its science and technology. It requires religion, ethics, art and other intellectual pursuits to make a complete society. Thus we cannot make the society fully dependent on the technological advances only. We require an intellectually open society for making human happiness possible.

Gandhi would have welcomed Wiener‘s proposal to cut down the destructive technologies which have contributed to the military might of the modern warring nations. Gandhi was in favour of eliminating the weapons of mass destruction which have proliferated over the years for the sake of a peaceful world. That is why he led the Indian freedom movement without any weapon of violence and destruction. He chose the weapon of Non-violence to conquer the colonial powers. Such is the unique achievement of Gandhi in the history of mankind.

6. Moral Progress, the Human Spirit and the Technological World

The recent developments in computer and information technology have made the world insecure because of the non-existence of a moral space in which they can be lodged. Technology which is morally free can turn into a dangerous weapon which can kill thousands without entering into a conventional warfare. The information technology has brought the world closer but at the same time it has opened the possibility of the destruction of this world because the easy communication and easy networking can bring the destroyers of the world closer. The recent terrorist attacks in various parts of the world have shown how easy communication has made terrorism far more deadly than conventional warfare. Information technology can be misused by the evil-minded people to get the world destroyed. Both Wiener and Gandhi anticipated the disastrous consequences of technology in the hands of man, when both warned that the human nature being what it is any new technology can become a means of exploitation and injustice. Gandhi wrote:

To use the language of the Bible: ―What shall it avail a man if he gain the whole world and lose the soul?" In modern terms, it is beneath the dignity of man to lose one's individuality and become a mere cog in the machine. I want every individual to become a full-blooded, fully developed member of society (Gandhi 1966: 172).

Gandhi knew that modern technology would reduce man to a cog in the machine and thus rub him of his individuality. Such a scenario is built into the very nature of the process of mechanization of life in all aspects.

Can we hope for a better world than the one governed by technology? That is, can we establish a world that is morally strong enough to resist the temptation to misuse technology? These questions are part of the moral discourse regarding computer and communication technologies. All moral theories around information and communication technology are concerned with laying down the foundations of an ethics that can safeguard humanity against the possible dangers of technology. The Gandhi-Wiener discourse is precisely about this humanist ethics that can make possible the moral and human use of technology.

Both Gandhi and Wiener believe that the human nature cannot be defined in terms of the mechanical forces which constitute the human body. Man is above matter and thus he cannot be satisfied by material possessions alone. Gandhi is emphatic about the spiritual nature of man when he says that man has a spiritual consciousness in him. Gandhi writes:

Let it be remembered that physical force is transitory, even as the body is transitory. But the power of the spirit is permanent, even as the spirit is everlasting (Gandhi 1966: 267).

This shows the spiritual idea of man in Gandhi's philosophy. He does not speak of a mechanical man but of a spiritual man who can rise above the material world for seeking higher values of life.

Wiener thinks of man in terms of the information systems which constitute the bedrock of the universe. But man is a not a material body alone; he has a mind that processes information. Thus man is not to be reduced to a physical system of matter and energy. There is consciousness in man which can be interpreted in terms of information and therefore in terms of higher faculties of intellect and reason. Wiener writes:

We, as human beings, are not isolated, systems. We take in food, which generates energy, from the outside, and are, as a result, parts of that larger world which contains the sources of our vitality. But even more important is the fact that we take in information through our sense organs, and we act on information received (1954: 29).

Thus we take the humans as different from machines because of their capacity to transform information into knowledge. Man, Wiener believes, can rise above the machines on the ground that man can make good or bad use of machines.

Both Gandhi and Wiener accept a higher world than the mechanical world in the sense that the human world is constituted by the human intellect and will. Besides, the human world is pervaded by the sense of values and the faculty of moral conscience. The Gandhian values of truth, non-violence, purity of mind and soul, non-possession and non-stealing are grounded in the human soul which is above the mechanical world. Similarly, the Wienerian values of freedom, justice, equality, peace, well-being, etc. are grounded in the same human spirit to which Gandhi appeals. Both these value-systems are complementary to each other because while Gandhi's emphasis is on the spiritual

development of man, Wiener emphasises the public virtues of democratic life such as freedom and justice.

The moral progress of mankind is towards a democratic world based on the moral and spiritual values. No world without the moral and spiritual values can be truly democratic and egalitarian. Both Wiener and Gandhi have argued for such a world based on moral and spiritual wisdom.

7. Entropy and the Physical Universe

Wiener's theory of the entropy of the universe shows that the universe has a tendency to slide into chaos out of order. This universal characteristic of the physical phenomena is applicable to the human systems such as our culture, society and polity. Each such system is prone to entropy like the earth on which we live as matter of a cosmic accident. Wiener writes:

Again, it is quite conceivable that life belongs to a limited stretch of time, that before the earliest geological ages it did not exist, and that the time may well come when the earth is again a lifeless, burnt-out, or frozen planet… it is a foregone conclusion that the lucky accident which permits the continuation of life in any form on this earth, even without restricting life to something like human life, is bound to come to a complete and disastrous end….

In a very real sense we are shipwrecked passengers on a doomed planet. Yet even in a shipwreck, human decencies and human values do not necessarily vanish, and we must make most of them. We shall go down, but let it be in a manner to which we look forward as worthy of our dignity (1954: 40).

This vision of the cosmos evokes a tragic sense which brings in the idea of spiritual and moral dignity of man. Wiener is emphatic on this moral dignity of man. The universe may be coming to an end in the distant future, but that does not deny the value of our life and its spiritual possibilities.

Gandhi agrees on the fact that the human life, even in an ephemeral universe, is a divine gift and it cannot be frittered away through violence. Man's life, according to Gandhi, is the most precious entity as every other form of life is. Therefore there cannot be any attempt to harm any life at all. The life of the human race along with the life of the universe must be protected at any cost through Ahimsa. The engulfing entropy must be resisted by adherence to truth and non-violence (*satyagraha*). Gandhi believes that the physical universe is not the ultimate truth because the moral and the spiritual world is higher than this world. Truth as God is higher than the material world that is bound to be dissolved. Gandhi, however, does not believe that the Ultimate Reality can be subject to entropy. But this is his spiritual faith rather than a scientific hypothesis.

The shipwrecked passengers that we really are can rise above this fate by ensuring that we participate in the higher values of life and seek the wisdom of the moral and the spiritual kind.

8. Conclusions

The students of technology must understand that we have a higher life to realise and higher values to aspire for. These values are not within the limits of our technological progress. We have to rise to the Gandhi-Wiener level of understanding the world and make use of the gifts of technology with wisdom and foresight. Let technology be a means and not an end. Let human beings be treated as ends in themselves as Wiener and Gandhi have told us.

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RESPONSIBILITY ASCRIPTIONS AND ORGANIZATIONAL STRUCTURE: THE CASE OF OSS COMMUNITIES

Neelke Doorn

Abstract

Responsibility ascriptions in the practice of ICT development and use is a topic of ongoing concern. The present paper focuses on the organizational structure in which computer systems are being developed. Borrowing from two examples of Open Source Software (OSS) communities I will try to show how trust relations replace the traditional power relations of hierarchical organizations, herewith enabling software developers to discharge their responsibilities. The paper concludes with recommendations for organizational design.

1. Introduction

In the literature on ethics and ICT ample attention is given to the responsibilities of programmers and system designers. The central questions relate to the topic of "responsible computing" (Johnson and Powers, 2005; Genova et al., 2007; Ahmed and Van den Hoven, 2008), "responsible use" (Vedder, 2001; Tavani and Grodzinsky, 2002) or blame for harm due to erroneous software, either intended or unintended (Nissenbaum, 1994; Takanen et al., 2004; Stieb, 2008). Recently, Deborah Johnson and Thomas Powers have enriched the discussion on ICT and responsibility by focusing the attention to the role of the computer system itself and its complexity . An analysis of moral responsibility without paying attention to the computer system itself is incomplete, the authors argue. Johnson and Powers mention a threefold complexity in the relation between responsibility and computer systems. The first relates to the metaphysics of responsibility: responsibility issues related to computer systems are *ontologically* complex because of the many people involved in their development and use, varying from modellers, coders and testers to documentation writers, system administrators, and users. Computer systems are not unique in this regard. The so-called 'problem of many hands' is a well-known problem within science and engineering. It refers to the difficulty of identifying, even in principle, the person responsible for some outcome if a large number of people are involved in an activity.

The second type of complexity Johnson and Powers distinguish is the *conceptual* complexity, which refers to the ambiguity in the way the concept is used. It is not without reasons that the political philosopher Miller labelled responsibility as one of the most 'slippery' notions in moral and political philosophy (Miller, 2001: 455). Not only does the concept vary over disciplines (moral responsibility is something different than legal responsibility or the everyday notion of responsibility), the term responsibility can also have different meanings within one discourse (viz. the use of the terms causal responsibility, role responsibility, moral responsibility within the ethical discourse), or refer to different time horizons (prospective or forward-looking responsibility versus retrospective or backward-looking responsibility). These different concepts each can have overlapping and interdependent meanings, which sometimes leads to conceptual confusion.

The third type of complexity Johnson and Powers distinguish is the *technological* complexity, which is the main concern of their paper. Their argument briefly runs as follows: since much moral action is *technological* moral action (TMA), the traditional notion of responsibility, when applied to human beings who are acting with and through technology, does not capture the full scope of the freely-chosen character of technological artefacts. Human intentions and what they achieve, is partly dependent on the designed character of artefacts. TMA involves three integrated components (artefact, user and an artefact-maker), which taken together determine the ways the user could act. Since technologies are different, there will be different TMAs, and consequently, different courses of action and different outcomes. The latter cannot be judged without taking into account the artefact itself.

The authors' paper is very informative and it contributes to the discussion on responsibility by focusing on the contextual and ontological complexities of TMA. Following this "Latourian" account of responsibility, I would like to focus on another important aspect that is often overlooked in the

discussion of individual responsibility, namely the organizational structure in which the computer systems are being developed. Just as artefacts unmistakably provide *and* limit certain courses of action, the organizational embedding of actors involved in ICT development has a similar effect.[23]

Insights from Science and Technology Studies (STS) show that traditional hierarchical organizations constrain the courses of action for individual members of that organization. If we follow the prevailing account of moral responsibility in ethics, which conceives of moral responsibility as a set of conditions that have to be met before one can be held responsible, it is questionable whether these conditions are ever met.[24] Since modern technology development is essentially a collective undertaking individual actors do not have the autonomy that is required for individual responsibility, so it is argued (Swierstra and Jelsma 2006).

In the present paper I will make a comparison between traditional organizations (in ICT: intellectual property (IP) organizations) and communities that work according to the Open Source Software (OSS) model.[25] I will try to show how the way the work of the collective of contributors is structured (i.e., the organizational structure), to a large extent determines whether and how we can hold people responsible for their actions.

The reason for focusing on OSS communities is twofold. First, OSS communities are the paradigmatic example of non-hierarchical networks, and as such they exhibit a different organizational structure than traditional hierarchical organizations. Second, contrary to the ontological and conceptual complexity Johnson and Powers refer to, which is valid for the whole branch of engineering and technology development, OSS communities are typical for work being done in the ICT sector. Although originating from communities of ICT hobbyists, the OSS model is increasingly considered a viable approach in commercial settings as well (Ågerfalk and Fitzgerald, 2008), exactly because of its promised advantages of reduced salary costs and cycle time, the absence of commercial obstacles for innovation and opportunities for specialised learning, innovation and shared best practice, and closer proximity to users (Carmel, 1999; Ebert and De Neve, 2001; Carmel and Tjia, 2005).

The outline of this article is as follows. In the section following this introduction I discuss the conditions that together capture the traditional individualistic approach to moral responsibility. I then show how they apply to OSS communities and hierarchical IP organizations. Based on insights from organizational science and sociology, the subsequent section is dedicated to trust, the glue that holds OSS communities together. In this section, I show how trust relations replace the traditional power relations of hierarchical organizations, which enable the actors to discharge their responsibilities. I end this paper with recommendations for other professional organizations that are confronted with responsibility issues.

Throughout the text I will borrow from two examples of OSS communities: the Fedora project and WirelessLeiden, a local user community that created an open wireless networking infrastructure built on Wi-Fi technology in the Dutch city of Leiden and surroundings. For reasons of space I cannot elaborate on these cases. For the Fedora project the reader is referred to the numerous internet sources on this project. A good description of the WirelessLeiden project can be found in (Van Oost et al., 2009). The data on these cases is collected through interviews with previous members of the Fedora project and board members of WirelessLeiden.

2. The traditional notion of backward-looking responsibility

Responsibility is one of the core concepts in philosophy, and it is therefore widely discussed in the philosophical literature. The majority of philosophical texts is about retrospective or backward-looking responsibility ascriptions. These ascriptions are often discussed in terms of conditions that have to be

[23] Note that I focus on the developers of technology, which is somewhat different from the discussion of TMA which primarily focuses on users.

[24] I think this account of moral philosophy to a large extent overlaps with the common sense notion of responsibility.

[25] I define the OSS model rather loosely as the collective term for the approach of peer-based cooperation aimed at the use, change, and improvement of software under the GNU General Public License (GPL) or that is in the public domain ([Perens, 1999]). Typical OSS products include the LINUX operating system (developed in different communities, of which RedHat, Fedora and Debian are the most well-known) and the increasing number of wireless networks that are built and maintained by volunteers.

met before someone can be fairly held responsible or accountable for some negative outcome (cf., (Feinberg, 1968; Thompson, 1980; Bovens, 1998; Vedder, 2001; Swierstra and Jelsma, 2006)). Since the practice of holding people responsible for negative outcomes is often accompanied with attitudes of blame, people refer to it as blame-responsibility as well.

In its most basic form, the fact that one can be held responsible involves that one causally contributed to a certain outcome (i.e., there has to be a causal connection between the agent's action and the damage done). Although people disagree on the question how strong this causal link should be, most agree that there should be at least *some* causal connection. It should be noted that in some situations, the causal condition should be understood as the *ability* to influence the causal chain, such as to account for morally faulty omission (e.g., failure to rescue a drowning child).

Also most people agree that the presence of a causal link is not sufficient for *blaming* people for the negative outcome. The discussion on constraints for blaming people goes back to Aristotle, who mentioned two excusing conditions: ignorance and force (cf., (Fischer and Ravizza, 1993)). Phrased positively, to be blamed for a certain outcome a person (1) must have known, or reasonably be expected to have known, what she was doing (including knowledge about particular circumstances) and (2) must have been in the position to do otherwise (i.e., she can not be blamed for actions done under compulsion, external pressure or hindered by circumstances outside her control). Note that ignorance due to negligence does not count as an exempt from responsibility.

But also the inclusion of Aristotle's excusing conditions is not enough to hold people morally responsible. In addition to the three conditions discussed in the previous paragraph (causality, knowledge and freedom), two more conditions can be distinguished. These conditions are relevant in the legal concept of responsibility as well. First, to hold someone responsible implies that a certain norm or value has been transgressed. (Bovens, 1998) argues that there can be no accusation without pre-existing norms and values (in criminal law represented in the principle of *nullum crimen, nulla poena sine praevia lege poenali*, which literally translates as ―no crime, no punishment without a previous law"). A similar argument can be found in the work by (Vedder, 2001), who refers to the pre-existence of tasks or obligations.

The last condition holds that the responsible actor is a moral agent. This condition refers to the mental faculties of the person at the moment of engaging in the action. The person should be responsive to moral reasons. In other words, a person must see her own actions in the light of moral reasons and be able to reflect on these (Fischer and Ravizza, 1998). Young children and people whose mental faculties are permanently or temporarily disturbed will not be held responsible for their behaviour. However, to put oneself knowingly and voluntarily into a situation of limited mental capacity (by drinking alcohol or taking drugs for example) does not exempt one from being responsible for the consequences of one's behaviour. This is the moral counterpart of the legal term *mens rea* (or fully: *actus non facit reum nisi mens sit rea*, which literally translates as ―the act does not make a person guilty unless the mind is also guilty"). Some people phrase this condition in terms of intention, meaning that the action was guided by certain desires and beliefs (Corlett, 2006).

To summarise, there are five conditions: (1) causality, (2) knowledge, (3) freedom, (4) the transgression of a norm or value, and (5) moral agency. These conditions have to be met before an agent can be fairly held responsible for a certain outcome. To illustrate how these conditions work let us look at the following (trivial) example. Imagine Mary and Joe, both collectors of sea shells. Mary invites Joe to look at her newest acquisition, a very rare and precious shell from the Dead Sea, and she hands it over to Joe. Suddenly Mary's dog jumps towards Joe's hand and Joe drops the shell, which unfortunately breaks. Can we hold Joe morally responsible for destroying the shell? The answer seems (obviously) no: even though Joe formally ‗caused' the shell to break (1) without being forced to do so (3), he did never intend to break it (~5) and nor was he aware of the behaviour of the dog (~2). Moreover, Mary gave him the shell, indicating that he was allowed to touch it (~4). Imagine a similar situation but now Mary warns Joe for the presence of the dog and she asks Joe not to touch the shell and to keep it in the glass case. However, Joe is anxious to take a closer look at the shell and to touch it so he picks up the shell at the moment he knows Mary is not looking. Unfortunately, the dog – again – jumps towards Joe's hands and as a result Joe drops the shell. Now the question about blameworthiness is clearly different. In this case Joe did not only cause the shell to break (1), he knew that it was ‗risky' to pick up the shell (2), no-one forced him to pick it up (3), Mary explicitly asked him not to do it (a ‗norm' he deliberately (5) neglected) (4).

This rather trivial example shows how the conditions apply to individual cases. The conditions together capture the general notion of individual responsibility. But how do these conditions apply to situations where individuals act collectively or to complex situations where people work in a division of labour? In the next section I try to answer this question by looking at two different type of organizations and see how the conditions apply.

3. Responsibility within organizations

In the introduction it was argued that insights from STS show that the application of the individual responsibility conditions is problematic in technoscientific practice (which I take to include the broad range of activities related to scientific and technological research and development, engineering and design). These conditions are seldom met, so it is argued (see (Bovens, 1998; Swierstra and Jelsma, 2006)). To elaborate on this issue and see how it relates to the organizational structure, let us take a closer look at two different organizational settings. The first is the traditional IP organization, which can be characterised by its hierarchical structure, and the second is the OSS community, which typically lacks hierarchical relations. Let us see how the conditions apply in case we want to hold someone responsible for certain negative outcomes.

3.1 The causal condition

To start with the causal condition, this condition is notoriously problematic in collective settings, as already pointed out by Johnson and Powers, and numerous other authors (cf., (Thompson, 1980; Nissenbaum, 1994). This holds for both traditional IP organizations and OSS communities. Technology development is almost without exception done in a collective setting in which technological researchers and engineers work together, often with non-technicians as well. As stated in the introduction, Johnson and Powers refer to this problem as the ontological complexity of computer systems and they relate it to the problem of many hands. However, the problem of many hands is an ambiguous term and it deserves some closer attention.

(Davis, forthcoming) has made a valuable contribution to the discussion the problem of many hands by distinguishing between the epistemic and the metaphysical side of the problem of many hands. The epistemic side of the problem of many hands refers to the difficulty *for outsiders* to identify the person who causally contributed to some outcome. For insiders this is less problematic. After all, they mostly know who did what. If the difficulty of identifying the person causally responsible for some outcome is related to the complexity of the causal chain, ―more information" will most likely resolve or alleviate this problem.

The metaphysical side, however, is not so much a problem of many *hands* but rather a problem of many *causes* and here having more information available does not resolve the problem. Failure, in technological disasters, is often the result of several independent failures, each of them being necessary but not sufficient for the system as a whole to fail. But the fact that neither of these individual failures was enough to let the system as a whole fail does not make anyone less responsible. As Davis puts is ―(s)ome parts of responsibility are lessened by being divided, especially financial liability, but the rest, such as blame deserved or the obligation to explain one's own part, may not be."

So the main concern for ascribing responsibility to others is the fact whether some negative outcome can be traced back to the person who contributed to this negative outcome. The fact that many people contributed and that each contribution was a necessary one does not exempt anyone from individual responsibility for his or her own contribution.

In traditional IP organizations, the tracking of people and code is often indeed problematic since commercial products are mostly delivered as black-boxed end products, in which the individual contributions are concealed. However, if we look at OSS communities they seem to be driven by a consequentialist heuristic to deliver good quality work and to prevent or repair errors. They therefore consider it important to be able to trace errors back to their origin. In order to distinguish between different contributions OSS communities follow a twofold strategy. First, in the field of programming people make extensive use of so-called version management systems, which allow for the tracking of the authors of specific pieces of the code. Within the Fedora project, an application is used that is conveniently called blame. This application helps with the version tracking of code and also the tracking of the author of every line of code. In the WirelessLeiden community a similar version

management system is used. Second, large projects are often divided into small subprojects, for which individual people are made responsible. In the WirelessLeiden project, for example, volunteers are made responsible for the maintenance of particular nodes or software packages. The causal condition is therefore only weakly problematic in OSS communities.

3.2 The knowledge condition

The second condition is the knowledge condition. There are roughly two reasons why knowledge might be problematic in technoscientific practice, of which only one holds for traditional IP organizations and two for OSS communities. The first relates to the so-called Collingridge dilemma which states that "attempting to control a technology is difficult, and not rarely impossible, because during its early stages, when it can be controlled, not enough can be known about its harmful social consequences to warrant controlling its development; but by the time these consequences are apparent, control has become costly and slow" (Collingridge, 1980: 19).

This argument seems convincing at first glance. Collingridge is unmistakably right in saying that the consequences of future technologies are hard to predict and it does therefore seem unfair to hold engineers responsible for all unforeseen negative consequences. However, not all technology is radically different from previous designs. Most of the times, engineers build upon knowledge available from existing technologies and this includes knowledge of risks. As professionals, engineers have a duty of due care, which means that they "should hold paramount the safety, health and welfare of the general public" (to quote the well known – and broadly supported – American National Society for Professional Engineers' (NSPE) code of ethics). A good standard for due care is probably the test of independent peers. If peers think that some negative consequence was foreseeable, we could probably conclude that the particular engineer did not exercise due care. Consequently, her lack of knowledge can be considered an instance of negligence. So the Collingridge dilemma does not pose a problem for the ascription of moral responsibility per se, but rather indicates when something counts as blameworthy negligence and when it does not.

The second reason why knowledge would be problematic is related to the organizational structure. This is more problematic for OSS communities than for traditional IP organizations since knowledge transfer is notoriously difficult in non-hierarchical settings. Hierarchical IP organizations often have formalised structures concerning the flow of knowledge. It is therefore rather clear which person knows what and which person should inform (or should have informed) someone else. OSS communities lack these kinds of formalised structures. However, it is premature to draw the conclusion that responsibility could therefore not be ascribed in OSS communities. Instead of disseminating knowledge through formal structures, OSS communities allow for more transparency in their work compared to traditional organizations. This does not only make the tracking of code (and its programmers) easier compared to the traditional programming environments, but it also allows for a more efficient dissemination of knowledge. Software code is not exchanged as a black-boxed piece of compiled software, but rather as raw source code, which makes it much easier to check software on bugs or to check the compatibility with other pieces of software such as to prevent unexpected undesirable outcomes. The now famous quote by Eric Raymond that "given enough eyeballs, all bugs are shallow" (Raymond, 2004(2001)) does not only refer to the fact that a joint effort to debug code is more powerful than isolated actions by individuals, but could also be read as a plea for transparency (if enough eyeballs *are allowed* to view the source code, all bugs are shallow).

3.3 The freedom condition

Regarding the third condition, freedom, some people say that members of hierarchical organizations lack the necessary freedom to be held responsible. Walsh, for instance, argues that people, when working for an organization, stop acting as themselves but represent that organization in their deeds (Walsh, 1970). People often have to act within certain pre-defined roles, which are confined by the institutional framework of the organization. Some people therefore argue that employees of a company are often compelled to act in a certain way and that they can therefore not be blamed for what they bring about (cf., (De George, 1991; Unger, 1994; Swierstra and Jelsma, 2006)). Opponents of this line of reasoning argue that these professional roles are taken freely and that people, since they personally benefit from accepting their professional roles, should also "bear responsibility for the untoward

consequences that may result from playing that role" (Flores and Johnson, 1983: 542). Although Flores and Johnson recognise that organizational structure does pose a limit on the individuals' autonomy, they argue that this is not sufficient to categorically undermine the responsibility individuals bear for the consequences of their behaviour within their professional role (543).

In OSS communities, the freedom condition is usually less problematic, exactly because people participate in OSS communities on a voluntary basis. The freedom condition is therefore fulfilled almost without exception.

3.4 The transgression of a norm

At first glance, the most problematic condition in OSS communities seems to be absence of pre-existing norms and values. OSS communities show a lack of hierarchy and, as a result, a lack of explicit norms. There usually are no formal contracts that explicitly state the obligations an actor has within a project. This could be problematic. After all, if we do not know what people are supposed to do in a prospective sense, we cannot adequately hold them responsible in a retrospective sense (Vedder 2001). Without the norms, it cannot be established that an actor did something undesirable (Bovens, 1998: 29). However, to conclude that responsibility can therefore not be ascribed in OSS communities is premature. Although there are no formalised contracts and job descriptions (as in IP organizations), OSS communities do have implicit norms concerning what is 'done' or 'not-done'. There is a vast amount of work being done that is not established as such beforehand. In his famous essay on OSS communities, (Raymond, 2004(2001)) compares OSS communities with bazaars, as opposed to the "cathedrals" of traditional commercial ICT companies. He argues that most work in OSS communities starts with a personal involvement (or even annoyance) with the problem at hand. People start working on a problem because they find it interesting and they are served personally with a good solution for it. Raymond even goes as far as to argue that as soon as one loses interest in a program, the only duty that is left is to hand it off to a competent successor. As such the pre-existence of well-established duties and obligations does not seem to be a prerequisite for retrospective responsibility ascriptions. The tasks in OSS communities on which retrospective responsibility is based come into existence in a rather organic way, during the programming work itself and often not beforehand. These tasks are based on implicit expectations, rather than official obligations to accomplish a certain task.

3.5 Moral agency

The condition of moral agency is left untouched in organizations. Although some people define this condition somewhat stricter in terms of intention (e.g., (Corlett, 2006)), the more general formulation is in terms of the mental capacities of an agent and her responsiveness to moral reasons. In most (if not all) professional settings people can be expected to be in the possession of these capacities.

Summarizing, if we look retrospectively whether we can hold an agent responsible for a negative outcome, it seems that this more problematic in traditional IP organizations than in OSS communities. For OSS communities, the causality condition is at most weakly problematic (but often not problematic at all). For traditional IP organizations both the causality and the freedom condition are more problematic (see Table 1).

Condition	OSS community	IP organization
Causality	weakly problematic	problematic
Freedom	unproblematic	moderately problematic
Knowledge	unproblematic	unproblematic
Transgression of a norm	unproblematic	unproblematic
Moral agency	unproblematic	unproblematic

Table 1: Responsibility conditions in OSS communities and IP organizations

4. Responsibility and organizational structure

In the previous section the notion of organizational structure was mentioned a number of times, notably in relation to the freedom and knowledge condition. Let us take a closer look at the differences between OSS communities and traditional IP organizations in terms of organizations structure.

In the literature on organizations a distinction is usually made between hierarchical and non-hierarchical or network organizations (of which OSS communities are a paradigmatic example). The traditional hierarchical organizations are characterised by relations of power. It is exactly the presence of these power relations that ensures that people do what they are expected to do. In the absence of formalised control relations, the problem of coordination is notoriously a vulnerability of non-hierarchical organizations. To be successful, these network organizations should have some mechanism at work to counteract this lack of hierarchical control. Some scholars have therefore argued that network organizations can be characterised by a distinct ethic or value-orientation on the part of exchange partners. Ronald Dore points at the "spirit of goodwill" underlying these relationships in which commitment and trust play a central role (Dore, 1983). This "spirit of goodwill" allows for the transmission of reliable information (Casson and Cox, 1999) and the willingness to make investments without contractual guarantees (Podolny and Page, 1998). Through norms and sanctions trust may act as a substitute for the formal control systems. Following the work by the sociologist Bernard Barber, who defines trust in terms of the expectations that social actors hold about one another, resilient trust can be conceived as faith in the moral integrity or goodwill of others on whom economic actors depend for the realization of collective and individual goals as they deal with future, unpredictable issues (Barber, 1983; Ring, 1999). In addition to strict economic exchanges, "trust networks" are infused with social exchange, entailing unspecified reciprocal obligations (Powell, 1990; Ring, 1999). In other words, the absence of power relations should be counterbalanced with strong information relations and an atmosphere of trust to ensure the validity of the information. In the creation of relations of trust informal processes, such as committing, seems to play a crucial role. Committing involves the "establishing of psychological contracts, as opposed to legal contracts, between economic actors, which consists of unwritten and largely unverbalised sets of expectations and assumptions, held by economic actors about each other's prerogatives and obligations" (Ring, 1999: 137). These theoretical insights are confirmed with empirical analyses of OSS communities, which show a high level of commitment by the team members (Wynn, 2004a; Shen and Monge, 2008).

How do these sociological insights relate to the way the work is organised in OSS communities? (Wynn, 2004b) has shown that in OSS communities the informal project leaders try to facilitate interaction amongst the team members such as to increase work unit effectiveness. By encouraging task ownership they "increase the intrinsic motivation to perform each task to the extent that these actions are agreed upon through the decision processes of the group" (328). In other words, through ownership and adherence to the project's goal, the team members become committed to the project. As such, in the establishment of the tasks, OSS communities seem to be driven by a consequentialist heuristic of "solving problems." Rather than based on a more deontological approach that look at specific actions, a consequentialist approach is more outcome and result oriented (Van den Hoven, 1998: 107). In a less idealistic phrasing we could say that in successful OSS communities the conditions are favourable for people for discharging their responsibilities, even though this may happen almost unconsciously. As such it becomes less problematic to hold people responsible for negative outcomes. After all, they have less excuses to "pass the buck" of responsibility.

5. Recommendations for organizational design

In the present paper I discussed the topic of responsibility within OSS communities. It was found that the ascription of responsibility is less problematic for OSS communities than for traditional IP organizations. I explained that this could partly be explained by the fact that OSS communities are more favourable for individuals to discharge their responsibilities. In situations where this happens less spontaneously, attention should therefore be paid to the way the work is organised. In a paper on the responsibility of system engineers, (Van den Hoven, 1998) makes a distinction between task responsibility and meta-task responsibility. The former refers to the agent's task to see to it that something is done or that some state of affairs is brought about. In addition to this task responsibility, he distinguishes the notion of *meta*-task responsibility, which refers to the system engineer's

responsibility to develop the computer system such that users can take up their own responsibility. According to Van den Hoven, engineers not only have an obligation to see to it that artefacts are made in accordance with functional requirements but also a special meta-task responsibility or obligation —to see to it that users can (check whether they can) see to the things they ought to see to. Part of the responsibility of engineers thus concerns the responsibility and agency of users" (Van den Hoven, 2009). Hence, this meta-task responsibility refers to a responsibility to ensure that the conditions are such that people can carry out their tasks.

In a similar vein to Van den Hoven's meta-task responsibility for system engineers, we could say that the people who —design" an organization, be it a formal organization or an informal OSS community, have a meta-task responsibility to design the organization such that its members will (likely) be able to discharge their responsibilities. This may include institutional frameworks (e.g., the way knowledge is shared amongst the agents), but also incentive structures that promote commitment to the organization's goal (e.g., economic rewards or credit for one's work). Assuming that the organization's goal is not immoral, this will ultimately lead to both technically and morally better products.

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EMBEDDING ETHICS IN EUROPEAN INFORMATION & COMMUNICATION TECHNOLOGY CURRICULA

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Abstract

In this paper, we present approaches to teaching ICT ethics in various settings in several European countries. The picture which emerges from the cases we present, and the context thereof, is a challenging one. For while it is possible to come up with examples of good practice, a systematic approach to the need for ICT ethics education is currently lacking throughout most of Europe. Hence, we can conclude our paper with a handful of recommendations for action in this area by the members of the ICT ethics research (and teaching) community.

1. Introduction

In most industrialised countries, including Europe, Information Communication Technology (ICT) competences are a prerequisite for the majority of jobs, and even for life as a fully functioning member of society in general. In recognising this, universities, colleges, high schools, careers developers, train-the-trainers organizations, etc. have introduced ICT courses and programmes. But ICT also introduces many, often quite new, ethical dilemmas for its developers and users (both professional and otherwise). Whilst ICT ethics as part of the professional curriculum is well covered in some countries (see section 0) the situation in Europe presents a diverse picture. In presenting curricula and methods for teaching ICT ethics at different levels in this paper, we aim to begin a process of ICT ethics education that can be more coherent.

We do this by focussing successively on various contexts for ICT education in our home institutions and countries (Belgium, Italy, and the United Kingdom (UK)). First, in section 2, we address education of ICT professionals, ranging from professional bachelor to engineering PhD students. Next, we venture outside the realm of higher education, and look at the secondary school context. As we shall note, this raises important issues about teacher training, and we therefore turn to that context in section 4. We end with a short conclusion and some proposals for further research as well as a call for action at the educational policy level.

2. Ethics and ICT at professional level in universities and colleges

In this section, we address the education of future ICT professionals at various levels in colleges and universities. Many curriculum outlines for such study programmes prescribe a significant amount of attention to ethical and social issues of ICT. Indeed, in the US and the UK, most ICT study programmes do comprise one or more ICT ethics courses. This is not the case, however, in most mainland European countries. And even when there is an ICT ethics course on the programme, it is often a real challenge to be of sufficient interest to ~~"te~~chnical" students for the course to be effective in a significant way.

Below, we first briefly look at the position of ICT ethics in higher education. Subsequently, we describe in some detail the educational approach in an ICT ethics course offered to engineering PhD students in an Italian university. Then we offer some comments on a Flemish course offered to professional bachelor students. Finally, we conclude this section with a look at the situation in British higher education institutions.

2.1 ICT ethics and society in higher education ICT curriculum outlines

This is not a new subject for lecturers in higher education. The topic of computer ethics has been presented in text books since at least 1985 (see e.g. (Johnson, 1985); (Johnson and Snapper, 1985)) and regularly updated as technology progresses (see e.g. (Tavani, 1996)). It is probably fair to say that

the United States took the lead in introducing the topic of ethics to the engineering community and to the education of professionals, and formalised this by providing a curriculum based on knowledge units (ImpactCS project, and Martin, 1997). Others have followed, for example the Core Body of Knowledge approved by the Australian Computer Society in 1997 included ethics and social implications in its recommendations (Underwood, 1997), and a review in 2008 maintains ethics as ‗professional knowledge' (Gregor et al., 2008). The British Computer Society (BCS) has also required ethics to be included in degree programmes for the purposes of BCS accreditation (British Computer Society, 2007).

The above gives something of a snapshot of the place of ethics in ICT professional education, but it is beyond the scope and space limitation of this paper to undertake a full review of the initiatives internationally in teaching ICT ethics. In this paper we focus on the case of Europe, which is interesting in that it is constituted by a group of countries with diverse cultures and at different stages of economic development but which is advised in policy terms by a Parliament (European Parliament), setting broad Directives that are binding to the Member States (e.g. on privacy). The different approaches to the teaching, and perceived importance, of ICT ethics in the three countries discussed in this paper indicate a lack of coherence in Europe regarding the education of ICT professionals (and users) as far as ethics and ICT is concerned.

2.2 An example of an approach in an academic context at the Politecnico di Torino

Whether at academic or professional level, introducing ethical issues of ICT in higher education ICT curricula often constitutes a real challenge. Teachers are faced with students who have followed years of courses, all of them concentrated only on the technical side. A suggestion for introducing ethics in these situations is to start from real case analysis with a bottom-up approach.

One example of a fruitful methodology was tested "in-field" at the Politecnico di Torino in Italy for teaching computer ethics to PhD students in engineering (computer science, etc.). It is composed of four steps: describe a real controversial case, identify all stakeholders and their interconnections ("stakeholders network"), identify the ethical issues that arise from the case and finally, define possible alternative scenario(s) for dealing with them. The students' reaction to this approach is usually quite positive since they start from a familiar, technical context (e.g. a "national DNA database") and then, with the support of the teacher, they "climb" the path towards non-technical issues like the social and ethical consequences of such projects.

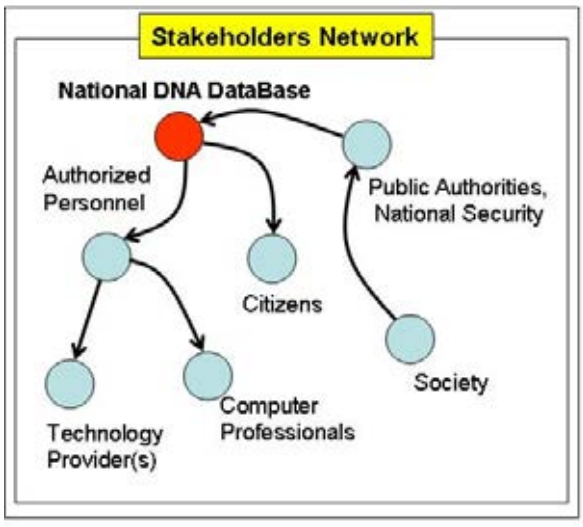

Fig.1

From the very first step, the engineering students start a so-called "reflexivity" process: the complete description of the real case introduces them to the complexity of the reality and to the out-of-the-box way of thinking in order to capture the entire scenario, not just the "technical problem" they are asked to solve. If ICT professionals are involved in a project, for example, implying the construction of a gigantic DNA database for security purposes, then they have to consider the social context of this

project, not just the technicalities. Who is the sponsor of the project? Where does the budget come from? Why is there a wish of having a database of citizens´ DNA? What is the role of end-users and citizens in general? What kind of society are we going to shape with this project? This introduces the fundamental concept of Science, Technology and Society studies where technology and society co-shape each other (Johnson, 1985).

In the second step, students trace the "stakeholders network": all parties involved in some way in the project are identified and the relationships among them are described as well. Continuing with our "national DNA database" example, this can result in a network as shown in Fig. 1. In this case, a very simple version of the stakeholders network (that indeed could be much more complex) features:

- the public authorities (national security), the main sponsor;
- this relates to the entire society, of course;
- the citizens, the main "target" of this kind of systems;
- the authorised personnel that will use the system;
- this is connected with technology providers and computer professionals involved in the development of the system and the personnel that will be the end-users of the system.

Here the "reflexivity" (the capacity of the actors, in this case PhD students in engineering, to recognise the forces that shape the scenario) (Bourdieu, 1992) starts. Usually, students capture the inter-connectedness of the relationships described in the stakeholder network. For example, computer professionals are of course involved in the design of the system, but clearly, they have also the key responsibility of designing the system with specific features. Values are always embedded into the system, and choices as to which values are prioritised are always made (see e.g. Nissenbaum, 1998; Duquenoy, 2007). For example, the robustness of a system for regulating nuclear power plants is likely to be a higher priority that robustness of an office system used for producing letters or spreadsheets. Values such as human safety, dignity, privacy (as expressed in the Universal Declaration of Human Rights) are important in our society, and should be equally upheld in systems design.

In the third step, the students (supported by the teacher) try to identify all the ethical issues involved in the system by looking at the stakeholder network. In our example at least two, privacy and unreliability, are very easy to identify.

Privacy

Very sensitive personal data will be stored in the system. Those data could bring an insurance company to refuse a contract to a person with a DNA "marker" that carries information about "potential" diseases which the individual could develop in the future. This implies issues of informed consent by the users, the capability of accessing and correcting personal data, and strictly controlled access to data. A more fundamental ethical question is the following: is it true that by providing to security authorities such a system, our security will be improved to the extent that we are willing to sacrifice (~~s~~ome") privacy.

Unreliability

Complex systems, like the one used in our example, will be never tested completely. In particular the software component will be so complex, the number of states to check will be so high, that at the end, engineers will be forced to release the software, even if they know very well that the system still contains some bugs. Furthermore, since the data stored in the system will also be of a complex nature, they too will be prone to unreliability. So here the ethical dilemma could be: taking into account the unreliability of the system, how can we ensure that the system will never enter a situation that could bring us to a catastrophic result? How can we avoid the "Titanic Effect" ("The severity with which a system fails is directly proportional to the intensity of the designer's belief that it cannot.") (Anonymous, 1985)?

In the fourth and last step of our methodology, where we try to define one or more possible alternative scenarios, a little theoretical background is treated. The main theories of ethics are introduced (deontologism, relativism, utilitarianism, etc.) and used for identifying possible scenarios: what could be changed in the system? This is of course the most challenging step in the process. It deals with questions such as what is right and what is wrong. Can we propose something different? Should we ask for the help of ethical reviewers (EU Commission, 2007)? Should we use the "Precautionary Principle" (Government of New Zealand, 2006)? Should we ask for a "moratorium" in some information technology research and/or applications development (such as implants, nanobots, etc.)? What should and/or can be the role of the (various) ICT professionals involved in the case?

It is very useful also to ask the students to think about a possible list of "recommendations" to, for example: project teams (e.g. when they are writing a research proposal and asking for funding); universities (how to prepare the next generations of computer professionals, which is of course the very subject of this section of the paper); various organizations, professional and other (guidelines, "soft-laws", Codes of Ethics, etc.); public authorities ("hard-laws", advice to policy makers, etc.).

2.3 ICT ethics for professional bachelor students at Leuven University College

In the Dutch speaking part of Belgium (Flanders), Leuven University College is currently the only institute of higher education where a course on ICT ethics features on an ICT programme at the professional bachelor level. It is interesting to note that this course through focusing on specific cases in student projects, aims at discussion and debate. In so doing, it proves fruitful not only to get future ICT professionals thinking about the ethical aspects of their trade but also promotes several more general ―soft skills" (arguing, presenting, debating, etc.). The course is an optional one, offered in the third (and final) year of the programme, and tends to be chosen by 20% to 25% of the students. So, there definitely is an audience for such courses among even the most ―practically/technically oriented" of students. It must be noted however that this particular course is taught by a lecturer whose specialisation is in system management, network security and computer forensics. This probably contributes significantly to technical students taking an ethics course seriously, and voluntarily. (See (Johnson, 1994) for a much more extensive treatment of this issue, though from a slightly different perspective.)

2.4 ICT ethics for ICT bachelor students in the UK

The United Kingdom has a strong foundation for addressing ethics in ICT education. This is due mainly to the fact that the British Computer Society (BCS), the Chartered Institute for IT, requires ethics and professionalism to be addressed as part of course criteria for accreditation by the BCS. When universities are competing for students, accreditation of ICT programmes by the BCS adds value by providing a standard that meets qualification requirements for membership of this leading professional body. In doing this the BCS gives professional credence to the importance of ethics to ICT professionals (as is the case in other professions). The BCS do not dictate how this should be taught, but in validating courses for accreditation the assessors (a panel of usually 3 independent experts in ICT) need to see it is explicitly addressed, and assessed. This leaves universities open to different approaches; at what level, or levels (1st, 2nd or 3rd year undergraduates) it is taught, and whether the issues are covered in different modules (e.g. networks, security, databases etc.) or in a single module (e.g. ethical and professional issues). In addition, recent requirements by UK research councils for attention to ethics in funding applications and the consequent ‗trickle down' to University research ethics committees has in some cases led to a requirement for ethics to be included in student projects (final year undergraduate and at masters level) and for research students – including computing science and engineering science departments.

As has been noted above, approaches to the curriculum vary. Ranging from professional dilemmas in ICT projects, in the workplace, and expected behaviour of ICT professionals to more of a focus on the ethical issues in the design, development and application of different technologies as they impact society. Lecturers who are assigned to teaching this subject are not usually trained for this speciality, and textbooks that give guidance are welcomed. Many of them are written from a United States perspective, but some others by UK authors (e.g. (Ayres, 1999); (Adams & McCrindle, 2008); (Duquenoy et. al., 2008)) or by authors from different nationalities in other languages than English (e.g. (Martens et al., 2008). These textbooks typically cover key topics of computer ethics (privacy, intellectual property, computer crime, etc.) using case studies, examples, and questions for discussion and review. A popular method of teaching that fits well with the course content is to offer challenging questions and real life examples for discussion by students, resulting in lively debates and exploration of both the issues and ethical approaches. Students at the beginning of a course often wonder what ‗ethics' has to do with computing, but by the end of the course see how relevant it is.

3. Secondary (and primary) education

There has been a tendency in European schooling to focus on teaching pupils how to use IT for their school work, and of course as part of a wider educational approach aimed at improving ‗digital literacy' and students' employment opportunities. The substantive issues of ‗computer ethics' typical in for example, conferences such as ETHICOMP, are not generally addressed other than aspects of computer misuse, and the dangers posed to school children. These latter issues appear to be brought in under a category of ‗eSafety' and serve to (a) educate children in the use (i.e. in combating misuse) of mobile phones used as cameras, and the dangers of chatting online and (b) meet school policy and risk-reduction exercises. For example, the UK National Education Network states: ―All schools have a responsibility to ensure that all pupils and staff access the internet safely and responsibly. Failure to do this could result in disciplinary or legal action taken against individuals, head teachers and governing bodies." (National Education Network, E-Safety Audit Tool)

The Rose Review (a report on the use of ICT in UK schools) published in 2009 promotes the use of ICT in schools, and encourages greater use at primary level: ―Children use and apply their ICT knowledge, skills and understanding confidently and competently in their learning and in everyday contexts. They become independent and discerning users of technology, recognising opportunities and risks and using strategies to stay safe." (Rose Review, 2009). Two points from an ICT curriculum newsletter (EPIC, 2009) reporting on the Rose Review are worth mentioning here:

- pupils use ICT effectively to communicate their ideas and to present their work, but they are less skilled in collecting and handling data and in controlling events using ICT;
- teachers tend to give more attention to those aspects of ICT where they themselves feel confident.

And there are strong indications that the situation in most other European countries is similar.

In 2006 and 2007 the Flemish government published ICT learning objectives for children of age 12 and 14 respectively. The safe and responsible use of ICT features prominently among them, but if you look at most teaching materials as well as current educational practice, they treat almost exclusively ‗utilitarian' features. To remedy this, the Flemish Ministry of Education published a brochure (Flemish Government, 2007) with succinct introductions to the main issues: reliability of online information, safe communication, dubious internet content, cyberbullying, intellectual property rights, health, and safety. The brochure includes a cd-rom with teaching materials (some specially developed, some adapted from Dutch materials, complemented with references to materials developed and sites maintained by third parties such as Child Focus and Safer Internet).

Some of the materials actually look quite useful and also the introductions to the various topics provided by the brochure are on average quite good. However, to the best of our knowledge, all this has had very little influence as yet on the teaching practice in schools. We conjecture there are several reasons for this:

- two years is rather short: from 2007 until 2009 there may not have been enough time to take these ―new" elements into the classrooms;
- all the government attention is currently focussed on children between 8 and 14; probably, some of the topics should better and/or more thoroughly be addressed at a later age;
- a brochure may not be enough to make teachers feel confident with the subject matter, and they may therefore not be inclined to devote much attention to these issues, as is suggested by the above cited British study.

Whatever may be the reasons for the current state of affairs, it is not the lack of interest among pupils which should keep teachers from addressing ethical and social issues of ICT in the classroom. In a recent large scale study about ICT use and associated risk behaviour performed among Belgian teenagers, most Flemish subjects complained about the lack of attention in their ICT classes for topics such as reliability of online information, online privacy, viruses, spam, downloading, chatting, etc. (Bauwens et al., 2009). (The Walloon educational curriculum for primary and secondary school currently does not feature ICT classes in any but a few programmes, so the Walloon pupils did not have similar complaints about the content of such classes.)

Personal experience gained from ICT ethics classes performed by students during their teaching practice points in the same direction. However, it is important to carefully select both the topics as

well as the educational approach in such a way that they appeal to the pupils at hand (Martens, 2005 and 2007). To illustrate this point, we briefly report on some classes by one of our students, Kurt Roosbeek, in November 2009. Roosbeek taught several groups of "high profile" (about) 15 year old pupils in a secondary school near Leuven, Belgium. In three subsequent weeks, he addressed the topics of cyberbullying, online privacy, and computer crime and ICT safety, devoting one class of about 50 minutes to each topic in three parallel groups. The following are some interesting observations about his experience in that context:

- almost all pupils showed substantial interest in all three topics;
- one group of pupils showed considerable disappointment when their third class, due to time constraints, had to be replaced by a (technical) class on database construction;
- many pupils actively engaged in very lively group discussions on the first and second topic; being more technical in nature, the third topic leant itself less to discussion;
- the class on e-privacy provoked by far the most intense interest; by starting each of those classes with a report of information found on the online profiles of pupils in that particular class-group, the teacher almost immediately captured their undivided attention;
- many pupils changed the privacy settings on their online profiles after the class on online privacy.

For our purpose, it is interesting to further note that the appeal of both cyberbullying and computer crime and safety in these class-groups was on average somewhat less than that of online privacy. We conjecture that this is largely due to the particular age and profile of the pupils involved. On the one hand, in Flanders, as mostly elsewhere, the intensity of (cyber)bullying starts to decrease at the age of 15, and even more so in "high profile" class-groups (Vandebosch et al., 2004). On the other hand, most of the pupils involved would still have been too young to have personal experience with e-banking, credit cards, etc. and nor will they personally have been responsible for most of the safety measures on the computers they use. Online privacy, however, turns out to be a very hot topic indeed among 15 year old pupils. At this age, many of them become "privacy conscious", virtually all of them sport online profiles on Facebook and/or elsewhere and virtually none of them have of their own accord investigated the privacy statement of the network site they use nor the possibilities for privacy settings in their own profile. So, again, it is the teacher who must learn to judge what subject should best be treated when and in what way.

From the above, we conclude that both pupils and policy makers would like to see more classroom attention for social and ethical aspects of ICT. However, we also suspect that it is the teacher who must learn to judge what subject should best be treated when and in what way. So, the success of classes on ICT ethics and safety in secondary (and primary) school will largely depend on the competence of the teachers responsible for implementing them. This brings us to teacher training, the subject of our next section.

4. Teacher training

To meet the education needs identified above, ICT ethics must be treated in teacher training In the Leuven University College teacher training programme, a course on ICT ethics has been compulsory for (future) ICT teachers since 10 years (Martens, 2005 and 2007). It was recently expanded and currently has a "use" of 4 ECTS credits, corresponding with an average intended student work load of 100 to 120 hours. The main goal of this course is twofold: enabling future ICT teachers to devise and teach (or lead) good classes on ICT ethics with pupils between 12 and 18, and making them want to do this. The latter is particularly necessary given the situation that such classes are currently by no means standard practice. So, how do we go about to achieve this?

The course's educational approach is a mixture of various ingredients. There are seven seminar classes of 3.5 hours each. The first two of these are used for an introduction and broad overview of the field by the lecturer. The other five deal with privacy, copyright, computer crime, information on the internet, assorted issues related to the role of ICT in work, society and education, and how as well as when to deal with such issues in secondary school (ICT) classes. Throughout the course, a textbook dealing with these issues while focussing on local (Belgian and Dutch) cases serves as reference text (Martens et al., 2008). All students are required to read the relevant chapters to prepare for participation in the classes. In this way, they get the necessary basic knowledge of the domain.

However, the whole area is subject to rapid change, and to be a good teacher, you must be able to pick up on developments, research a new issue, and illustrate important points with up-to-date examples and cases. These skills are to be acquired by the students through the execution of small research projects. Each of the five "topical" seminars is prepared by a student project group. Within their topic, they choose on what to focus and investigate the issues of their choice in much more detail than in the textbook. They of course look into relevant literature and online information, but are explicitly expected to also undertake less bookish "field" research. Recent examples of project preparation activities of the latter kind include interviews with supermarket managers on customer data processing, polls on illegal downloading by pupils and fellow students, assessment of the use of open source and creative commons materials in schools, investigation of the "digital divide" between the north and the south of Belgium through a (photographic) comparison of the ICT infrastructure in a Flemish and a Walloon teacher training college, and discussion of the ICT infrastructure development policy with ICT coordinators in schools. After all this preparation, the students themselves lead the whole of "their" seminar. They must not only present their findings, but aim at a high active participation of all participants through classroom hands-on research and experimentation, discussion and debate, quizzes, etcetera. In this way, the classes are also used as labs to test and improve teaching methods that can be used in their own future classes with secondary school pupils.

Finally, students are required to follow the news about current developments and cases in the field during the three months the course runs, preferably consulting general newspapers as well as ICT related magazines and online sources.

Students are evaluated in four different ways, each contributing more or less equally to their overall course result: preparation and execution of the research seminar they lead, active participation in classroom activity and online e-learning discussions during the course as a whole, content and reflective quality of the assembled materials on current developments and a concluding "examination" discussion with the lecturer to show their personal mastery of the whole problem domain as presented in the course textbook.

Taken together, all this provides the students with a good basis for ICT ethics classes in secondary school as well as (in most cases) with a considerable eagerness to try their hand at those during their teaching practice. When asked which improvements in the course content or teaching approach they wanted to propose for next year, the participants in the 2009 edition of the course unanimously replied none were needed…

In 2009, a similar course (of 3 ECTS credits) was for the first time offered as an option to teacher training students in other topics than ICT. It may be premature to draw conclusions after only one run, but we would like to share some preliminary observations. The course was chosen by about 10% of the students it was offered to, preparing to be a teacher in subjects as diverse as mathematics, physics, Latin, economics, technology, and physical education. In line with our findings in other contexts, almost all students arrive in the course virtually unaware of the issues it deals with. In fact, all of the 17 participants claimed to have chosen the course simply because it had "ICT" in its title, ignoring the fact that it also mentioned "ethics" and "society". In spite of this, upon completion of the course, almost all of them expressed their satisfaction with having taken it. The course aims at taking a more interdisciplinary approach to the field than does the one for ICT students described above, but apart from that both the content and the teaching approach are largely similar. It is therefore interesting to note that the degree of penetration of the field by the participants and the quality of the seminar preparation work was in most cases considerably less than is usual in the course for future ICT teachers. This may be partly due to the fact that the optional course has a smaller ECTS weight and is perceived by the participating students as "only" optional, and partly also to the fact that unlike the ICT students in the other course, most students apparently come to this course with no prior experience of well structured classroom discussions nor of research project work in groups. However, it also casts doubt on the wisdom of educational policy makers who claim that ICT use, including issues of safety and responsibility, can and should be learned by pupils exclusively through ICT use in classes on other subjects, guided by teachers who themselves have not specialised in ICT as a topic.

In this section, we have so far focussed on teacher training for (primary and) secondary education. In these contexts, ICT ethics will mainly be connected with education in ICT use by non professionals. However, as we argued in section 2, ICT ethics should and can also be incorporated in the education of future ICT professionals. In these study programmes, the stress is on the production (and/or

administration) of ICT. We usually find some such programmes in specialised study profiles at the secondary level, and furthermore of course at the higher level in colleges and universities. Most (other) courses in these programmes focus on technical aspects, and so usually prefer to do the pupils or students. Teaching such students –ethical reflexivity" can be a challenging task, which requires special preparation of the teachers in addition to the more general methods and considerations addressed above.

5. Conclusion

We have identified in our paper the need to introduce Ethics in European ICT Curricula but we should also find the right teachers for this challenging task. Our first recommendation is to start with a "train-the-trainer" phase. This first phase should provide teachers with the basic knowledge that will enable them to engage students who probably have never been exposed to ethical reflexivity related to the technical aspects of ICT.

One of the challenges with this subject is that the categorisations for teaching ethics in engineering sciences across Europe are diverse, ranging from a strong societal implication (e.g. "Science, Technology and Society") to very specific (e.g. "Social and Ethical Impact of Computing", "Computer Ethics", etc.). In some countries only the technical aspects of ICT are given to students, leaving the social and ethical aspects and impacts of ICT un-addressed. This field is naturally interdisciplinary requiring cross-fertilisation between engineers, social researchers, philosophers and others. Our second recommendation therefore is to instigate some interdisciplinary discussion to allow for the exchange of expertise, and encourage a shared understanding of the issues involved.

In this paper we have argued for the importance of –ICT ethics" in various ICT curricula. We have also looked at the current situation in various European educational contexts and found it to be less than optimal. We have presented in some detail example approaches in higher education of ICT professionals, secondary education and teacher training. In all of these settings, teaching ICT ethics is by no means obvious. Of crucial importance is the competence of the teachers, both with respect to domain expertise, as well as methodologically. This leaves the international research community on ICT ethics with a challenging but possibly very rewarding task, and leads to our third recommendation: systematically developing and evaluating ICT ethics teaching approaches and materials, and helping to put them into practice in ICT and ICT teacher training curricula.

Finally, although recommendations by professional bodies to include ethics in education curricula have a significant impact on the inclusion of ethics in ICT teaching and should be applauded, there is also the danger that such approaches become merely a ‗tick-box' exercise and that the legitimacy, importance and value of this subject are not adequately recognised. It is important that the ‗people at the top' in educational institutions understand that professional ethics in ICT has a crucial role to play. A ‗top-down' lead sets the tone and will motivate teachers and students. As research efforts into teaching this subject across communities increase, and with the trend towards the inclusion of ethics in technical research and development programmes, as well as the raised public awareness of the impact of ICT and consequent need for the ICT industry to take on board the issues faced, we can hope that this message ‗filters-up' to those ‗at the top'.

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HOW DOES THE EVOLUTION OF ICTS CHANGE THE LAW? AN APPROACH TO LAW THROUGH THE PHILOSOPHY OF INFORMATION OF LUCIANO FLORIDI

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Abstract

The evolution of the Information and Communication Technologies (ICTs) is progressively changing the environment we live in. Such evolution is going to bring about a convergence between the physical and the virtual reality (the phenomenon of cloud computing) and the creation of a new environment, i.e., the infosphere. We believe the evolution of ICTs is likely to affect the conception of law in many ways: above all, it changes the reality that law is meant to govern, since it changes the notion of space we live in. This does not only mean that we move from a State-regulation to a self-regulation: this may be true but is the starting point of our reasoning and not the ending point. There is a major turn at stake: our normative mind-set towards the stability of the world. Our normative beliefs (i.e., what we believe it is stable) will be no longer regulated and based only on the common perception of a physical reality but, first and foremost, on the shared reliance upon a reality made of information.

1. Introduction

The purpose of my paper is to envisage how the conception of law is meant to change according to the evolution of the Information and Communication Technology (ICTs). This paper includes 5 sections apart from the Introduction. In the first section (2) I point out that the evolution of ICTs redesigns the ontological statute of reality, which can impose conditions and restrictions upon the legal claim to govern reality. In section 3, it is remarked that technological reality is not a monolithic but a stratified dimension: each layer of reality calls for a different legal treatment. There can be a diverse legal approach and treatment in relation to different oppositions: State-regulation vs. self-regulation; centralised regulation vs. decentred regulation; vertical regulation vs. horizontal regulation. In this perspective I analyse three different phases in the representation of law: (3.1) a bounded centralised model of law; (3.2.) centralised vs. decentralised models of law; (3.3.) distributed vs. decentralised models of law; and I draw from these models some consequences affecting the stratified technological reality (3.4.). In section 4, I point out that the reontologisation of reality characterising the society of information requires us to making reference to a solid and rigorous philosophy of information, that of Luciano Floridi. On this basis, in section 5, I make a comparison between informational notions and legal categories or, to put it better, I try to rethink some legal categories starting from some informational notions. In the final section (6), I stress out, by making reference to Floridi, that the evolution of ICTs creates a new environment and reontologizises reality, so that the society of information needs to figure out an informational approach to law. In this perspective, I point out some problems and I suggest some guidelines, in order to develop such a legal approach.

2. The govern of reality

Law as a normative system has always been concerned with the aim of governing reality. How law can govern reality, however, has been constantly a matter of endless theoretical disputes. According to us, law governs reality by stabilising normative expectations about reality. The problem requires legal scholars to explain no less than three fundamental terms: law, reality and the relation between them. It demands consequently to elaborate (i) a conception of law, (ii) an ontology of reality and (iii) a theory of normativity. The evolution of Information and Communication Technologies (ICTs) is likely to redesign all these terms. It does so more radically than it is usually thought. Many scholars do recognise the difficulty.

The proliferation of books and articles on the regulation of the Internet or of Cyberspace clearly shows this much. However, they often fail to acknowledge that such a problem requires a new

theoretical approach. For instance, expressions such as "the law of the Internet" or "the regulation of Cyberspace" can be deceptive, since they implicitly suggest that either Internet or Cyberspace are only *subject* to the regulation of law and they do not have by themselves any regulative attitude. This is not true, since both the Internet and Cyberspace may have, for instance, inherent topological dimensions (Pagallo, 2007) that can exhibit normative values. However, such a critique does seek to reaffirm a current platitude, namely that technology is self-regulating. This leads us to understand technology once more *as* a normative system ("the code is the law", as stated in Lessig, 2006).

The problem is to realise that the evolution of ICT is going to redesign the ontology of reality and that this change "can go backwards, forwards and sideways", to quote Alvin Toffler. To put it differently, what we have to face is a "computational rendition of reality. (…) In this sense, the technological paradigm of computation pierces deep down to the invisible microscopic texture of things, which it reconstitutes as a large array of computational rules and procedures. In so doing, it exposes (or projects) a new, non-observable realm of reality" (Kallinikos, 2006, 6). Therefore, a different statute of reality (a different ontology) can impose conditions or restrictions upon the legal claims and can force us to reconsider our understanding of the law. What is, thus, the ontological statute of reality that law is meant to govern? Our methodological and epistemological point consists in suggesting that the reality determined by the evolution of ICTs is stratified: its ontological statute must be analysed according to a "proliferation of reality in different objects, levels and spheres of reality" (Ceruti, 2009, 5).

3. The stratification of reality

In the first part of the paper, I analyse the general understanding of the relation between law and reality in the information society, with reference to the regulation and the governance of the Internet and of Cyberspace. The way in which the problem is approached and dealt with is often quite old-fashioned and impinges on both legal and epistemological categories that are no longer fully capable to account for the changes brought forth by the evolution of ICT. However, this requires, first, to recall the stratification of reality (physical, logical, of contents: Benkler, 2006) of the Internet and of Cyberspace that still supports, in part, the application of traditional legal categories (regulations, hard and soft law, codes of conduct, customary rules, etc.) (Murray, 2007). The reality of the Internet and of Cyberspace is made of at least three layers: 1) a physical layer; 2) a logical layer; 3) a layer of contents. This means that whenever we reflect on the regulation of the Internet and of Cyberspace, we should first consider what layer of reality our reflection is concerned with.

The legal debate has been concerned, in a first phase, with a bounded, centralised model of law (hierarchy); in a second phase, it is concerned with the opposition between centralised versus decentralised models of law (network); and, in a more mature phase, with the dialectics between decentralised models of law, i.e., decentralised (with intermediaries) or distributed (without intermediaries) networks (Durante, 2007). We should make clearer how this legal debate is structured in relation both to the conception of law and to the theory of normativity.

3.1. First phase: a bounded, centralised model of law

This phase is long-lasting and concerns the whole legal modernity. It is based on the results of the Treaty of Westphalia (1648), which established an organization of space and political-legal international relations based on a rigid principle of territorial and absolute sovereignty. Each state is sovereign on its territory and does not recognises any state to be more superior than itself (*superiorem non recognoscentes*): this principle affirms a conception of law based on a representation of the legal system that is made of a bounded, central and vertical hierarchy. This model operates both between the states and within a single state. In the international space it posits the problem of the lack of a third power that can mediate between conflicting states, whereas in a single state it is always the sovereign power that mediates between conflicting parties or individuals. The autonomy of law is based on the will of the national state, which is the principal legal actor on the scene and often the only one. In a single state, the production of law is the result of a centralised body of law that can be intended either as a government or as a social body. In both cases, the representation of law is filtered by the idea of a sovereign power, which is centralised and vertical, both in the internal and in the external relation to the other states. The reality governed by the law is based on a peculiar representation of space,

philosophically re-elaborated by Kant (drawing it from Newton). According to Kant, space is the horizon of politics and law as being the coexistence of occupiers throughout time. This model is dominant until the 20th century and up to now each national state tends to fully affirm its sovereign power over its own territory. To the extent to which legal space, both at the national and international level, can less and less be equated with territorial space, this model of law needs to be adjusted. So, what we have to learn from this is that the spatial dimension of the reality of law (i.e., the reality that law intends to govern) governs the conception and representation of law itself.

3.2. Second phase: centralised vs. decentralised models of law

This phase concerns contemporary ages and it is based on the progressive affirmation of the model of the network that is, to some extent, horizontal and decentralised, as opposed to the previous (still operating) model of law. National boundaries no longer trace the limits within which the sovereign power governs reality: individuals and groups can determine legal (political, economic, social, etc.) effects that overcome the national space and therefore question the affirmation of authority based on a bounded, centralised, vertical system. Individuals and groups progressively become the nodes of a supranational network capable of producing its own regulation. The model of the network also concerns the relations among states within the international arena. The autonomy of law is based both on the deliberate and spontaneous actions of individuals and groups, who are the principle actors in the new space of the network. The space of the network (the networked space created by the technological platform of the Internet and by ICTs at large) is different from the physical, Newtonian, space, on which Kant based both the epistemological and the political categories of modernity. The networked space is glocal, decentred, hybrid (physical and virtual), both expanded and contracted (Floridi, 2007b), geodesic (i.e., made by nodes), computational. Space no longer simply measures and exposes the limits of the coexistence of occupiers, since those occupiers are computational objects, whose main characters are given by their "mobility, transferability and combinability" (Kallinikos, 2006, 18). Still, the lesson to be drawn is that the govern of reality does not only depends on actors but primarily on how space is re-configured, since the reality that law is meant to govern is always grasped and understand within a specific conception of space. In this perspective, the status and role of nodes in a geodesic conception of space bring us to considering the last and more mature phase of this development.

3.3. The third phase: distributed vs. decentralised models of law

The networked space has been often presented as a pure decentred space, radically horizontal and almost anarchical. This (quite misleading) image was due to the opposition to a centralised model of law and to an underestimation to the topological characters of the networked space. The progressive analysis of the structures of networks and nodes has been fruitful for the clarification of the model of law based on networks. There are distributed networks that are radically horizontal (each node has the same importance) and decentred networks that are still horizontal, but each node has not the same importance nor plays the same role of all other nodes. In the decentred networks the idea of a centre does not completely disappear: in these networks some nodes can play the role of intermediaries or even of filters. However, the decentred network differs from a centralised model: in the latter the centre necessarily precedes the interactions between users and governs them, whereas in the former model the centre is the result of the interactions between users. Once more, the configuration of the networked space, either distributed or decentred, is crucial to figure out the limits and conditions of governance. This phase represents both a present and a future trend to account for the governance of reality, made of the dialectics between different forms of networks, even if networks can be considered as a manifestation of a deeper transformation of reality: "networks could be seen as a surface manifestation of a much more profound and comprehensive social and economic change. I connect some of these wider socioeconomic changes to the growing involvement of technological information in organizational and institutional life (Kallinikos, 2006, 15). In fact, there is likely to be a major turn at stake, which is concerned with our normative mind-set towards the stability of the world: "Stability has been afforded and constructed through the relative insulation of organizational operations from environmental contingencies" (Kallinikos, 2006, 8). In other words, the problem is how to face the contingency of a world made of computational or informational objects, whose

mobility, transferability and combinability cast some doubts on our claim for a stable set of beliefs and organizational relations. Our normative beliefs (i.e., what we believe it is stable) and organizational relations will be no longer based only upon the common perception of a material and bounded reality but, first and foremost, on the shared reliance upon a reality characterised by the *dissolvability* and *disembeddedness* (Kallinikos, 2006, 15) of computational and informational objects.

3.4. Consequences of the different topology of reality

If we go back to analysing the reality of the Internet and of Cyberspace, as measured in its layers, we can say that all the above-mentioned models of law are at work. To the extent to which we move from the physical layer to the layer of contents, we also move from the first to the third phase of the governance of reality, depending on the physical or computational notion of space on which these layers are based. This brings forth at least three main consequences:

1) the reality of the Internet and of Cyberspace is governed by different models of law, which can overlap and be intertwined according to their technological architecture and as a result of the entanglement among layers of that reality;

2) the first layer, i.e. the physical one, is governed by the first and the second model of law: as it has been analysed by and large in the debate initiated by Johnson and Post (1996); the second and the third layer both belong to the second and third model of law, according to the following dichotomies: State-regulation vs. self-regulation; deliberated decisions vs. spontaneous actions; regulators vs. architectures; concentration vs. dispersion; materiality vs. computation;

3) the governance of reality not only depends on actors and conceptions of law but first and foremost on the configuration of space within which the reality is grasped and can be made subject of regulation. This consequence should be stressed. In Kantian terms, space is both the epistemological horizon of constitution of the object and the political horizon of coexistence of the occupiers. Every change in the conception and in the configuration of space is likely to produce effects both from an epistemological and a political viewpoint. The object, be it material or computational, is the objective, rational basis on which we form our own beliefs. Coexistence is the scope of every organizational system of politics or model of law. Therefore, ICTs evolution is likely to modify both the objective basis of our beliefs and the modes of our coexistence.

The first two considerations show that the governance of the reality of the Internet and of Cyberspace could be fruitfully analysed according to the above-mentioned models of law and I think that this is the case in relation to many important issues concerning the Internet. However, the third consideration brings us to considering how the evolution of ICTs reshapes the concept of space and environment in which the reality to be governed takes place. This consideration can shed further light on the future trends concerning the governance of the networked society of information To this aim, I suggest to direct our attention to a theory of information that accounts for the "ontologisation of reality" (Floridi, 2007a) that occurs in a novel space or environment, i.e., the "infosphere" (Floridi, 2003) as a qualitative (and not only quantitative) consequence of the development of ICTs.

4. The Philosophy of Information of Luciano Floridi

For this reason, the second part of the paper is devoted to the analysis of the philosophy of information laid down by Luciano Floridi, which has best grasped the ongoing process of transformation of the ontology of our reality and has formulated it in plain theoretical terms (2010a).

Luciano Floridi's (2007a) philosophy of information is an *ontocentric, patient-oriented, ecological macroethics*, that suggests to reconsider the issue of agents' interaction from a wider perspective than that exclusively based on the role of human agents, which obeys to a rigid methodological anthropocentrism. This approach accounts for a wider understanding of the interaction between agents and patients or reagents, reshaping the notions of actors and of interaction on more solid ontological bases (Floridi, 2008, 21). Thanks to its ontocentric perspective, the informational theory offers a distinct, unified perspective for the varying status and regime that involve the content of reality. On the basis of the ontological equality principle, the objects of reality (as well as actors and relations between actors) are informational entities that should be morally treated as part of the informational environment, or infosphere, to which they belong *qua* informational systems. The process of

transformation of the ontology of our reality can be, thus, summarised by reference to two neologisms that Floridi has coined: *infosphere* and *re-ontologisation*.

"*Infosphere* is a neologism I coined years ago on the basis of 'biosphere', a term referring to that limited region on our planet that supports life. It denotes the whole informational environment constituted by all informational entities (thus including informational agents as well), their properties, interactions, processes and mutual relations. It is an environment comparable to, but different from cyberspace (which is only one of its sub-regions, as it were), since it also includes off-line and analogue spaces of information. (…) *Re-ontologizing* is another neologism that I have recently introduced in order to refer to a very radical form of re-engineering, one that not only designs, constructs or structures a system (e.g. a company, a machine or some artefact) anew, but that fundamentally transforms its intrinsic nature. (…) Using the two previous concepts, my basic claim can now be formulated thus: digital ICTs are re-ontologizing the very nature of (and hence what we mean by) the infosphere, and here lies the source of some of the most profound transformations and challenging problems that our information societies will experience in the close future, as far as technology is concerned", (Floridi, 2007a).

In this perspective, the ontocentric and infocentric convergence suggest the aims of Floridi's information ethics: its primary goal is to be "impartial and universal because it brings to ultimate completion the process of enlargement of the concept of what may count as a centre of moral claim" (Floridi, 2008, 12). Secondly, as a result of its characters of impartiality and universality, this theory offers a field-independent macroethics that "rectifies an excessive emphasis occasionally placed on specific technologies, by calling attention to the more fundamental phenomenon of information in all its varieties and long tradition." (Floridi, 2006, 256)

A comprehensive normative framework is hence able to regulate the life-cycle of information in the infosphere in an impartial, universal, field-independent manner. On the one hand, this framework is based on the moral analysis of the notion of informational entropy as the most ominous form of evil and, on the other hand, it is structured according to four moral laws regulating the level of entropy in the infosphere. Whereas informational entropy "refers to any kind of destruction or corruption of informational objects (not of information), that is, any form of impoverishment of being" (Floridi, 2008, 11), the four moral laws command that: "0. Entropy ought not to be caused in the infosphere (null law); 1. Entropy ought to be prevented in the infosphere; 2. Entropy ought to be removed from the infosphere; 3. The flourishing of informational entities as well as the whole infosphere ought to be promoted by preserving, cultivating, enhancing and enriching their properties" (Floridi, 1999, 2001).

Entropy refers to informational objects and not to information as such, while the four moral laws do not only refer to informational objects but to the whole infosphere: "The duty of any moral agent should be evaluated in terms of contribution to the sustainable blooming of the infosphere, and any process, action or event that negatively affects the whole infosphere – not just an informational object – should be seen as an increase in its level of entropy and hence an instance of evil" (Floridi, 2008, 24). In the light of what we have said so far, we should try to apply the moral and ontological notions of the informational approach to the field of legal categories.

5. Informational notions and legal categories

It is important to focus upon the novelty of this informational approach for three main reasons. This approach offers us some consistent indications and theoretical tools to update three essential legal notions from an informational standpoint: 1) the notion of legal agents (*legal subjects*) as informational systems; 2) the notion of norm (*legal provision and expectation*) as information; 3) the notion of reality (*legal objects*) as a new informational environment.

1) In the post-industrial society of information, the legal subjects can no longer be conceived only in an anthropocentric perspective. On the one hand, agents can be constituted also by autonomous artificial agents, to which a growing number of tasks are delegated. On the other hand, the activity of collecting and processing information is no longer achieved only by a single agent, either human or artificial, but by a distributed and pervasive system (as in the case of an autonomic computing system: Kephart & Chess, 2003): "The nature of coding and computationally produced information are such that they make indispensable the relentless and meticulous parsing of reality and its reconstruction as large, often huge, series of automated operations" (Kallinikos, 2006, 6). In this perspective, legal

subjects are not to be intended only as single and human centres of legal imputation but also as systems of interactions between agents and reagents, both human and artificial, both single and distributed, that share information: this brings direct consequences as to the elaboration of new norms of accountability. The informational approach does not only show how interacting agents and patients communicate and share data by means of positive or negative messages. Thanks to its ontocentric perspective, the informational theory offers a distinct, unified perspective for the varying status and regime that involve the nature of agents, of their relations and the content of shared data. On the basis of an ontological equality principle, all the agents, relations and data are conceived as informational entities that are to be treated as part of the informational environment, or infosphere, to which they belong *qua* informational systems. This calls for an extension of both the class of who are responsible for the effects of their actions and of what we are responsible for: in this perspective it becomes clear that what is most crucial from a legal point view is the elaboration of new norms and limits of accountability.

2) In the post-industrial society of information, the capability of the positive norms to predict future behaviours and establish expectations is to be rethought: a positive norm implies a representation of reality that is quite static, compared to the capability of the world of changing itself. The amount of information that is contained in a legal norm is often not sufficient to account for the complexity of the technological reality and its rapid self-modification. On this basis, the notion itself of a legal norm has to be rethought starting from a deeper and systematic analysis of the informational content of a norm (Durante, 2007). However, the idea of treating the legal norm as information, produced not only by a single centre but, first and foremost, by a decentred or distributed multi-agent system, is not new in the field of philosophy of law. What is novel is the need to treat the norm/information as a specific, technical concept that is part of a semantic reinterpretation of the reality. This requires us making reference to a specific philosophy of information, which does not only take into account the syntactic aspects of information but also its semantic dimension (Floridi, 2010b). A theoretical approach to the idea of a legal norm intended as an expectation that contains a certain amount of information should be able to deal with the two essential features that an information must detain: (a) newness and (b) reliability. As to the first feature, we observe that only what is new can nourish information: "In order to be informative, information must be able to add a distinction and confer something new on what is already known. In this respect, the value of information, what may be called its informativeness, is indeed a function of the kind of 'news' it is capable of conveying, and 'news' differs substantially with respect to what it adds to that which is already known. As a rule, the value of 'news' is traceable to its unique (contingency) and novel (time) character" (Kallinikos, 2006, 53-54). As to second feature, we observe that information is to be reliable, in order to be set as a shared premise of agents and reagents' expectations, actions and relations. Its informativeness is also an intersubjective function of a series of states-of-world that are represented and chained in a way that can support our own expectations, actions and relations. On the one hand, information introduces something new in the knowledge of reality; on the other hand, the knowledge of reality introduced by information becomes relevant to the extent to which we can rely upon it, in order to determine and stabilise our expectations (information intended as legal norms). A semantic treatment of information can shed further light on the way to reconcile the newness of information (and we should recall also that "the production of information out of available information (is) a process (…) inherently unstable and unpredictable", Kallinikos, 2006, 6) and their reliability, since it focus also on the consistency of their content, and not only on the way information is produced.

3) In the post-industrial society of information, the evolution of ICTs is no longer viewed, according to the informational approach, only as a matter of applied ethics or empirical approaches, but as something that constitutes a new environment (*infosphere*) that brings about a reontologisation of reality, made of informational objects possessing their own ontology. This requires us to study how the law can deal with the informational objects and what are the main features that characterise this reontologised reality, since this affects the relation between law and reality, bearing in mind, however, that the informational treatment of reality does not constitute in its own the entire picture, i.e., the whole representation of reality. This would require us to confront systematically the informational approach with a more radical computational approach to the understanding of reality. We should limit to consider the application of the four moral laws along with the *ontological friction* in the infosphere (according to which "given a certain amount of information available in a region of the infosphere, the

lower the ontological friction in it, the higher the accessibility of that amount of information becomes", Floridi, 2007b, 3). The four moral laws along with the ontological friction tend to establish a general principle, which structures an informational approach to law, according to which the informational environment should be ruled and governed on the basis of a presumption in favour of the most liberal creation, circulation and distribution of information. This means that the burden of proving that restrictions in the creation, circulation and distribution of information are justified should be placed, first, on who invocates them (Pagallo & Durante, 2010, forthcoming).

6. An informational approach to law

In the present and last part of the paper, we try to figure out the guidelines of an informational approach to law, that is to say, a vision of law that would be theoretically capable of dealing with the reontologisation of reality. The ontology on which law has always been based is made of material objects, whose positive existence is the ultimate epistemological guarantee of the content of legal propositions and expectations. Even though – just to make a very simple example – the content of a legal contract is not directly a specific real thing but an exchange of promises, nevertheless the way to measure whether the promises have been fulfilled is to refer to the positive existence of the real things that are the final content of the exchanged promises. How does law change in its relation to reality, when the ontology of reality is no longer based on the positive existence of material objects? The distinction between material and immaterial objects that law is acquainted with is not sufficient to deal with the problem, since such a distinction is drawn within the same ontological framework of reality that law has always been based on, namely, the positive existence of physical objects.

It is this framework that today radically changes in the society of information. Every conception of law is based on normative beliefs towards the world we live in and we aim to regulate. As beliefs or expectations, they have to possess a content that is provided with a certain degree of stability. Indeed, we cannot believe in something that is continuously changing or, to put it differently, we cannot take any decision or any course of action in relation to a reality that endlessly changes. For this reason, our normative beliefs concern what may be said to enjoy some stability, what can be take for stable. The evolution of ICTs changes the notion of stability, that is, of what we believe it is stable. From an epistemological point of view, stability is a prerogative, if not the essence, of the object: however we may intend it, the object is what we encounter in the world, as if it were encountered outside us, and it is always characterised by a certain degree of stability. This is the reason why we regulate our beliefs and expectations about the world upon the existence of the object, that is, of what is said to be stable in objective terms. Nonetheless, the evolution of ICTs that changes our own environment and space modifies also the status of the object and, thus, the notion of what may be taken for stable. In the physical reality, what is taken for stable is ultimately based on what has a positive existence; in the society of information, what is taken for stable has to be based on reliable information. As far as reality is no longer only represented and described by information (information over the reality) but it is made of information (information as a reality), there is not a reality out of the information, whose positive existence our normative expectations and beliefs over the world can be based on and therefore be stabilised. In that case, the conditions of our reliance on information should be found within the reality made of information, that is, they have to be based on the informational object itself. In other terms, what does it mean to stabilise expectations, when the content of an expectation is no longer a material but an informational object? This requires us to developing the idea of a stabilisation of expectations and beliefs that is based on the shared reliance on information: this is at least the theoretical framework of a renewed conception of law in the society of information.

We are aware of the fact that we could posit the problem but we are not yet ready or able to answer it. However, it has been reasonable to delineate a theoretical framework for this. The examination of Floridi's philosophy of information, however, enables us to point out a significant line of research, since it suggests that:

1) The ontology of reality on which law is based is no longer made of material but of informational objects. This first suggestion has to be taken into consideration in its full meaning, since law is not confronted with informational objects as if they were something that lie in a place different from where law lies: both law and informational objects are part of the same reontologised reality – the infosphere – that constitutes a common environment. Law – as a normative system – still has the role

of reducing the complexity of the environment: however, the question is now how to deal with the growing complexity of the informational environment. As we have seen it, newness is an essential feature of information. In this perspective, conceiving a legal norm as a prediction that contains information may offer us an instrument which is more capable of dealing with the rapid and continuous self-transformation of the technological reality, since the informativeness of the information always and necessarily involves a reference to the novelty of the world. This means that legal norms should be produced more and more by the decentred interaction between users, which is able to convey a larger amount of information compared to a centralised system of deliberation. We did not make reference to a radical distributed interaction, since in our opinion the idea of a centre – a hierarchy – does not entirely disappear: however, it is not an already established centre that governs the interaction. On the contrary, it is the interaction that creates a centre (Watts, 2003, 53. See also Murray, 2007, 47-48, who speaks of a polycentric system of regulation), that is, forms of hierarchy of values or principled constitution. This leads us to a second point: if the creation and the distribution of information are taken as a primary objective, this goal should be counterbalanced with the need to select relevant and reliable information. It is precisely in relation to this requirement that law can display its essential function in the society of information.

2) The aim of law, in reducing the complexity of the environment by stabilizing expectations, is thus to be rethought in relation to the status of information as well as to the structure of the information cycle. The Philosophy of Information helps clarifying what information is, what the entire life cycle of information is and, notably, what its informativeness consists of. This point is crucial and allows us to draw an analogy between law and information: both legal expectations and shared information, as we have said, pose the problem of selection of relevant and reliable information. Since multiple, distributed sources of information have been added to the traditional storage devices, the issues of selecting data and of filters of relevance and reliability have become essential, with the problems of agency that such selecting systems or creation of filters bring along. Furthermore, this problem is strongly connected with that of the terms of accountability (imputation and responsibility) for the decisions and the actions we take on the basis of the information we rely upon. In this perspective, law will be more and more conceived, in the society of information, as a system that is capable of producing and securing, on the one hand, the conditions to select relevant and reliable information and, on the other hand, of establishing the terms of legal accountability (imputation and responsibility) that is the result of the reliance upon shared information (Durante, 2009). This function of law should be accomplished in a decentred way, by means of the interaction between users, who are interested in setting the (legal or social) conditions of mutual reliability or trust (Durante, 2008). This leads us to our final consideration that concerns the essential role of trust in the society of information.

3) The inner rationality of the legal multi-agent system of the networked society of information is to be found in its attitude towards coping with the lack of knowledge characterizing the informational asymmetry between centralised and decentralised models of law. Law has to stabilise expectations: this function is better accomplished when expectations are shared, since, to the extent to which an expectation is shared, it can give rise to trustworthy forms of cooperation. In fact, reliance on shared expectations transforms an individual risk into a collective one (where also costs are to some extent shared) and allows agents to cope with the lack of certainties. Online users cannot make reasonable decisions on the basis of an expectation, if such an expectation stems merely from established past knowledge (data, programs, instructions, etc.) that depend, however, on original conditions that are likely to be, more or less visibly, modified by the mobility and reactivity of other agents. Rather, a rational expectation may be based on present shared information from decentred relations that can be evaluated and corrected by means of information feedbacks. This happens when users are concerned with common tasks to be performed and the performance is subject to shared information. In this case, it becomes reasonable to expect a determined behaviour that is based on shared information. Reasonableness applies to a set of expectations from which rules of conduct can be inferred. Those expectations never depend simply on already codified knowledge (*static law*) but on the conversion of tacit knowledge (*dynamic law*). Reasonableness is based upon a decentred and horizontal communication between users, which sets a norm of inference that is not deduced from a past certainty. Such a norm transforms a series of possible events into the content of shared information that it is feasible to be intersubjectively relied on. Online cooperation proves to be reasonable where it is teleologically aimed at a specific goal of common concern, which has grown out of a communication

process constructing the framework within which it is reasonable to expect a determined behaviour from another agent.

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FINDING A CORE CURRICULUM IN TECHNOLOGY EDUCATION

Matthew Edwards

Abstract

Politicians seem to be taking over public schools, and they are creating some interesting dilemmas for the school administrators and teachers. With the indefatigable argument that government needs to be as streamlined as industry, schools are taking a beating in the apples to oranges comparisons that are grinding through current political discussions. There may be some comparisons' between schools and industry that are valid. However, students should not to be reduced to widgets. Yet the desire to make the comparison is proving too much for the politician, and the ease of creating —hard numbers" by assessing core subjects is pushing school districts to abandon their defences for the arts, technical programmes (that don't —count" as a core subjects), and anything else that won't help generate the dollar or the —politically correct" assessment. Sometimes it is more difficult and has less immediacy to fight to change policies than it is to be creative within a stifling system. Hence, the necessities for technical and other programmes, that don't quite fit into the evolving system, to look towards methods that fit —politically correct" validations. This paper suggests a way to not only validate certain programmes, but to also streamline education to a degree that would make industry proud.

1. Introduction

1.1 Learning to hate to learn

Recent evidence in the US indicates that high school students, who have completed more academic subjects than their predecessors, increasingly view academic schoolwork as less interesting, less meaningful, and less likely to be useful later in life (Wraga 2009). Yet we are seeing a big push in the US to increase the amount of mandatory core curriculum courses in the public school system, which in turn is pushing many elective courses out of our schools. The core curriculum is defined and interpreted by most institutions as English, Math, and Science. If interest in a subject matter is an indication of how much we learn, or of how much we actually assimilate, then the following research would suggest that our education systems are in trouble.

An annual survey of twelfth-graders, taken by the Survey Research Center at the University of Michigan's Institute for Social Research documented some interesting trends. In 1983, when asked —how often schoolwork is meaningful" 40.2 percent of seniors responded —often or always" and 18.3 percent responded —seldom or never". However, in 2005, only 27.5 percent responded —often or always" and 28.2 percent responded —seldom or never." When asked in 1983 —how important school learning will be later in life," more than half of all the students surveyed responded —quite or very important" and 19.9 percent responded —not or slightly important"; in 2005, 37.1 percent responded —quite or very important" and 28.8 percent responded —not or slightly important" (NCES 2004). It is apparent that the perception of students today is that they will not be able to apply much of what they learn in school to their daily lives. This seems to coincide with projections of declining numbers of Baccalaureate degrees in some states. North Dakota projections showed a 30% decrees by 2017(Bragg, Townsend, and Ruud 2009).

The only surprising thing about these trends is that many of those who make decisions affecting school curriculum are surprised. When facts relating to how many students attend and graduate from Universities are known, then these trends of declining interest and faith in education should become more obvious. Current trends of student populations who graduate from high school, and continue on to graduate from a university, range from 18% to 40% at the highest (Bragg, Townsend, and Ruud 2009). This would strongly suggest that the amount of typical core curriculum being forced upon 60 to 80 percent of the population may actually be inappropriate. English, Math, and Science courses are good, but are these courses really the only path to acquiring that knowledge, or to achieving success in life, or to gaining employment opportunities?

1.2 Rationale

A recent report from the National Center for Education statistics, Special Analysis 2007: High school course taking, stated: "From the early 1980s, when states began to increase the number of courses required to receive a high school diploma, the average number of credits earned by high school graduates increased from 21.7 credits in 1982 to 25.8 credits in 2004" (NCES 2007). This move is due to political pressures that have put an inordinate amount of importance on the core curriculum.

In William Wraga's article-Toward a Connected Core Curriculum- he states an added implication. "The analysis indicates that these increases occurred in academic courses; during the same period, enrolment in vocational courses declined" (Wraga, 2009). The push in these core areas is made partly on the assumption that every child who doesn't earn a university degree is not doing all that they could, or should, by choosing to pursue an education that is not coupled with a baccalaureate degree or higher.

2. Can technology be a part of the core curriculum or vis-a-vis?

2.1 Reasons and complications

Having been an education counsellor in the US public school system I am confident that new state testing regulations related only to the "Core Curriculum", and pressures from policies such as the "No Child Left Behind Act" (NCLB) have contributed to the increase in core curriculum requirements by pressuring administrators and policy makers to react, rather than using good data and common sense when legislating and regulating policies related to education.

Because policy makers tend to react rather than to act positively towards well thought out solutions, it becomes paramount for educators and administrators to be creative in solving problems that could be real stumbling blocks to students. One option is to create an *integrated core curriculum* which organises educational experiences around common personal and social problems, with subject matter introduced only as it relates to particular problems that one might encounter in real life situations. Some educators refer to this type of education as "Applied Education".

One idea is to use common computer software, and integrate a curriculum that can take advantage of many disciplines. For example, teach students math by using spreadsheet applications from industry, such as Micro Soft Excel. You could teach the math concepts and methods, and then apply the formula to the software. Many firms in the field of Construction Management use this type of software to estimate volumes, measurements, and costs of structures in the heavy civil and heavy commercial building industry. Individuals who can understand and manipulate the use of the software are in great demand. However, the applications can be as simple as calculating recipes and figuring budgets. In the US school system these examples I have given of integrating curriculum could cover several courses; Math, Technology education, Family Science, Construction technology, and personal finance.

2.2 Obstacles in implementation

A common problem of using this type of integrated approach arises when we train our teachers to disaggregate curriculum to a point where many teachers being taught in the core areas, such as math, have very little experience with practical application. When teaching university courses I have found that very few students have the slightest understanding of how to apply much of their math skills in the applications that I teach for Estimating and Bidding. For example, the basic concepts of the Pythagorean theorem are commonly taught when squaring large buildings, or figuring roofing materials from areas with varying pitches. Yet, many university students that I have taught have felt that this commonly used math was completely useless outside of trying to get a good grade in a math class. Consequently, I find that I am re-teaching basic math concepts to students who have completed math courses through calculus.

2.3 Is Change Possible?

The question then becomes, "How do we get qualified teachers that not only understand their subject, but that also come with some experience in its practical application?" An interesting article this past summer by Frederick Hess makes some points worth mentioning. He states,

—Highly effective teaching entails not only the application of research-based methods, but also leadership, content knowledge, life experience, organization, commitment, wisdom, enthusiasm, and applied knowledge (including a practical sense of how schooling can be put to use). The median working adult who transfers laterally into teaching has likely enjoyed more opportunities to develop these qualities and skills than has the average new college graduate (Hess 2009)." He then backs the viability of this statement up with information taken from the Woodrow Wilson National Fellowship Foundation survey. He stated that, —42 percent of college-educated Americans aged 24 to 60 would consider becoming a teacher, and would be more likely to do so if they could count on quality training and support and expect to start at salaries of $ 50,000.00 or more. Those who expressed an interest in teaching as a second career were more academically accomplished than those who were not interested. Given current life spans and career trajectories, it is reasonable to imagine that many 35-45 year old entrants might teach for 20 years or more" (Hess 2009)."

From this information it is apparent that the resource for more teachers capable of applying their knowledge is available, but at what cost, and is bringing teachers into the field who have not had teacher education courses create more of a problem than it solves?

3. The Cost of Change

3.1 Teacher Turnover

To help answer the first question I will turn to a report from the National Commission on Teaching and America's Future titled, The High Cost of Teacher Turnover. This report claims that the cost of Teacher turnover is more than 7 billion dollars per year. The NATAF's estimate, which is based on the cost generated by teachers who leave their school or district during a given year, does not include the districts cost for teachers who move from school to school within a district in search of a better position. The estimate also does not include any federal or state investments that are lost when a teacher leaves. If all of these costs were taken into account, the true cost to the nation would be far in excess of $7 billion.

The dropout rate for teachers in some areas is staggering. For example, in 1999 in the school District of Philadelphia, 919 new teachers began teaching and 12,000 students began ninth grade. Six years later, 58% of those students had graduated from high school, but only 30% of those new teachers were still teaching in Philadelphia. This means that the new teacher dropout rate (70%) over six years in Philadelphia was higher than the student dropout rate (42%) (Carroll 2009).

3.2 Teacher Retention

A study attempting to find solutions for teacher retention for business education departments surveyed education department chairpersons with respect to the characteristics of individuals entering and remaining in the teaching profession. Ninety-three percent of the respondents reported that business education teachers prepared through alternative certification programmes had a higher retention rate. They reported that alternative certification programmes often recruited non-traditional students seeking a career change, generating higher teacher retention rates. Eighty-seven percent of the respondents suggested that older teachers, not close to retirement age, had a higher retention rate that young or new teachers.

In their conclusions and recommendations, the first recommendation stated, —Design a high quality alternative business education teaching certification programmes because, as research has shown, these certification programmes often recruit non-traditional students, seeking a career change, generating higher teacher retention rates (Gaytan 2008).

With the kind of expense in teacher turnover, and the studies showing good results with alternative certification programmes, it would appear that training a more mature and stable teaching force, and paying them according to their past work experience, would be well worth the investment. In doing so, it would be easier to institute a shift from disaggregated subjects being taught to a more applied approach.

The foundation for bringing in this type of people is already being practiced in the State of Utah through an alternative certification programme (USOE 2010). Teachers from industry can be paid according to the years work experience that they enter the teaching field. This mature faculty would

come with a much deeper application in their subject matter, and would be more able to advise students relating to the students career interests. (Unfortunately, these individuals are severely restricted as to what role they play in the secondary institutions and currently their utilization is limited by such restrictions).

4. Education with application

4.1 Warning

A warning from the National Commission on Adult Literacy that is concerned with where our education system has placed us described current policies and practices associated with preparing adults for the workforce as ―putting our country in great jeopardy and threatening our nation's standard of living and economic viability" (NCAL 2008). This type of warning and a concern with losing the top spot in world economics has created a wide opening for new ways of considering how the education system works.

There is a movement in the United States towards a more applied education at the post-secondary level. The applied education at this level is not the same as changing education at the high school level in an effort to create deeper understanding of subject matter. However, the principle of application in education lends itself to the argument that there is a yearning from the public to have education that is not taught closely to or completely in an abstract esoteric sense. Those teaching in institutions of higher learning should begin to question a common belief that an applied education is of lesser value to society, and therefore tends to have a lower social status applied to it.

4.2 The Applied Baccalaureate

Applied baccalaureate degrees are offered in public higher education institutions in 39 states (78%), but only on a limited basis. A brief titled, *The Adult Learner and the Applied Baccalaureate: Emerging Lessons for State and Local Implementation* gives reasons for this rise. ―Applied baccalaureate degrees have arisen from a number of convergent forces. They provide a bachelor's degree option for participants in Associate of Applied Science (AAS) degree or applied associate degree programmes offered primarily in occupational-technical (or career-technical) education programme areas. These degree programmes represent a potentially important curriculum path to the baccalaureate for a siseable number of postsecondary students".

Continuing in the same article, some state officials have stated that the reason some institutions have given for offering education that has an applied base is ―To address an employment sector that faced serious economic challenges, including occupations associated with business, education, health care, public safety, and various industrial, computer and engineering technology fields. In many of these states, applied baccalaureate programmes fill niche employment needs, because they are small, highly specialised, and uniquely positioned to address labour force needs" (Bragg, Townsend, and Ruud 2009).

Statistics from the previous report show that some states have less than 20% of their population receiving a four year degree after graduating from high school. If political pressure has convinced some institutions of higher education to fill a void by offering a more diverse education to handle the changing needs of a growing population, then wouldn't it reason that our secondary education needs to help prepare their students for this educational environment as well?

The argument is not that all education should be taught only if it is addressing a particular occupation. The argument for a well rounded and diverse liberal education still holds value and has validity in a world which needs an educationally flexible and forward thinking workforce. However, the point needs to be made that an educational shift that teaches various subjects would do much better when function is applied to the learning. It is a better and deeper learning strategy in a world where students are required to understand so much more information than their predecessors. This will provide a greater number of individuals with more avenues for success.

5. Implementation

5.1 Complexities

Some of the difficulties of creating a more diversified teaching force, along with the financial concerns that inevitably become the driving force behind educational reform decisions have been addressed to the extent that an article of this nature has room for consideration. The idea of having the answer to the —how to" question concerning applied education might be considered absurd considering the complexity of each subject. Therefore the —answer" lies in a system that supports the structure through general policies, but allows a fair amount of autonomy to the educator in implementing their own applications in the educational process. This can occur through the educators own experience, and through specific in-service training and idea sharing between colleagues.

5.2 Using Modern Technology and other Solutions

Hiring policies need to change along with complementary pay scale implementation where years of experience in industry is recognised and rewarded. Programmes that allow easy access for teacher training should be instituted. In rural areas this is more difficult where geographic regions are expansive. However, with the use of modern technology, the ability to obtain entire degrees at reputable institutions is already in place. A beginning teacher from industry can be exposed to teaching methodology, classroom organization, and many other desirable skills through education networks that are already in place at secondary institutions. The beginning teacher should not have to go any further than the school where they are employed. This same system could be used for collaboration with their colleagues.

5.3 Personal experience

Developing curriculum is not an easy task, but in many cases is already in place. The vehicle or the delivery method of the curriculum, where individuals have had experience applying their specialty, will be way ahead of young inexperienced teachers.

While teaching applied math (without an endorsement) for a small rural district, I found myself in a classroom filled with various levels of math students. There were students who were tired of taking upper division math, and those who never quite grasped basic math. Having had no formal training in teaching math, I entered the classroom with only my experience in industry. I was conveniently located next to a shop where I had access to industrial equipment. The class and I moved fluidly from the whiteboard to the shop throughout the semester.

We created mock and actual structures, such as the stairs for the promenade at the junior prom. The level of engagement from the students was astounding. Comments from students of all levels left me wondering about the quality of some of their prior educational experiences with certified professional educators. The previously advanced math students would make comments of how it gave them a head ache to actually have to think about their math. From students who previously struggled with math I received acclamations of —finally get fractions, hurray!"

This was many years ago, and so began my quest to find more applications in the classroom. I taught English, Technology education (with an endorsement), and Math, along with vocational courses. In every case success came with applied teaching techniques. Due to my rural setting, one advantage I had that many teachers could not enjoy in today‘s politically challenging environment was autonomy.

6. Autonomy

6.1 Getting past the help

The political atmosphere where federal governments have become so involved in the micro-management of educational institutions has done more to hinder innovation in education than their broad sweeping reforms have done to help. As a matter of point, it may be argued that many reforms imposed by the federal government have exacerbated the situation by frustrating educators and administrators with impractical underfunded demands and threats of job cuts. They have undermined

the changes they desired to incorporate. An analogy for how some teachers are feeling would be to tell a swimmer that circling sharks are much less likely to attack if you aren‘t nervous. The federal government feels that because of their sise and position of power, they are protecting educators and students. They don‘t even realise the ramifications of constantly circling the school with their good intentions.

The requirements and restrictions to become an expert worthy of hire in the public school system are stifling. A broader set of parameters in finding teachers who can apply their experiences in education should be available to administrators. There are no guarantees of hiring good teachers just because they meet the certification requirements. There is a very human element to being a good teacher that is difficult to assess without having observed each individual teacher in action. The administrator must be given greater leeway and be trusted to hire and fire as she/he sees fit. Of course this needs to have limits, and we expect a certain amount of protection from indiscriminate use of power. However, poor producers are not hard to spot in industry, and the same can be said in public schools.

6.2 Coming together

Math is readily recognised as an industry standard and is more easily subjected to assessment than other disciplines. However, while teaching English I had my classes tour a small newspaper print shop. They then took a politically controversial topic that was common in the local area and I asked them to write a letter to the editor after they each investigated the topic. Having an audience the sise of a newspaper readership created amazing results in the student‘s composition. With the technology that exists today, teachers have advantages of application in many subjects.

It would it be possible for a business teacher to cover two subjects in a single class during one semester. For example, a class titled *English through keyboarding*, or two elective business classes with a substantial amount of writing and content specific English could count for one English course. For those students who would enjoy a different approach, the amount of writing that could take place in a keyboarding course may surpass that which they would get in an English course. Investigating stories and doing research while the student learns to manipulate technology is not a single learning experience. Do we have a compulsion to disaggregate every subject? With the shortages of qualified teachers that have been discussed earlier, is there really a concern from the labour unions that we would no longer have a need for English teachers, or that English teachers will displace computer teachers if they are technologically capable? Is this a good use of our human resources?

6.3 Existing Paradigms

It might raise a few eyebrows on the streets if the public were to discover that most university professors in the United States are not required to take a single course in pedagogy in order to teach their subject, yet with few exceptions, you are not allowed to take your expertise in any subject to the secondary level without having taken several education courses. You must become a certified teacher. What makes a teacher a good teacher at the university? Is it their personality? Then why can‘t we hire teachers in secondary schools who have a good teaching personality, with stipulations that would afford opportunities in learning pedagogy? The double standard needs to be addressed. I do not argue that teaching cannot be greatly improved with formal education. However, it would seem that being so flippant with university professors teaching abilities at the highest levels of learning, and so militant in the secondary schools is an inexcusable double standard. Is there medium ground on the subject?

7. Conclusion

Technology has become so intertwined in all that we do. It is literally inescapable if you choose to live in modern society. There are studies that show symptoms of withdrawal for participants who have technology such as texting taken away from them for a period of time. For example, a study on cell phone use concluded, ―Between 6% and 11% of respondents showed symptoms of addiction related to tolerance, withdrawal, and displacement of attention to school or work, and the inability to diminish use. Displacement of people was common among a higher percentage of respondents. The number of messages sent, and the perceived skill at using SMS technology were significant predictors of the number of addiction criteria exhibited by respondents. Among the small percentage who revealed symptoms of addiction, usage of text messaging was double to triple that found in most of the rest of

the population sample studied. While gender had been shown to be a predictor of overuse tendencies in past studies, no gender differences were found for addiction measures, but males were heavier users of text messaging than females" (Perry 2007).

With our live so intertwined in technology, it seems outrageous that we are still considering disaggregating the curriculum to a degree that technology classes are mostly elective courses, and the core has had such an emphasis, due to the ease of assessment, that we now have students who have to choose between being in the band, or taking an art class, because there is not enough room for the —core". The following short clip came directly from a local paper in the state of Utah,

—Eight Utah public and private schools face accreditation woes, according to a report the State Board of Education plans to discuss Thursday.

The Utah State Accreditation Committee and the Northwest Association of Accredited Schools (NAAS) are recommending approval for 287 Utah schools this year but want to place five others on "advised" status, meaning they have problems that could eventually threaten their accreditation or they filed incomplete annual reports. They're recommending "warned" status for three other schools, which is one step closer to losing accreditation than advised.

High schools must be accredited in order for the credit they give students to be considered valid. Accreditation status is based on a number of factors, including curriculum, counsellor to student ratio and assessment (Schenker 2010).

This recent article is indicative of the type of pressures placed on schools and handed down to teachers and students that is causing a stranglehold to be placed on ideas that may be —outside of the box".

Certain ideas that appear good and simple become complicated. Not because the nature of the issue is so complex, but because the parameters that the idea is placed in are severely restricting. The first goal should be to broaden the parameters in which public schools function. In order for this to take place, more autonomy must be given to states, and thus more autonomy can be given to local schools. Applied education requires applied common sense.

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HOW TECHNOLOGY CAN MAKE GREEN GREENER A CLOSER LOOK AT CURRICULUM IN CONSTRUCTION MANAGEMENT

Boyd Fife

Abstract

This research was conducted to determine if Utah high schools are teaching high school construction students green building techniques and if students are being introduced to energy efficient building software. The research establishes the need for energy efficient building practices which affect human health and the economic wellbeing of U.S. citizens by conserving energy.

Teachers were asked questions that reflect the green building practices currently being incorporated throughout the nation. The teachers responses to these energy efficient build practices were then compared to responses obtained from industry professionals who specialise in efficient homes. The homes built by the Utah high school programmes differed greatly when compared to what is being constructed by professionals in the green building environment.

1. Introduction

The U.S. building industry in the United States has a tremendous impact on the environment and human health. Buildings consume 38- 40% of total U.S. energy, 71% of the electricity, and 12% of the water (USGBC. 2008). Building demolition, remodelling, and construction generate over 35% of non-industrial waste (Office of Solid Waste. 1998). Air pollution in buildings can cause health problems, with pollutant concentrations between two and five times greater, and sometimes more than 100 times greater, than those of outdoor air (Wallace, LA. 1997). Most Americans spent more than 90% of their time in buildings, some of which have indoor environments associated with asthma, respiratory-tract irritation, Legionnaires' disease, and cancer (USEPA. 2004). When considering carbon dioxide, the country's operation of buildings produces 38% of all U.S. emissions. According to Architecture 2030, —Ttere are hundreds of coal-fired power plants currently on the drawing boards in the U.S. Seventy-six percent (76%) of the energy produced by these plants will go to the operation of these buildings (Architecture 2030. 2010)."

It is important that construction students be taught green building principles to ensure that the structures they erect in the future will be environmentally safe for all occupants.

1.1 Purpose of the Research

The main research question addressed is: —Are construction students being taught correct ethical building-science principles, and is related energy saving software being introduced in the classroom?" To address this question, data on energy efficient building practices in all of Utah's high-school construction programmes was collected and analyzed. This data suggests that the gap between the need for energy efficiency and industry practice may start in construction classrooms.

In addressing the research question above, interviews designed for data collection were directed towards examining curriculums in construction management. Top issues were linked with energy efficient building practices and related construction software. Questions included issues about solar heat gain to reduce the need for electricity and fossil fuels for comfort heating of buildings, as well as other high efficiency-climate responsive designs. In addition, questions regarding the use of the computer programs Elite Software, (Elite Software. 2009) REM/Rate (REM/Rate. 2009) for Heat Vent and Air Conditioning design efficiency, and 3-D Computer Aided Drafting software for Building Information Modelling (BIM) (BIM. 2009) were asked. Findings of this research will not only enhance awareness of traditional building efficiency, communication using BIM, and other energy modelling software, but they will also help in training construction management students and faculty in making buildings that take into account both regulations and social and ethical needs. In 2000, Guy and Farmer defined ethics in the context of buildings in a particularly useful way. They point out that

ethics can be viewed as concepts that we ~~-te~~st, qualify, and reconstruct through an on-going, dynamic process of design innovation (Simons, G. and Graham, F. 2000)."

This research will significantly contribute to teach energy efficient building practices and computer applications in construction programmes throughout the state of Utah. The first step in this teaching process will be the reporting of findings from this research to the Utah State Department of Education's annual construction conference. The conference will be held June 10 & 11, 2010 at Southern Utah University. The research information will be shared with construction teachers from throughout the state and will determine workshop topics for Utah teachers.

2. Survey Questions and Results

The survey questions were divided into two groups:

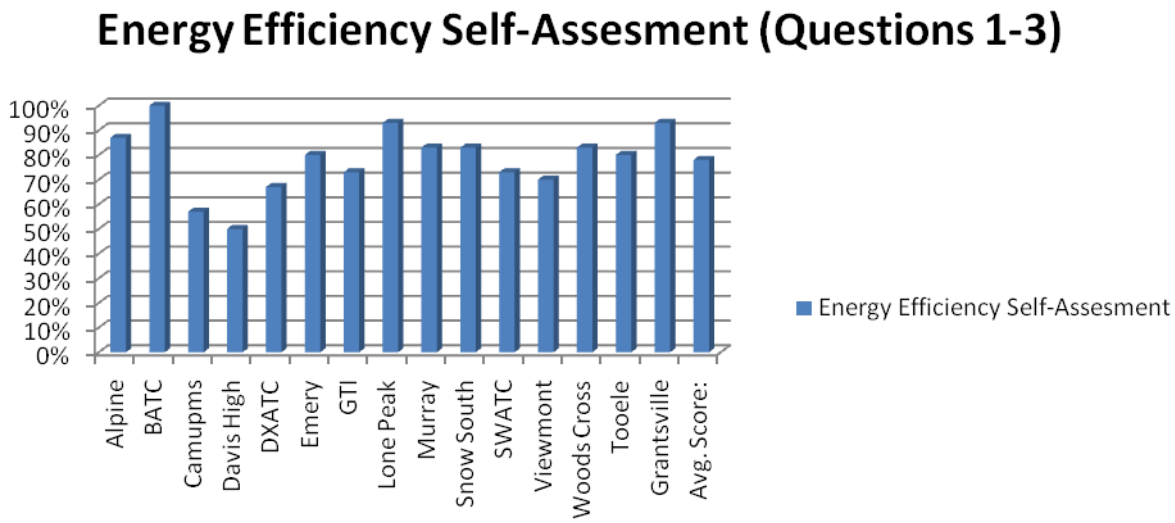
1. Questions one through three were asked at the first of the interview to determine the respondent's position on how they view energy efficiency and how their school is incorporating related energy building practices. It was determined that if these questions were asked after specific questions about their actual building practices the response may have been skewed. These questions determine a base line of how schools regard their overall energy practices, which can then be compared to the implementation of that practice.
2. The second set of questions four through fourteen focuses on industry specific energy practices reflecting conservation. These questions are compared to the base line questions to determine how effectively schools are using green building techniques.

2.1 Results of Questions 1-3

Representatives from all fifteen of Utah's high-school construction departments were asked questions to determine how closely their opinions about the energy-efficiency of their programmes matched with their programme's actual building and teaching practices. First, respondents were asked to rank the importance of teaching high school students about energy-efficient building techniques, the quality of their programmes energy-efficiency curriculum, and the energy-efficiency of their structures on a scale from one to ten. Adding the three numbers given by each respondent together, dividing the sum by thirty, and rounding to the nearest hundredth, gives a percentage score which represents the respondent's opinion of their programme's energy efficiency. Their answers to the questions, each of their scores, and the average score between them are expressed in the following table and graph:

- Question 1: What would you rate the importance of teaching high school students about energy efficient building techniques?
- Question 2: What would you rate the programme at your school teaching students about energy efficient building?
- Question 3: How energy efficient are your structures?

Name of school	Q1	Q2	Q3	Score
Alpine	8	8	10	87%
BATC	10	10	10	100%
Camupms	7	5	5	57%
Davis High	5	5	5	50%
DXATC	10	5	5	67%
Emery	9	8	7	80%
GTI	8	4	10	73%
Lone Peak	10	10	8	93%
Murray	10	7	8	83%
Snow South	8	8	9	83%
SWATC	7	7	8	73%
Viewmont	8	5	8	70%
Woods Cross	8	9	8	83%
Tooele	7	8	9	80%
Grantsville	10	10	8	93%
AV. SCORE:				**78%**



2.2 Results of Questions 4-14

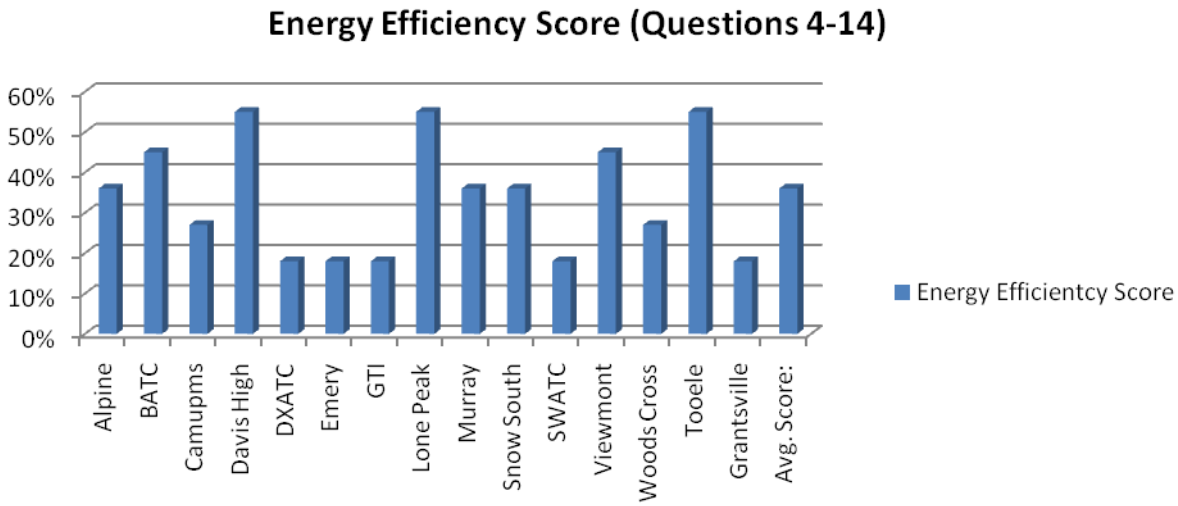
On the average, Utah‘s high-school construction teachers gave the energy-efficiency practices of their programmes a score of 78%. But the answers given by the respondents to a series of questions about industry-specific energy practices revealed that the opinion of the respondents does not reflect the failure of their programmes to promote energy-efficiency. The respondents were asked fourteen questions about their building practices. Eleven of these questions required yes-or-no answers. Respondents who affirmed they were using one of the eleven energy-efficient practices were given one point for each practice. Adding each respondent‘s points together, dividing the sum by eleven, and rounding to the nearest hundredth, the respondent‘s practice of energy-efficiency was given a percentage score. The answers to the questions, each of their scores, and the average score between them are expressed in the following table and graph:

- Question 4: Do you seal all penetrations through top and bottom of interior, exterior wall plates, and ceiling penetrations?
- Question 5: Do you seal the exterior of the home?
- Question 6: Do you feel a home can be built too tight and that a home should be able to breathe on its own?
- Question 7: Do you incorporate a fresh air system which brings fresh air in from the outside giving the home air exchanges?
- Question 8: If you do incorporate a fresh air system, do you have a heat exchange system?
- Question 9: Do you incorporate a direct vent, on demand water heater or other water heater other than the traditional venting type?
- Question 10: Do you place insulation under your basement slabs?
- Question 11: Are your buildings Energy Star Rated?
- Question 12: Do you introduce students to a blower door or duct blaster?
- Question 13: Do you teach Building Information Modelling (BIM)?
- Question 14: Do you use software to calculate HVAC loads?

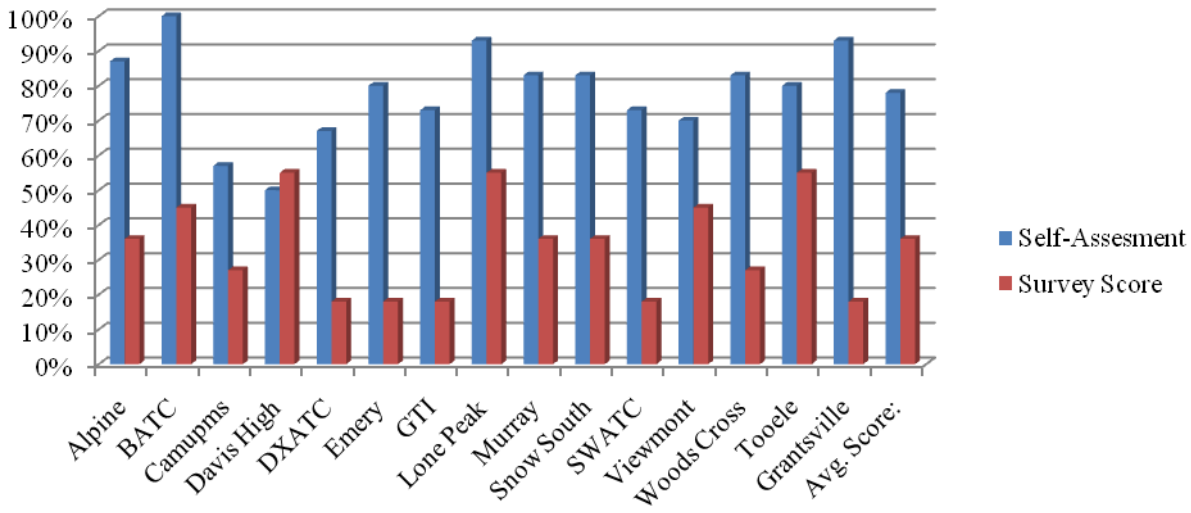
	Q4	Q5	Q6*	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14 %
Alpine	Yes	Yes	No	No	No	No	No	No	No	No	Yes 36%
BATC	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No 45%
Camupms	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes 27%
Davis High	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No 55%
DXATC	No	Yes	No	No	No	No	No	No	No	No	No 18%
Emery	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes 55%
GTI	Yes	No	Yes	No	No	Yes	No	No	No	No	No 18%
Lone Peak	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes 55%
Murray	Yes	Yes	No	No	No	No	No	No	No	No	Yes 36%
SnowSouth	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No 36%
SWATC	Yes	Yes	Yes	No	No	No	No	No	No	No	No 18%
Viewmont	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No 45%
WoodCross	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No 27%
Tooele	Yes	Yes	No	Yes	No	No	No	No	No	Yes	Yes 55%
Grantsville	No	Yes	No	No	No	No	No	No	No	No	No 18%

Average Score: 36%

*A no answer on question 6 scores a point instead of a yes.



Comparison between the two Graphs:



On the average, the actual energy-efficiency practices of the schools surveyed received a score of 36%. Davis High, Emery, Lone Peak, and Tooele, which had the highest scores, put into practice only 50% of the energy-efficient practices mentioned in the questions. A comparison of the scores of each school in the two tables reveals a large discrepancy between what teachers think about the energy-efficiency of their programmes and their actual energy-efficiency in practice.

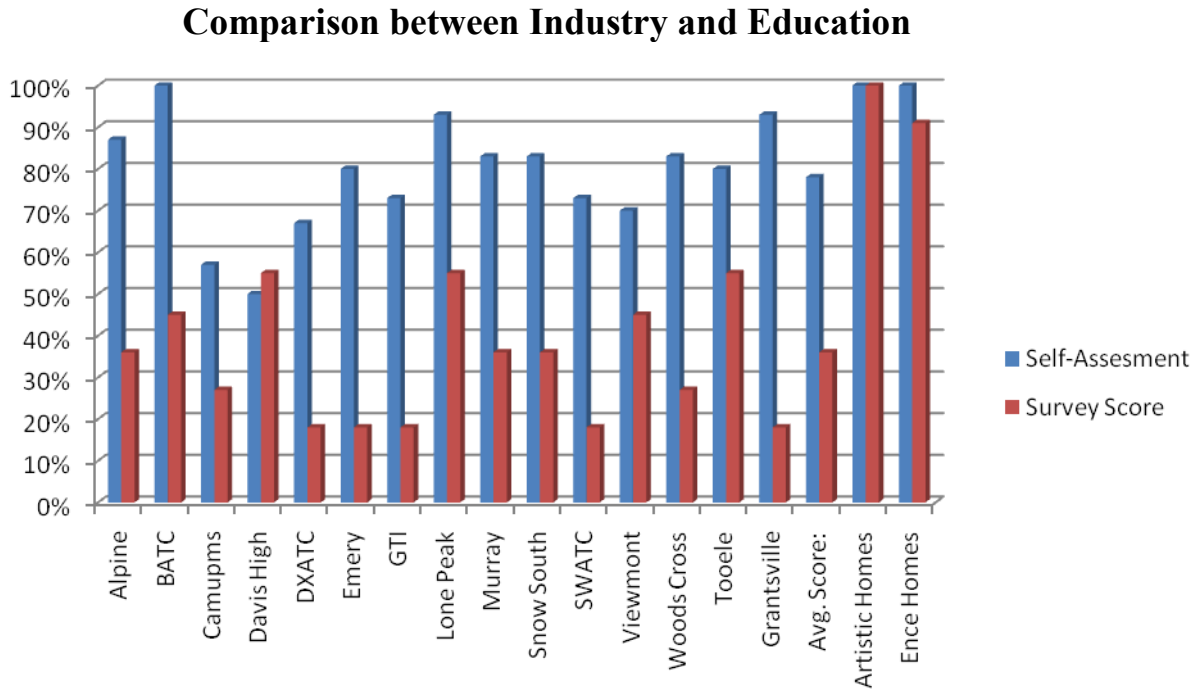
2.3 Results of Industry Survey

In addition to the fifteen schools, two companies with reputations for energy-efficiency were given the survey. Ence Homes, the largest energy efficient builder in Southern Utah, and Artistic Homes, the largest home builder in New Mexico, were chosen as industry comparisons.

Their responses to the first three questions were assumed to be tens (100%), based on their reputations. They were asked questions 4-14 under the same circumstances as the schools. A comparison between the responses of these industry leaders and the responses of the schools is shown in the following table and graph:

	Q4	Q5	Q6*	Q7	Q8	Q9	Q10*	Q11	Q12	Q13	Q14	%
Ence Homes	Yes	Yes	No	Yes	Yes	Yes	No*	Yes	Yes	Yes	Yes	91
Artistic Homes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	100

*When questioned about the no response on question 10 the representative from Ence Homes indicated that the company had conducted research and had determined that in a predominantly cooling climate the need for slab insulation was negligible. The 2009 International Residential Code supports this finding.



These findings show that the energy-efficiency practices of the schools surveyed do not come close to teaching their students what is actually being practiced by energy-efficient builders in the industry. The results from the building industry as indicated in the last two columns of the above graph reflect the large disparity between Utah secondary education and the prevailing energy standard currently practiced in the residential home industry.

3. Justification of Survey Questions

Q4. Do you seal all penetrations through top and bottom of interior and exterior wall plates and ceiling penetrations?

Q5. Do you seal the exterior of the home?

Q6. Do you feel a home can be built too tight and that a home should be able to breathe on its own?

These three questions (4-6) focus on the importance of making the home as air tight as possible. Other than when the outside air is at a comfortable temperature, one of the key elements of an energy efficient home is to seal out the random exchange of interior and exterior air. Air barriers such as foam insulation used to plug plumbing and electrical holes, building wraps, sealed sheetrock, or OSB board provide the basics in stopping air from coming into the structure. In buildings that are not sealed, extreme exterior temperatures make the heating or cooling equipment expend more energy for comfort control. In addition, through wind washing, moisture in the form of vapour can be carried into the wall-cavity and home if the home is not properly sealed.

Controlling heat flow, air flow, moisture flow, and solar and other radiation will control the interaction among the physical elements of the building, its occupants, and the environment (Lstiburek, J. 2009). Of these four, airflow —merits major consideration mainly because of its influence on heat and moisture flow (Hutcheio, N. 1953).” This heat and moisture flow may affect the structural integrity of the home by causing wood dry-rotting within the wall cavity and enhancing termite activity. As the cellulose components of the building become wet, they produce mould, which creates a hazardous environment for the occupants. Outdoor pollutants such as radon gas can be kept out of the home if it is built tight.

Cleary, sealing the home is a major step toward better energy efficiency and improved health. Because code requires questions four through six, most Utah high schools practice them.

Q7. Do you incorporate a fresh air system which brings fresh air in from the outside giving the home air exchanges?

Q8. If yes to #7 do you have a heat exchange system?

These two questions were asked as a follow up to question six, because of the necessity of mechanical ventilation for tight buildings. One of the new age energy quotes, "build it tight and vent it right," encompasses these two aspects of energy efficiency. When a structure is sealed properly, the moisture that is created within from showers, cooking, and general household activity elevates humidity levels, which encourages mould spoor development, building deterioration, and a general lack of occupant comfort. Health is further threatened through the use of household chemicals, natural gas appliances, and building materials that contain resins and glues. The real problem is that houses are being built with polluting materials and without provisions for supplying the occupants with fresh air (Bower, J. 2000). The tight sealing of a home is important, but only if moisture and other pollutants are removed from the home through mechanical ventilation. The Environmental Protection Agency confirms, "inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out of the home" (USEPA. 2009). Mechanical ventilation enhances the comfort and health of the home by removing volatile organic compounds (VOCs) found in many house hold cleaning products and other building pollutants. Of all the Utah high schools that were surveyed, only two installed fresh air and heat exchanges.

Q9. Do you incorporate a direct vent, on demand water heater or other water heater other than the traditional venting type?

Traditional water heaters waste energy by constantly keeping a large tank of water hot, whether hot water is being used or not. These heaters often constitute 25% of home energy spending (California Energy Commission. 2008). Direct vent, on-demand, and solar water heaters provide energy efficient alternatives to traditional water heaters. Direct vent water heaters have an air inlet and a vent that cycles air from outside the home for combustion. Direct vent water heaters save energy because they do not "rob conditioned indoor air from the house" (Weingarten L. and S.1996),

On-demand or tank less, water heaters do not heat water constantly. Instead, they heat water as it's needed. A single on-demand water heater is between 24%-34% more energy-efficient than traditional water heaters in homes that use 41 gallons or less, and even in homes that use large amounts of hot water, can be 8%-14% more energy efficient (U.S. Department of Energy. 2010). On-demand water heaters last up to 7 years longer than traditional water heaters, thus cutting down landfill waste and resource consumption (Chiras, D. 2009). Solar water heaters use free, non-polluting fuel and can be 50%-75% more efficient than traditional water heaters (American Council for an Energy-Efficient Economy. 2007).

Q10. Do you place insulation under your basement slabs?

Depending on factors such as climate and soil, 10%-25% of heat in a home may be sucked out through the bottoms of grade and basement slabs (Drake, L. 2000). This heat loss is preventable by insulating underneath the slab. Some contractors in the housing industry state that, because heat rises, there is no need for insulation to be placed under a slab in cold climates. In truth, hot air rises, not heat. The constant geothermal temperature of the soil under a basement slab in Utah is about 50-55 degrees Fahrenheit, depending on location. If the interior home temperature is 70-75 degrees, the approximate 20 degree difference is a constant draw on the interior conditioning of the home. In summer, this difference is beneficial, but in winter months, when heating is required, the benefit is reversed. Two of the Utah high schools insulate under basement slabs.

Q11. Are your buildings Energy Star Rated?

An ENERGY STAR® rating on a home represents a minimum of 15% higher energy-efficiency than the building code requires. Often, ENERGY STAR-rated homes use features that increase energy-efficiency by 20-30% (ENERGY STAR. *2010).* This higher energy-efficiency is verified by a 3rd party inspection, not by the builder. ENERGY STAR-rated home inspections focus on tight construction and ducts, insulation, heating and cooling, windows, and the efficiency of the products and appliances used in the construction. ENERGY STAR homes can keep 4,500 lbs. of greenhouse gases out of the air each year (ENERGY STAR. *2010).* In 2008, ENERGY STAR saved home owners $19 billion on their utility bills and avoided greenhouse gas emissions equivalent to 29 million cars (ENERGY STAR. *2010)*.

In addition to giving a building a higher efficiency rating, ENERGY STAR rating also enhances the possibility of sales and a greater interest from perspective home buyers. Three of the Utah high schools are Energy Star Rated.

Q12. Do you introduce students to a blower door or duct blaster?

Blower door tests determine how airtight a home is by using a large fan mounted in an exterior door frame to pull air out of the house. As air pressure inside the house lowers, the higher air pressure outside the house forces air in through all unsealed cracks and openings. Inspectors may then use smoke pencils to detect the leaks (U.S.D.O.E. 2010). Sealing these leaks reduces energy consumption by preventing conditioned air from within the home from escaping, and from being replaced by exterior, unconditioned air.

Duct blaster tests work like blower door tests by depressurizing HVAC ducts to detect leaks, and by using a manometer to determine pressure inside the ducts. According to the U.S. Department of Energy, properly designed duct systems are critical to preventing significant wasteful energy consumption (U.S.D.O.E. 2010). Blower door and duct blaster testing is basic in determining how much air leakage there is in a home through windows, doors, and leakage in the HVAC and air-conditioning runs. Two of the fifteen high schools in Utah currently teach this in the classroom.

Q13. Do you teach Building Information Modelling (BIM)?

For many reasons, BIM represents a historical and radical change in the industry (Stephens, J. 2009). First, problems in exchanging information cost the construction industry over $16 billion (Gallaher, M. and O'Connor, A. and Dettbarn, J. and Gilday, L. 2004). BIM can be used to solve these communication problems (Boutwell, S. 2008). Second, buildings account for 71 percent of electricity consumption and 1/3 of the nation's energy use. BIM allows "architects, engineers, and building owners to weigh various design options and their effects on energy consumption, daylighting, thermal comfort, and more," (Stephens, J. 2009) in order to significantly reduce the energy consumption of buildings. Third, the construction industry generates a fifth of the world's waste, including 40% of the world's solid waste. BIM has the ability to "cut down on the selection and use of unnecessary materials and resources and to prevent costly, environmentally harmful mistakes (Kossman, R.2009)." Considering the environmental benefits of BIM, and its importance to the future of the construction industry, construction educators have a responsibility to the community and to their students to teach BIM in the classroom. Only one of the fifteen schools in Utah currently teaches BIM in the classroom.

Q14. Do you use software to calculate HVAC loads?

The HVAC code states that all ducts must be sised according to Manual D, which is the industry basis for determining duct sizing for heating and cooling systems. It is similar for the sizing of the heating and cooling equipment with the use of Manual J. Together, these two manuals indicate to heating specialists the proper equipment and duct-sizing for any building design. Many contractors estimate these sises through rule-of-thumb-square-footages, which in the past have been somewhat effective. However, with new, more sophisticated heating and A/C equipment, it is imperative that more accurate calculations contribute to the sizing decision of equipment and ducts. The use of computer programs such as Elite and Rightsoft helps to eliminate mistakes and make the process of load calculations much faster. The author has witnessed examples where one heating contractor simply walked a residential duplex and stated that each unit should be equipped with a 100,000 BTU furnace. When the calculation on the same homes were done using Manual J a 50, 000 BTU furnace was sufficient. The contractor specified a furnace that was 100% larger than the recommendation from Manual J. This is a gross error given the fact that Manual J over sises to compensate for any under sizing by the service provider. Six of the schools in Utah teach HVAC software in the classroom.

4. Conclusion

The results of this research indicate a large gap between what Utah high school construction teachers perceive as being adequate energy efficient building practices and what the green industry deems as acceptable. The construction industry companies scored 96% answering only one question in the negative which is arguable, given the explanation by Ence Homes for this negative response. The energy efficiency average from the survey for Utah high school programmes was 36%. There is a full 60% gap between how teachers actually educate students on green building and what industry experts incorporate into their homes.

The results and information from this study will be presented to the interviewees to gain input from their perspective as teachers. This will take place during the Utah State Department of Education's annual construction June Conference held at Southern Utah University, June 10 & 11, 2010.

Workshop topics for the June Conference will be developed from questions 4-14 and will include the importance of building enclosure sealing, heat recovery air ventilation, high efficiency water heaters, investing in slab insulation, benefits of the ENERGY STAR rating, how to conduct and benefit from blower door and duct blaster testing, how to introduce Building Information Modelling into the class room, and an introduction to REM/Rate and Rightsoft HVAC energy software.

Future research follow-up will consist of the following:

1. Feedback from those surveyed which will take place June of 2010.
2. Research to determine if information given at the 2010 June Conference workshops was implemented into future high school project homes. This study is to be carried out after the 2010-2011 school year.
3. Some teachers indicated that their lack of energy efficient practices was due in part for the need to generate money for their programmes by building less expensive homes. A research into the pressure exerted by school administrators for the building programmes to generate capital and how financially successful do programmes need to be in order to exist would be a worthwhile research.

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ELECTRONIC VOTING TECHNOLOGY, THE SOFTWARE ENGINEERING CODE OF ETHICS, AND CONCEPTIONS OF THE PUBLIC GOOD

William M. Fleischman

Abstract

The Software Engineering Code of Ethics, in common with other professional codes, places concern for acting in the public interest as the first of its fundamental principles. Yet the electronic voting systems currently in use are plagued by design and software engineering flaws that undercut public confidence in the fair conduct of elections. We argue that it is difficult to imagine that the principle of acting in furtherance of the public good formed part of the consciousness of members of the software engineering teams that produced the code for these devices. Our contention is that the uniformly poor quality of software engineering evident in these systems is a symptom of a degradation and attenuation of the conception of the public good associated, in part, with the narrowing of curricula in public education produced by the pressure to improve scores on standardised tests in mathematics and reading. We argue that the commitment to the public good is under further pressure associated with a polarised and politicised climate of public discourse and that the combined effect of these factors is to tend toward anaesthetizing (software) engineering professionals to the wider social implications of their work. On the other hand, we note the admirable record of concern relating to problems with electronic voting systems evident in the long and active discourse among individual professionals, teams of researchers, and professional societies such as the ACM and IEEE. Finally, we discuss some possibilities for raising the level of awareness of civic responsibility, especially through the education of those aspiring to careers in software engineering.

1. Introduction

Since the introduction of electronic voting systems following the passage of the Help America Vote Act (HAVA) in 2002, numerous studies (Kohno, *et al*, 2004), (Feldman *et al*, 2006), (Theisen, 2006), (Bishop, 2007), (Appel *et al*, 2008), have disclosed serious flaws in virtually all electronic voting devices marketed and in use in the United States. HAVA was intended to prevent problems like those encountered in the contested count of the 2000 Presidential election, yet these shortcomings have created the a situation in which the purported remedy for problems associated with the conduct of fair elections has in actuality intensified public doubts about the electoral process.

The flaws identified by these scientific studies of existing electronic voting devices include susceptibility to the installation of malicious software resulting in the intentional theft of votes; the further possibility of modification of records, audit logs, and counters to frustrate subsequent forensic examination of the election process; denial of service attacks that disable the use of these devices either at the start or during the course of an election; as well as accidental "flipping of votes" and other anomalies caused by careless handling or unskilled actions of election workers. Furthermore, experience in the use of electronic voting devices in recent elections has confirmed their fallibility. Ballots have been inexplicably lost from or added to vote totals; direct recording electronic devices (DREs) have provided incorrect ballots; machines have failed to operate at the start of voting and have broken down during the course of an election; memory cards and smart card encoders have failed during elections.

The existence and widely publicised knowledge of the vulnerability and unreliability of electronic voting machines serves to undermine the public's confidence in the security, integrity and accuracy of the electoral process and erodes the essential bond of trust between citizens and their government. These are clearly matters that threaten the public good.

Many of the flaws are directly attributable to poor software engineering practices in the design and development of electronic voting devices. The Software Engineering Code of Ethics, which "expresses the consensus of the profession on ethical issues," places concern for the public interest as its highest

priority, the first of the eight principles that express the ethical aspirations of the profession. How are we then to square the uniformly questionable quality of electronic voting devices designed to carry out the intent of HAVA with fidelity to this principle on the part of the several independent teams of software engineers, working for different companies, who participated in the design and development of these devices?

It may well be, as some suspect, that it is an intractable problem in software engineering to produce electronic voting devices that solve simultaneously the critical functions of protecting the secrecy of each voter's ballot, protecting the security of the voting process, providing an interface that is sufficiently easy to use for all voters – including those with disabilities related to vision, hearing and mobility – and assuring the integrity and accuracy of the final ballot count. Although these questions are implicitly raised by research efforts investigating vulnerabilities and deficiencies of current electronic voting devices – and although these investigations have spurred a vigorous discussion in the profession concerning electronic voting – there remains the responsibility that rests with any practitioner involved in the development of these devices to take care to implement best practices (for example, in regard to encryption) and to acknowledge the possibility that even the most carefully designed device may fail to meet the exacting standards necessary for the conduct of elections in a democracy.

In their recent paper, "The Public Is the Priority: Making Decisions Using the Software Engineering Code of Ethics," Gotterbarn and Miller "present three cases – one fictional and two based on news reports – that illustrate how a software professional can use the Code as a decision-making aid when ethical conflicts arise." (Gotterbarn and Miller, 2009) In their examination of the difficult conflicts arising in the three cases they consider, the authors provide much valuable guidance for practicing software engineers whose consciousness is supported by an active and robust conception of the public good.

The contention of the present work is that the phenomenon of poor standards of software engineering practice evident in the design and development of existing electronic voting devices is a symptom of something more fundamental and more dangerous than inattention to the Code of Ethics itself. It is that the concept of what constitutes the public good, what it means to act in the public interest, has been degraded and attenuated to the point that, in this case at least, it is difficult to imagine that the principle of acting in the public good can even have penetrated the consciousness of the members of the various software engineering teams. In this connection it is pertinent to recall Terry Winograd's admonition that "we can take obliviousness as a key sign" of behaviour that is ethically deficient. (Winograd, 1991)

In this paper, we will explore some of the factors that have resulted in the degradation of the concept of acting in the public good. We will present the results of informal as well as more structured surveys of how inattention to the importance of education in citizenship undermines concern for the public good. This inattention to education in the meaning of being a good citizen extends from the earliest years of a young person's formation through his or her experiences in secondary school and university. It combines powerfully with what young professionals learn from stories of the unexemplary behaviour of public officials, members of government, and leaders of industry and finance to nourish a cynicism that argues concern for the public good out of existence. Finally, we discuss some possibilities for raising the level of awareness of civic responsibility, especially in the education of those aspiring to careers in software engineering.

2. What Are the Conceptions of the Public Good?

Some aspects of the idea of the public good are clear and unmistakable. When, in the course on computer ethics, students consider the cases of injury and death that resulted from engineering and software flaws of the Therac-25 radiation therapy machine, it is quite clear to them that the engineers who designed the device and the (apparently lone) programmer who wrote the software (incorporating, also, code from earlier versions of the machine) (Leveson and Turner, 1993) acted with reckless indifference to the safety, health and welfare of the cancer patients whose treatment would be administered using the Therac.

Even when the applicability of the notion of "public" involves subtler considerations, students "get it." In his discussion of the Challenger disaster (Davis, 1991), Michael Davis carefully parses the

meaning of "(holding) paramount the safety, health and welfare of the public" – the first of seven fundamental canons of the Engineering Code of Ethics – as it applies to the astronauts preparing for the launch of the Challenger. He argues that the proper interpretation of "the public" involves the distinction between those who possess relevant information or expertise and those "whose lack of information, technical knowledge, or time for deliberation renders them more or less vulnerable to the powers an engineer wields on behalf of his client or employer." He continues, "On this … interpretation, someone might be part of the public in one respect but not in another. For example, the astronauts would be part of the public with respect to the O-rings because, not knowing of the danger, they were in no position to abort the launch to avoid the danger. The astronauts would, in contrast, not be part of the public with respect to the ice forming on the boosters because, having been fully informed of that danger, they were in a position to abort the launch if they were unwilling to take the risk the ice posed." (Davis, 1991) This is a distinction students in my computer ethics course appreciate and understand.

It is not clear, however, that students are as keenly aware of the threat to the public good in cases where the danger is less tangible, less physical, more abstract. In an informal survey, students did identify the public good with situations in which there was the possibility of physical harm brought about by a computer or engineering artefact. Equally, they were aware of the risks posed by the dissemination of technology developed for purposes of securing an advantage in warfare. By contrast, the connection between citizenship and the public good seemed less clear and immediate to them. I want to advance the claim that this is due, in part, to a shift in emphasis that has resulted in the marginalization of concern for education in the essentials of citizenship.

During the past century and a half, public education in the United States has functioned in tension between two competing perspectives. In simplest terms, these perspectives are represented in the two formulations 1) strong schools produce strong citizens and 2) strong schools produce a strong economy. The influence of the thinking of Horace Mann is evident in the first formulation. "The fundamental purpose of (…) public schooling in a democracy: transforming children into civic-minded, independent-thinking, and socially responsible adults committed to both the common good and engaging in productive work." (Cuban, 2003)

The second perspective regularly advances to the foreground during periods of real or perceived economic vulnerability. Since the publication of "A Nation at Risk" in 1983, much has been made about the relatively poor performance of American students in the areas of science and mathematics. Although the returns thus far seem questionable, a great deal of effort has been invested in the attempt to reverse this decline, especially in the area of mathematics proficiency. Within the past decade, these efforts have only intensified under the pressure of performance goals in language skills and mathematics established in connection with the No Child Left Behind (NCLB) initiative. (Lee, 2006)

Many critics have noted the resulting narrowing of curriculum that has impoverished both the perceived importance and instructional time available for science, history and social science, as well as art and cultural studies. In particular, surveys reported in "The Civic Mission of Schools" indicate that "school-based civic education is in decline." (Carnegie Corporation of New York and CIRCLE (The Center for Information and Research on Civic Learning and Engagement, 2003) Furthermore, a 2006 CIRCLE Working Paper states that in order to address deeper notions of citizenship education, schools should recognise that "citizenship education requires cross-discipline responsibility – establishing and building interactive relationships across subject areas, including math and science." (Homana, *et al*, 2006) But these cross-disciplinary initiatives have been rendered even more illusory by the mandates of NCLB.

Although one can find fortunate exceptions to this desertification of education, the overall trend seems clear. In altogether too many elementary and secondary schools, the highest level of priority attaches to "instruction" in mathematics and basic English – that is, instruction directed with often obsessive focus on the target of satisfactory scores on state proficiency examinations. All else is understood by administrators, teachers, and students alike to be of secondary value as measured in the unmistakable currency of time and attention. Such perceptions are not without consequence.

When formal education in citizenship is relegated to the sidelines, what are the strongest formative influences on conceptions of the public good in the minds of young people? Beyond the undeniably important models presented by parents and family, the words and actions of individuals prominent in public life – politicians, members of the professions, leaders in business, the media – form the matrix

of ideals and possibilities that come to define the notion of the public good. In the highly politicised, polarised, and uncivil climate that, with the exception of the brief interval following the attacks of September 11th 2001, has prevailed in the United States and characterised public life for nearly twenty years, it is not unrealistic to imagine that some considerable damage has been done to the shared understanding that a nation is united by a commitment to the common good. Idealism survives in the minds, hearts, and actions of many young people but the corrosive effects of cynical and unprincipled behaviour in the public realms of government, politics, business, and finance cannot fail to exact a toll on the belief that there is common civic purpose that is worth the investment of one's energy and goodwill.

3. Where is the Commitment to the Public Good?

Several interesting questions occur to the young, inquiring mind concerning the current hyper-politicised, hyper-polarised atmosphere of public discourse in the United States. Is this atmosphere unparalleled in the history of the country? In our lifetime, probably it is; in the history of the country, almost certainly not. A related question is whether such an atmosphere is most frequently associated with a period of turmoil and negative developments. This seems a delicate question best left to the long view of historians.

The second question is whether this atmosphere is a cause or symptom of a decline in the importance attached to a robust commitment to ideas of the common good. Clearly there is always a tension in the minds of individuals between what will benefit them at a cost to others and the recognition that a moment is at hand where it is prudent to relinquish an advantage in the short term in favour of measures or actions that preserve the wellbeing of the larger community. In looking for explanatory factors that tip the balance in one direction or the other, one thinks naturally of those periods of great uncertainty in which the nation faces peril of one sort or another. Certainly, after September 11th, the nation responded with great cohesion and determination that the attack not succeed in bringing it to its knees. How much more despicable the strategy of linking this reaction to the prior disposition to invade Iraq and using well-founded revulsion to such a course as a wedge to be exploited for domestic political advantage. In that calamitous propaganda campaign, one distinguishes the role of the media in disseminating and amplifying half-truths and outright lies. (Not that this is anything new. Although the story of the exchange between correspondent Frederick Remington and his employer, William Randolph Hearst - ―All's quiet in Cuba. There will be no war." "Please remain. You furnish the pictures and I'll furnish the war." – is thought to be apocryphal, two New York newspapers, Hearst's Journal and Pulitzer's World, competing for a sensation-addicted readership did their best to foment U. S. intervention in Cuba and what became the Spanish-American War. (Wikipedia, 2010)) Indeed, the actions of partisan media outlets confound any serious attempt to resolve the cause or symptom question.

What one can say with fair certainty is that a portion of our country exhibits at this moment a pathological tolerance – at times, an almost insatiable appetite – for untruth of the most naked sort. So, long after the supposed linkage between Saddam Hussein and the September 11th highjackers had been thoroughly debunked, public opinion polls (those admirable handmaidens of a degraded political discourse) continued to reflect a significant majority of the public that remained obstinately wedded to this belief. And in the current national ―discussion" concerning health insurance and access to health care, talk of ―death panels" and the need to ―keep the government out of my Medicare" has preempted serious consideration of reform. Meanwhile, the reality that, in spite of the world's highest per capita level of expenditure on health care, the U. S. ranks somewhere around 35th among nations of the world in both life expectancy and infant mortality remains one of the nation's best kept secrets. Such contempt for what is ascertainable in preference to hysteria-inducing falsehood cannot reflect a positive moment in the history of the nation.

Where, then, is there space for the commitment to the public good? Although there are voices calling out for a return to the apparently obsolete and discredited tradition of ―comity, courtesy, reciprocity, and accommodation," (Krugman, 2010), these voices seem faint and without resonance. On the contrary, expressions of need to find common ground and common purpose are more likely to be dismissed with contempt by the political and journalistic nihilists who command the public earwaves. In the meantime, the nihilists loudly proclaim lies and absurdities, contradict themselves without

embarrassment, and depend on the dominant media to report their assertions with approval or solemn sobriety. Research recently published in *The Economic Journal* confirms their faith in this process. (Carrillo and Castanheira, 2008) —Extreme positions can build trust among an electorate who value ideological commitment in times of uncertainty.” —Carrillo and Castanheira‘s paper is an important challenge to the widely accepted median voter theorem. In the median voter theorem, voters who are fully informed will use their understanding when casting a ballot… But, as the researchers point out, it is rare for a voter to be fully informed in real life. More likely, voters will have incomplete and sometimes inaccurate (!) information (from the press and other sources such as campaign advertising) about how left-leaning or right-leaning stances actually translate into high quality proposals…” (Science Daily, 2008, emphasis added)

In their mathematical model, Carrillo and Castanheira posit —a independent and profit-maximizing press” that can —extract rents” from the electorate by investing its own resources in collecting and disseminating information about the quality of candidates. Although an attractive mathematical idealization, it is empirically difficult, at this juncture, to discern a —press” or media answering to such a description. I am primarily concerned with the way in which a polarised public discourse interacts with the thinning of education in citizenship to crowd out a more reasoned and reflective consideration of the public good. This is the world in which our students, preparing for careers in software engineering and other technologically dependent disciplines, live and form their perspectives – a world in which inducements to concentrate on the technical aspects of their education are accentuated while those that tend to focus on the societal effects are diminished. And because their work will have enormous consequence for the public good, it is important for us to create the space within our curricula to help them develop a more robust conception of the public good. Codes of ethics help. Discussion of how to apply them, as in the recent paper cited above (Gotterbarn and Miller, 2009), also helps. But without attention to the —atmospherics” in which the civic consciousness of aspiring professionals is formed, these measures alone are not sufficient.

4. Let‘s Get Back to the Question of Electronic Voting Devices

We can begin by recognizing that the weight of all the investigations of existing electronic voting devices impeaches in the strongest terms the quality of engineering design and software engineering involved in their manufacture. And we can reiterate that they fall far short of manifesting the —concern for the public interest” demanded of any practicing (software) engineer by the profession‘s code of ethics. Where does this leave us? In the absence of testimony from individuals who participated in the design and implementation of the software, we are left to imagine that they were mostly unqualified programmers given tasks for which they were not prepared professionally; nor were they conscious of the serious civic responsibility attached to their project.

In any event, the companies that produced these faulty voting systems should be held accountable for what amounts to something close to criminal negligence. The depressing reality is that they have thus far escaped any serious consequences. In large part, this is a result of the compromised situation of state and local election boards who must depend on voting machine manufacturers for technical support in case of malfunctions that threaten to disrupt the conduct of scheduled elections. In effect, election boards are held hostage, often by contract, to the very companies responsible for supplying defective systems. With few exceptions, these elections authorities have been coerced into defending manufacturers of faulty voting equipment as a matter of defending their own judgment in purchasing the systems in the first place. (Theisen, 2008)

And we can certainly question the judgment of those federal legislators responsible for the passage of HAVA. Stampeded by the outcry over the electoral crisis attached to the 2000 Presidential election, they enacted, in haste and without due consideration, legislation that placed individual states and localities under stringent pressure to adopt technological devices that could not credibly be certified as (and, in actual fact, were not capable of) meeting the high standards of security, integrity, and accuracy required for the conduct of elections in a democracy.

On the other hand, we can say that the profession – apart from those directly involved in the design and implementation of existing electronic voting devices – has acquitted itself well in this connection. The long history of concern voiced by professional organizations like the ACM and IEEE and of individual researchers like Peter Neumann, Rebecca Mercuri, Barbara Simon, Edward Felten, Avi

Rubin, Daniel Wallach, and numerous others admirably meets the professional standard of concern for the public good and should be held as an example of professional probity in matters that affect the public good. It also stands as a paradigmatic example of Terry Winograd's "troupe of jugglers" in which he places "the emphasis on being committed to entering into discussion with others and taking seriously their concerns and understandings." In Winograd's view, "One of the most powerful ethical acts we can each do is to participate in creating a social context in which the future actions of ourselves and other are consistently in line with our values." (Winograd 1991) I believe this is a very helpful perspective to commend to our students.

5. A Point of Personal Privilege in the Form of a Short Digression

Still, examining the literature of proposed fixes for existing electronic voting technology, one has the unsettling feeling of encountering once again the unshakeable belief that the cure for the problems of technology is yet more technology. It would be refreshing to hear a judgment from the professional that electronic voting technology may not be the appropriate solution for the conduct of elections in our society. It is my own quiet contention that electronic voting technology is a solution to a problem that does not exist. The original source of difficulty in the Presidential election of 2000 was, after all, a paper ballot that was a nearly perfect model of how not to design a user interface. But for many years and in many voting districts, people used mechanical voting machines on which the user interface was perfectly clear – you pull down the lever over the name of the candidate or the answer to the ballot question that you desire to submit, you see that your choices are those you intended, and when you pull the lever to open the curtain, your vote is recorded.

There is something symbolic in the act of presenting oneself before one's neighbours, stating one's name to the two individuals from opposing parties who keep the record of voters in the polling book, signing in one's own hand, and waiting to enter the voting booth. It is a small but important ritual of civic solidarity.

My own observations, voting in local precincts in three states over the course of five decades (and serving more recently as an election inspector and poll watcher), is that problems of throughput have only been exacerbated by the introduction of electronic equipment. There are the same long lines at predictable times during the day. However, an electronic system that fails to boot properly or displays an erroneous ballot at the start of the election is the source of far greater difficulty than a balky mechanical device for which there is a replacement available. And although it is possible for a malicious agent to sabotage an individual mechanical device, it requires a physically observable act (breaking off pencil points in the gears on the back of the machine that tally the votes). In contrast, electronic voting systems present numerous possibilities for sabotage by "invisible hands" and on a far greater scale than just an individual device.

6. Some Reflections on the Responsibilities of a Teacher

The evolving story of the shortcomings of electronic voting technology and the record of professional concern with these problems is an important resource for cultivating student consciousness about work that affects the public good. The story reveals a "Two Cultures" phenomenon – the real world in which new products are designed, or existing technology adapted, under conditions of time or contractual pressure, for purposes that have serious social consequence; and the academic world with time and perspective but, perhaps, limited leverage to prevent foreseeable harm. These two optics should be helpful for imagining "what it must have looked like from inside" a production team and what the world outside saw. The story also makes clear the importance of understanding what has been referred to as "the ecology of use" of new technologies, in this case the election ecosystem. (Alvarez, *et al*, 2009, Fleischman, 2010)

To reiterate: Codes of ethics help. Purposeful discussion of codes of ethics helps. But in a world in which inducements to concentrate narrowly on the technical aspects of their education are accentuated, while those that tend to focus on the societal effects are diminished, we need to pay attention to these atmospherics and be proactive in helping our students cultivate a robust and active conception of the public good. As I have argued elsewhere, "We are, from the perspective of unsophisticated public perception (and perhaps in our own unguarded moments of self-estimation), a profession of mandarins. We study, invent, and deploy the technologies that make possible the circulation of the most important

commodity of the 21st century. We are the environmental engineers who make it possible for the world to live on the banks of the great reticulated river system through which flows the information on which the wealth and well-being of nations and individuals depend. And as with other historical examples of the mandarin caste, we can become intoxicated with the language of our order. It is appropriate that our students be well grounded in the language and fundamentals of their discipline – that they understand in technical sense that a —message" is a block of symbols from a finite alphabet (perhaps just 0s and 1s); that, in passing from source to destination, a message is first encoded, then transmitted over a channel (in which —noise" may be introduced), then received and decoded; that we use redundancy to increase reliability, decrease the likelihood and facilitate the detection of errors. They should understand the technical means by which the World Wide Web, or any network, facilitates the flow of —information" as a series of —neutral" transactions involving packets of bits. It is appropriate that they be filled with enthusiasm for new concepts like The Semantic Web. But we should be aware that, in viewing everything in antiseptic terms of neutral transactions, anonymously moderated, involving packets of data, we run the risk of inducing insensitivity to the contextual. As much as they should understand theoretical and technical aspects of their subject, they should also be aware, for example, that redundancy is a tool occasionally put to purposes less admirable than error correction (…). And that immersing ourselves exclusively in projects involving new and emerging technologies is sometimes a means of anesthetizing ourselves against uncomfortable reflection on the anti-social uses of existing and mature technologies. This does not imply either fear or hatred of new technologies. It is simply an element of self-awareness that we should all cultivate, an awareness all the more essential for students whose education takes place in an environment dominated by metaphors and by dynamic pressures that render these reflections difficult to sustain." (Fleischman, 2006)

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ELECTRONIC VOTING SYSTEMS AND THE THERAC-25: WHAT HAVE WE LEARNED?

William M. Fleischman

Abstract

In this paper, we explore certain parallels that exist between the medical accidents involving the Therac-25, a computer controlled radiation therapy device, and the problems that have arisen in the conduct of elections in the United States in connection with the use of electronic voting systems. We lay out in detail elements of similarity in development, marketing, deployment, and regulation of the Therac-25 and of the various electronic voting systems currently in use. We pay particular attention to system interactions at several hierarchical levels and explore what has been learned – especially in regard to responsible practices of software engineering – from past experience, and what makes it so difficult to avoid the vexatious repetition of certain unsatisfactory patterns of behaviour, even in the presence of admonitory precedent. Finally, we discuss some possibilities for incorporating the insights offered by the comparison of these two cases in courses on ethics and professional responsibility, especially in the education of those aspiring to careers in software engineering.

1. Introduction

Between June 1985 and January 1987, a series of accidents involving the Therac-25 medical linear accelerator caused severe injuries to six cancer patients. Three of these patients died as the result of massive radiation overdoses. The accidents were found to have been caused by the failure of software that controlled safety critical operations of the Therac-25. A thorough retrospective analysis of these accidents undertaken by Nancy Leveson and Clark Turner revealed that, from an engineering standpoint, the Therac-25 was a poorly and carelessly designed system. More generally, their analysis points to failures at a higher level of abstraction in the systems of medical treatment in which the Therac-25 was utilised, as well as failures in the regulatory regimes meant to protect the public through prior approval and oversight of the use of such medical devices.

The Therac accidents are widely studied in courses or modules devoted to the ethical responsibilities of professionals in the computing field. It is difficult to imagine that these accidents did not influence the authors and the content of the various professional codes of ethics – for example, the 1992 revision of the Code of Ethics of the ACM and the Software Engineering Code of Ethics promulgated in 1999.

Since the introduction of electronic voting systems following the passage of the Help America Vote Act (HAVA) in 2002, numerous studies – we cite, among others, investigations by teams at Johns Hopkins University, Princeton University, the University of California at Berkeley, and the Center for Election Integrity at Cleveland State University – have disclosed serious and unsettling flaws in virtually all of the electronic voting devices marketed and in use in the United States. (Excellent materials concerning the history of voting and related technologies are available. (Jones, 2003, Wikipedia, 2009)) In addition, experience in the use of electronic voting devices in recent elections has confirmed their fallibility. Ballots have been inexplicably lost from or added to vote totals, direct recording electronic devices (DREs) have provided incorrect ballots, machines have failed to operate at the start of voting and have broken down during the course of an election, memory cards and smart card encoders have failed during elections. Since HAVA was intended to prevent problems like those encountered in the contested 2000 Presidential election, these shortcomings have created the unsatisfactory situation in which a purported remedy for problems associated with the conduct of fair elections has served to intensify public doubts about the electoral process. By analogy with the case of the Therac-25, the software controlling these electronic voting devices can be considered "safety-critical" in the sense of safeguarding the integrity of elections on which public trust in the legitimacy of elected governments rests.

Carefully considered, these studies of the deficiencies of electronic voting systems reveal numerous parallels with the engineering and system failures diagnosed in the case of the Therac-25. These begin with operation of the devices themselves, in particular with chronic "minor" malfunctions that must

somehow be ignored or explained away in order not to undermine belief in the trustworthiness of the devices. At a higher level, investigations disclose the absence of defensive design, overconfidence in the infallibility of software, inadequate software engineering practices relating to safety and security, conflation of user friendly with safe interface design, and, most pointedly, inadequate or nonexistent documentation.

In comparing the medical treatment systems in which the Therac-25 was utilised with the systems of state and local election boards which form the —ustomer base" for electronic voting devices, we find the same pattern of articulation failure within organizations, failures of due diligence, complacency involving unwarranted trust of the vendor and tolerance for fault-prone devices, and inadequate training of personnel.

At the level of the vendor or manufacturer, the parallels that begin with poor engineering practices already cited, extend further to the predilection to rush the product to market while overselling its reliability, the absence of documentation and audit trails concerning adverse incidents, inadequate response to such incidents, and evidence of willingness to bear the cost of penalties rather than undertake necessary engineering revisions.

Finally, the situation at the level of regulatory regimes seems even less satisfactory in the cases relating to present-day electronic voting devices than it did in the 1980s in connection with the radiation accidents associated with the Therac-25. The same problem of the absence of regulatory personnel with the technological competence to evaluate system shortcomings appears to plague the current case as it did at the time of the approval and oversight of the operation of the Therac-25. At the same time, there appears to be a widespread belief at present that the regulatory system will somehow fix everything.

In this paper, we explore parallels between the Therac-25 and electronic voting systems, laying out in detail elements of similarity in their development, marketing, deployment, and regulation. We pay particular attention to system interactions at several hierarchical levels and consider what has been learned – especially in regard to responsible practices of software engineering – by past experience and what makes it so difficult to avoid the vexatious repetition of certain unsatisfactory patterns of behaviour, even in the presence of admonitory precedent. Finally, we discuss some possibilities for incorporating the insights offered by the comparison of these two cases in courses on ethics and professional responsibility, especially in the education of those aspiring to careers in software engineering.

2. Two Histories in Parallel: The Therac-25 and Electronic Voting Systems

In this section, we develop in some detail the parallels that exist between the system failures, broadly construed, in the case of the Therac-25 accidents and the deployment of electronic voting systems pursuant to the passage of HAVA.

2.1 Irresponsible Design Practices in Regard to Safety and Security

Safety- and security-critical devices are supposed to operate predictably in a wide range of conditions. Design of devices that rely on software for safety and/or security must begin with the assumption that any software program of reasonable complexity can be made to behave in an unexpected manner under certain conditions. Thus, system designers must be aware (or made aware) of the contexts in which their designs will be deployed and, to the extent possible, must design for robust behaviour under foreseeable circumstances in these contexts.

In their enumeration of causal factors implicated in the Therac-25 accidents, Leveson and Turner (Leveson and Turner 1993) cite overconfidence in software and absence of defensive design features to detect and prevent dangerous conditions of operation of the machine. Undoubtedly, the most serious failure in the design of the Therac-25 was the decision to eliminate independent circuits to monitor beam scanning, and hardware interlocks as safeguards against radiation overdose. These features were standard on all radiation therapy devices built prior to the Therac-25. Their elimination was emblematic of an unarticulated assumption that, properly written, software was capable of error-free control of machine operation under all conditions. Beyond this, the design of a computer controlled radiation therapy device must provide operators with limited technical knowledge of computers and

software sufficient information to detect potentially unsafe conditions. In the case of the Therac-25, meaningful feedback of this nature was not incorporated into the design.

In the case of the design of electronic voting systems, the hazards against which protection must be provided include fraud resulting in the theft or suppression of votes, fraud or error that results in disenfranchisement of individual voters, and fraud or error that frustrates detection and postelection audit of election anomalies. An analysis of the Sequoia AVC Advantage 9.00, a widely used direct-recording electronic (DRE) voting machine, demonstrated design flaws that facilitate installation of virtually undetectable vote-stealing firmware and viral propagation of fraudulent firmware using the audio-kit daughterboard provided to accommodate voters with impaired vision or mobility. (Appel *et al*, 2008) In addition, the study disclosed design flaws in the user interface of the AVC Advantage that could result in disenfranchisement or violation of the privacy of individual voters.

An earlier study of the Diebold Accu-Vote-TS DRE (Kohno, *et al*, 2004) disclosed design flaws in the use of smartcard technology that render the system vulnerable to attacks that would result in vote-stealing, vote suppression, or premature termination of an election. In testimony before the U. S. House of Representatives, Tadayoshi Kohno stated: "Last summer, I was one of four computer experts to analyze the design of Diebold's Accu-Vote-TS paperless electronic voting system. As a consultant, I was accustomed to analyzing computer systems with poorly designed security mechanisms. But, since Diebold's machines had already been used in actual elections, I was initially expecting to find the Accu-Vote-TS system employing at least somewhat effective security mechanisms. I was mistaken. In our analysis we found that the implementers of the Accu-Vote-TS system ignored basic security best practices, and we found that the Accu-Vote-TS system was vulnerable to a number of simple and easy-to-mount integrity- and privacy-compromising attacks." (Kohno, 2004)

The California "Red Team" Reports, commissioned by the California Secretary of State as part of a "top to bottom review" (TTBR) of electronic voting systems certified for use in the state at the time of the review, demonstrated similar design flaws in all systems studied. (Bishop, 2007) In most instances, these design flaws stem from obliviousness of the conditions prevailing on and before the day of an election, and disregard of the strong incentives that might impel an attacker – either an outsider or a dishonest election worker – to corrupt the election process.

2.2 Deficient and Unsatisfactory Software Engineering Practices

Among the violations of basic software engineering principles cited in the Therac-25 study (Leveson and Turner, 1993) are 1) software specifications and documentation as an "afterthought" rather than as carefully integrated aspects of the project; 2) failure to establish rigorous quality assurance practices and standards; 3) failure to strive for simplicity of software design and failure to avoid dangerous coding practices; 4) failure to design in advance into the software routines for error detection for capture of information useful for auditing errors; 5) failure to subject software to extensive testing and formal analysis at every level as well as failure to perform regression testing subsequent to software modifications; 6) failure to design carefully the display and presentation of information, including meaningful error messages, to the operator; 7) failure to provide carefully thought through documentation and user manuals. Indeed, it hardly seems appropriate to apply the term software engineering to the process of design and development of the Therac-25, except in the loosest and most derisory manner.

Software engineering deficiencies are legion among the electronic voting devices investigated in the studies previously cited. The case of the Diebold Accu-Vote-TS presents the most glaring set of unsatisfactory and oblivious practices. The machine was studied by a team of researchers from Johns Hopkins University, the University of California at San Diego, and Rice University. (Kohno, *et al*, 2004, hereinafter referred to as "the Johns Hopkins team", even though the first-listed author, Tadayoshi Kohno, is affiliated with UCSD.) Several of the flaws discovered by the team have to do with the failure to use secure cryptographic techniques to protect the integrity of the election process. (Kohno, *et al*, 2004) Smartcards used by individual citizens to enter their votes and by election officials to initiate an election, access administrative functions (for example, viewing partial results), and to close an election on the Accu-Vote-TS **do not perform any cryptographic functions**. This facilitates a variety of attacks by an adversary equipped with "home-brew" smartcards. Several scenarios for accomplishing this, based on the absence of encryption in normal smartcard usage, are described in (Kohno, *et al*, 2004). These were first revealed in a press release by the Johns Hopkins

team on July 23, 2003. The ensuing exchange between Diebold (Diebold Election Systems, 2003) and the Johns Hopkins team (Kohno, *et al*, 2003) is instructive. Diebold's response concentrates on alleged difficulties of perpetrating the attacks described by the Johns Hopkins team, even given the absence of encryption. In rebuttal, the Johns Hopkins team points out that "Diebold uses an insecure protocol that makes them vulnerable to counterfeit smartcards. Modern smartcards can perform cryptographic operations, allowing for more sophisticated protocols. If Diebold had used such protocols, their system would be robust against our attacks."

Where encryption was employed on the model of the Accu-Vote-TS analyzed – for the protection of vote records and audit logs – the technique adopted was laughably insecure. A single Data Encryption Standard key was hardcoded into the source code of the program that controlled the Accu-Vote-TS. Apparently, this same key had been used without change for at least five years and had been hardcoded into earlier versions of the machine.

In addition to questions concerning encryption, the Johns Hopkins team's analysis disclosed a dangerously undisciplined process for updating the code of the Accu-Vote-TS. "There are … no references to tracking numbers from a bug database or any other indication that such fixes have been vetted through any change-control process. Indeed, each of the programmers seems (*sic*) to have completely autonomous authority to commit to any module of the project." (Kohno, *et al*, 2004) These practices are related to a system of documentation that seems capricious at best and replete with glaring omissions that suggest inattention to accepted standards of security engineering at worst. (Kohno, *et al*, 2003)

In the case of the Sequoia AVC Advantage 9.00, software engineering inadequacies appear to have their origin in the retention and modification of "legacy" code originally written in the 1980's and in the continued utilization of the Z80 processor with its limited memory space and dense instruction set. "The code suffers from, among other infelicities, multiple versions of computations; inconsistent naming conventions; frequent use of literal numeric values ('magic numbers'); subtle linkages among status values; numerous global variables; generic and undescriptive names; names that differ in only a single character; inconsistent declarations for external data objects; and subtle dependencies on data types and other properties." In certain places, the code explicitly violates FEC guidelines that are meant to ensure more transparent program logic and structure. Effects of the Z80's restricted memory space are revealed by "(c)omments in the code (that) hint that the standards have sometimes cost precious memory space, which can lead to an uncomfortable tradeoff, ignore the rules or adopt other potentially risky techniques to recoup." (Appel *et al*, 2008)

As a final observation, poor or missing documentation and careless re-use of existing code have been cited extensively in analyses of problems involving the Therac-25 and electronic voting machines. (Leveson and Turner, 1993, Kohno *et al*, 2004, Appel *et al*, Hoke 2008)

2.3 Overselling the Technology, Placing Excessive Reliance on Vendors

Once a technologically flawed safety- or security-critical device has been released to the marketing division of a corporation, the skeins of circumstance leading to unhappy outcomes have been unravelled. They are not likely to be gathered up before disaster occurs. (And perhaps not even then.)

The Therac-25 was developed by Atomic Energy of Canada Limited (AECL) as part of a continuing joint venture with a French company, CGR. As early as 1978, the Commercial Products Division (CPD) of AECL envisioned abandoning the joint venture because of fears of projected financial losses associated with marketing the Therac-25. In 1981 the joint venture was dissolved. The machine was marketed by AECL, but in the face of signs that it would never returns profits to the company, production of the Therac-25 was halted in 1985, the same year as the first recorded accident with the device. (AECL, 1997) This history suggests that there was considerable pressure from the beginning to market the twelve existing units to hospitals and cancer treatment centres. At any rate, an operator involved in one of the accidents "testified that during instruction she had been taught that there were 'so many safety mechanisms' that she understood it was virtually impossible to overdose a patient." (Leveson and Turner, 1993) The same article cites additional indirect evidence of strong representations by AECL sales and training personnel concerning the safety of the Therac-25.

In the aftermath of the first accident, in which the patient experienced a "tremendous force of heat … this red-hot sensation" and complained to the technician responsible for treatment that "You burned me," the technician – apparently under the influence of the vendor's claims of safety – replied

that this was impossible. This impression was strengthened by the categorical response of AECL engineers to the inquiry of Tim Still, the radiation physicist at the facility where the accident occurred, that the aberrant behaviour Still suspected (operation in electron beam mode without proper scanning to spread the beam) "was not possible." (Leveson and Turner, 1993) Further evidence of the dependence of Therac-25 users on vendor assertions about safety is given below in connection with a most egregious safety claim made by AECL.

Examination of vendor prospectuses underscores the comments of many observers concerning the propensity of voting technology vendors to oversell the security and reliability of their equipment. In a discussion of defective services provided by vendors, Ellen Theisen observes "Many election officials also dismiss voting system studies conducted by respected experts, consultants, and universities when those studies discredit the voting systems. These officials choose, instead, to rely on assurances and claims of voting system vendors, despite the perennial and well-known tendency of vendors in general to present biased information about their products in order to make a sale and protect their reputations." (Theisen, 2008)

Even better than relying on one's own publicity and salespersons' claims is buying the services of a putative neutral observer. The Election Center describes itself as an international service association of election and voter registration officials that trains election personnel and advises Congress and government agencies on election process issues. The Center's Executive Director, R. Doug Lewis, has been a major source of arguments supporting paperless DREs and opposing the movement to require a voter-verifiable paper trail. A story in the Philadelphia Inquirer revealed that "the center had taken donations from makers of electronic voting machines – Sequoia Voting Systems Inc. of Oakland, Calif. and Electronic Systems & Software Inc. of Omaha, Neb. In addition, donations came from "probably Diebold" Inc. of North Canton, Ohio.' Lewis stated that he did not think accepting donations from the manufacturers presented any conflict of interest or breach of ethics." (Theisen, 2006a)

The increasing dependence of state and local election officials on vendors has resulted in extortionate service contracts for support of election administration activities, and intervention in the conduct of elections that violate laws and ethical norms. Cases have been documented in the states of Texas, New York, California, and Hawaii. In California, Diebold installed uncertified software on all machines used in its client counties without notifying the California Secretary of State as required by law. "Diebold illegally installed a voting system with touch screen machines and tabulation software that had neither been certified by the state nor federally qualified, even though state law required both. In fact, Diebold sold and installed the system in San Diego County (and three others) before the company even applied for state certification." (Theisen, 2008) These and similar actions by other vendors hold the entire system of elections hostage while vendors are contractually insulated from normal measures of accountability.

2.4 Recourse to Jargon and Extravagant Claims in Regard to Safety and Security

One problem with the Therac-25 involved the opacity of error messages. "Error messages provided to the operator were cryptic, and some merely consisted of the word MALFUNCTION followed by a number from 1 to 64… An operator involved in one of the accidents testified she had become desensitised to machine malfunctions." She said, "It was not out of the ordinary for something to stop the machine… They would give messages of low dose rate, V-tilt, H-tilt and other things; I can't remember all the reasons it would stop, but there was a lot of them." (Leveson and Turner, 1993)

After the second recorded accident, which resulted in an overdose of between 13,000 and 17,000 rads, AECL engineers hypothesised that a transient microswitch failure might have been implicated in the accident. Even though they were unable to reproduce the malfunction, they proceeded to "fix" the microswitch problem and announced to Therac-25 users that "analysis of the hazard rate of the new solution indicates an improvement (in safety) over the old system by at least *5 orders of magnitude* (emphasis added)." (Leveson and Turner, 1993) This astounding claim subsequently played a role in the misattribution of cause in the first of two accidents at a hospital in Yakima, Washington. Testimony of the medical physicist at the facility suggests that it contributed to the occurrence of the second accident by causing the staff to discount the possibility that the Therac-25 might be subject to malfunction. In a report on the first incident written after the second had occurred, the medical physicist wrote, "At that time, we did not believe that (the patient) was overdosed because the manufacturer had installed additional hardware and software safety devices to the accelerator. In a

letter from the manufacturer … (three months before the first accident), it is stated that ‗Analysis of the hazard rate resulting from these modifications indicates an improvement of at least five orders of magnitude'! With such an improvement, we did not believe that there could have been any accelerator malfunction." (Leveson and Turner, 1993)

Because of failures of electronic voting devices both in legally mandated tests prior to the election and on the day of the election itself, the May 2006 primary election in Cuyahoga County in the State of Ohio emerged as one of the nation's most notorious election debacles. Members of public review panel charged with investigating and providing recommendations for future election administration learned that the Diebold GEMS server used for tabulating election results had been crashing at least once a day for several weeks before the election (see the section on chronic malfunctions that follows). A known problem for the GEMS server is Diebold's use of the Microsoft JET "engine" which was well-known for two limitations: 1) if its two gigabyte data limit were to be exceeded, data corruption could occur and 2) a limit on concurrent operations which could similarly result in data loss or corruption. "In an October 2006 conference call with the vendor's GEMS architects and engineers, plus BOE (Cuyahoga County Board of Elections) managers and one BOE board member, the vendor stated that JET problems could not and had never affected GEMS operations." Subsequently, a court ordered review of the unofficial results database identified several indicators of possible data corruption. (Hoke, 2008)

"In an attempt to ‗bring elections into the 21st century,' election system manufacturers promised Congress and the elections community that their computer-based systems provide the following features: (1) they record and tally votes accurately; 2) ensure the secrecy of the ballot;

3) operate reliably on election day; 4) allow the disabled to vote independently; 5) prevent over-voting and reduce inadvertent under-voting; 6) simplify administration and reduce the cost of elections; and 7) provide a paper audit trail and meet federal standards.) The facts presented in this document show that no such electronic election system presently exists." (Theisen, 2006a)

2.5 Placing Operation of Safety- or Security-Critical Equipment in the Hands of Underprepared Personnel – Operator Tolerance of Chronic "Benign" Malfunctions

This is perhaps the most obvious of all the points of similarity. And it is the place where the parallel and highly synergistic effects of all these factors begin to emerge.

Therac-25 operators complained about the length of time it took to enter redundant data concerning the treatment about to be administered. A modification made to "streamline" data entry was later implicated in several of the accidents. "Making the machine as easy as possible to use may conflict with safety goals. Certainly the user interface left much to be desired, but eliminating multiple data entry and assuming operators would check the values carefully before pressing the return key (to administer treatment) was unrealistic." (Leveson and Turner, 1993)

In operation, the Therac-25 frequently malfunctioned in ways that did not appear to involve patient safety. As noted above, operators became insensitive to these "benign" machine malfunctions. At one clinic, a radiation therapist reported that, regularly, as many as 40 dose-rate malfunctions occurred in a day's operation. Although one is left to wonder how personnel at multiple sites could develop this tolerance for chronic anomalous behaviour of a life-critical device, it seems to be an invariant response of individuals who are technologically underprepared, assured of the safety or security of the devices they operate, and working in situations where standard protocols or time pressure preempt common sense. (Murdoch, 2009)

The magnitude of the problem of chronic voting machine failures – which in this case cannot be classified as "benign" – has been massively documented by many observers. (Theisen 2006b, Theisen 2008, Hoke 2008) What is common – and distressing – here, however, is the helpless tolerance of election poll workers for these failures. In the midterm elections of 2006, Theisen tabulated 1022 reports from 314 counties in 36 states of failure of 21 different models of electronic voting equipment. Each of the reports has a "multiplier effect" either in the number of devices that malfunctioned at a site, or the number of voters affected by the failure. One report from Johnson County, Indiana, concerning the ES&S iVotronic device states "After we used the procedure that was given to the inspector, three machines out of four were not available at the start of voting." Another from Utah and Salt Lake Counties in Utah relates that "Voter access card encoders for the Diebold touch screens weren't

working in at least 32 of 118 polling locations, causing long lines, waits up to two hours, and voters turned away." (Theisen 2006b)

The seriousness of unresolved conditions of chronic electronic voting equipment malfunction can hardly be overstated. "At a recent off-the-record KSG/NSF symposium on electronic voting, an election official made the following observation: At a company, it is natural for new employees to make mistakes on their first day of work. This is problematic since, for elections, every election day is the first (and only) day of work for many, many people." (Kohno, 2004)

2.6 Management Tolerance of Chronic "Benign" Malfunctions

At first glance the tolerance of chronic "benign" operational anomalies by those in supervisory roles seems more perplexing and certainly more disturbing. But there is an explanation that seems inescapable.

Although this was not directly the subject of the investigation of the Therac-25 accidents, the uniform failure of supervising nurses, technicians, radiation physicists, radiologists, oncologists, and hospital executives to question the safety of a device that malfunctioned so regularly is an obvious point to note, especially in light of the comments of operators concerning their own insensitivity to these chronic problems. As these accidents demonstrate, permission given by supervisory personnel to disregard potentially hazardous operation of technology can open very big holes in the safety culture of an organization.

It is similarly puzzling to find local election officials, secretaries of state, and state boards of elections defending the quality of devices that have such a poor public record for reliability and security. (Theisen, 2006a) On the other hand, the independence of election personnel has been undermined by the need to rely on the support of vendors, frequently under emergency conditions caused by the shortcomings of the election equipment these same vendors have supplied. In effect, these officials are hostage to the equipment they have purchased and can hardly acknowledge its faults without impeaching their own judgment.

2.7 Shortcomings of Existing Regulatory Regimes: "You regulate with the bureaucrats – and the regulatory regimes – you have."

At the time of its development, the Therac-25 was subject only to pre-market notification by the U. S. Food and Drug Administration (FDA) prior to commercial distribution in the U. S. This meant that all AECL had to do was establish or assert that it was substantially equivalent in safety and effectiveness to a product already on the market. In the wake of the Therac accidents, this was recognised as a failure of regulatory protocol and new procedures were adopted for the approval of software-controlled devices. (Leveson and Turner, 1993)

It seems axiomatic that enterprise will lead regulation in technological expertise. At the time of the approval of the Thrac-25 (1983 at the latest), the FDA would not likely had personnel familiar with existing software engineering norms or the potential dangers of the control software written for the Therac-25. (On the other hand, a perceptive individual familiar with the ideas of safety engineering might have questioned the wisdom of completely abandoning hardware interlocks in favour of software control.) At any rate, "(o)nce the FDA got involved in the Therac-25, their response was impressive, especially considering how little experience they had with similar problems in computer-controlled medical devices." (Leveson and Turner, 1993)

In the case of the massive nationwide adoption of electronic voting devices following the passage of HAVA, the problem stems from the absence of a strong central authority to set standards for voting systems. In the face of uncertainties about the reliability and security of electronic voting systems, state and local election authorities seem to have assumed that the regulatory system would fix everything. Given the objections regularly raised by states and localities against "unfunded federal mandates", it is ironic that HAVA was a "unfunded, but woefully underprepared mandate" in which states were under pressure (of losing federal funds authorised in the act) to adopt electronic voting systems before any serious consideration – having regulatory force – of the possible vulnerabilities of these systems was possible. In effect, given the historical structure of local control of elections in the U. S., HAVA amounted to the adoption of a federally mandated technology subject only to a weak and easily suborned patchwork of state regulations.

Although HAVA established the federal Election Assistance Commission (EAC) and required it to develop national voting systems standards, the standards in place at the time of passage were the 2002 Voting System Standards issued by the Federal Election Commission. These are widely understood to be inadequate. "Despite their very serious security flaws, the Diebold DREs were certified according to federal and state standards. This demonstrates that the certification processes are deficient. The Federal Election Commission's 2002 Voting System Standards say relatively little about security, seeming to focus instead on the machine's reliability if used non-maliciously." (Feldman *et a*l, 2006) The same judgment applies to the certification processes implemented by individual states. "In general, the certification process seems to rely more on testing than analysis. Testing is appropriate for some properties of interest, such as reliability in the face of heat, cold, and vibration, but testing is ill-suited for finding security problems. As discussed frequently in the literature, testing can only show that a system works under specific, predefined conditions; it generally cannot ensure that there is no way for an attacker to achieve some goal by violating these conditions." (Feldman *et a*l, 2006)

2.8 The Eventual "Fix"

In the case of the Therac-25, the eventual "fix" was to retrofit existing machines with the hardware interlocks that AECL engineers had "designed out" of the original device in favour of software control. But the impetus for this solution came in good part from a Therac-25 user's group organised after one of the most horrifying of the series of accidents. At the first meeting of the user's group, radiation physicists from several facilities described hardware retrofits they had installed in spite of representations by AECL that these were "redundant." Although the FDA drew praise from observers for its actions once it took the matter in hand, the "input and pressure from the user group was also important in getting the machine fixed and provides an important lesson to users in other industries." (Leveson and Turner, 1993)

The "fix" in the current situation of electronic voting technology is a work in progress in which the role of "user's groups" is quite prominent. Several states and local jurisdictions have pushed back against both the federal mandates and the recalcitrance of voting device manufacturers, decertifying machines found to be unacceptably prone to error and vulnerable to attack (California), requiring that others be equipped with the means of producing a voter verifiable paper audit trail (New Jersey?), and in certain extreme instances, retreating to the use of paper ballots (county election boards in Florida?).

This is clearly one instance in which the computing profession has distinguished itself by its proactive role in critiquing, analyzing, and investigating, the design of electronic voting technologies as well as plans for the conduct of elections based on their use. The work of Peter Neumann (beginning with Neumann, 1990) and Rebecca Mercuri (Mercuri, 1992 and 2001, among many other contributions) is worthy of special citation as laying the foundation for much of current and recent investigations. The profession has lent its expertise and energy to multidisciplinary public and academic initiatives involving faculty and practitioners of the law, sociology, political science, public policy, and government. Nonetheless, the critical voice of the profession did not prove sufficient to forestall the precipitous rush to legislate that produced HAVA in the aftermath of the 2000 presidential election.

3. Results and Discussion

To the question, "What have we learned?", the cynic would reply, "Nothing," the realist, "A great deal, but nothing that changes reality," while the optimist would insist, "We are making progress, some of it in the right direction."

A provocative working paper from the Caltech/MIT Voting Technology Project proposes a holistic approach to auditing what the authors refer to as "the election ecosystem." (Alvarez, *et al*, 2009) This comprehensive ecological perspective would seem a fruitful approach to apply, *ab initio*, to the problem of designing new safety- and security-critical technologies.

In a course on ethical issues in computing with an audience of students in the fields of computer science, computer engineering, and software engineering, case studies like that of the Therac-25 unquestionably capture the students' attention. A course that takes an example of this nature as the jumping-off point for the serious exploration of issues relating to the development and use of computing and communications technologies will have a lasting effect on some students. But it is

unrealistic to expect that this exposure, even when reinforced by careful reading of the ACM and Software Engineering Codes of Ethics will stand surety against the economic and competitive pressures that will be brought to bear on these students in their professional careers.

It might be helpful to present these as a triptych: Therac – Codes of Ethics – Electronic Voting Devices, with the historical perspective and the warning they provide about the consequences of acting incompetently or obliviously in a professional capacity. And the proactive role of the computing community in addressing serious problems with electronic voting machines can serve as a model of appropriate and expected professional conduct.

One might speculate that it would be equally important to present these sorts of cases, adopting the ecological perspective and stressing the limits of technology, to those aspiring to careers in medicine, law, government, and public service. Finally, in the face of the extravagant claims made for electronic voting technology, one is reminded of the wise words of the late Joseph Weisenbaum: "The nonprofessional has little choice but to make his attributions of properties of computers on the basis of the propaganda emanating from the computer community and amplified by the press. The computer professional therefore has an enormously important responsibility to be modest in his claims." (Weisenbaum, 1972)

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E-EXCLUSION AND THE GENDER DIGITAL DIVIDE

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Abstract

The digital divide is considered by many authors as one of the major ethical issues of the information age because reinforces inequalities in society. This paper examines the gender digital divide in Europe and presents a detailed case-study of one the most successful e-Government systems in Greece: the Greek TAXation Information System. Surprisingly, this efficient and well-running system exhibits long standing gender discrimination. However, the problem is not technical but legal and political and requires careful consideration, as the statistics shows a gender gap in e-Government usage not only in Greece but all around Europe.

1. Introduction

"The real problem is not whether machines think but whether men do"

(B.F. Skinner, *Contingencies of Reinforcement*, 1969)

The research on the digital divide has lead to an increasing awareness of the problems the lack of participation in the digital society may bring to democratic societies. Some authors argue that gaps in ICTs usage may lead to stratification in information gaining and, even worst, may reinforce existing inequalities in society (Hacker & Mason, 2003; Hacker & Van Dijk, 2000; Bikson and Panis, 1995). The internet usage gaps and the low rates of internet usage by social groups that most need ICTs to improve their lives brings to the fore the governments' responsibility in alleviating these inequalities and creating opportunities for all. Many researches have revealed that the internet users are usually well educated and experience certain economic advantages, while the digital ~~"il~~literate" are those of low economic status and have specific demographic characteristics (Bikson and Panis, 1995; Van Dijk & Hacker, 2003). The most vulnerable social groups are usually those that are excluded in one or another way from the digital society. However, the digital divide is a subject with highly political involvement and requires combined action in order to establish a digital society for all (Van Dijk & Hacker, 2003).

The European Union has set officially the creation of the knowledge society as one of the main goals of the Lisbon strategy that will make *Europe more dynamic and competitive* (EC i2010). All member states have engaged in relevant action plans in order to advance the ICT adoption by the European society and to alleviate social inequalities concerning the use of ICT. Social inclusion, better public services and quality of life are clearly set by the i2010 action as distinct policies that will ensure that the benefits of the Information Society can be enjoyed by everyone. However, Hacker & Mason argue that there is always a question concerning what dysfunctional system effects may result from non-inclusive emergent systems. A threat of loosing vertical accountability and sacrifice democracy in favour of efficiency is a permanent problem when fundamental changes take place in public sector (Homburg, 2008; Foteinou & Pavlidis, 2009). Finally, there is the issue of how a democratic political system can maintain non-democratic communication systems (Hacker & Mason, 2003).

The issue of the digital divide is, of course, not new in literature, with some authors arguing that most technologies diffuse widely and the differences in ownership and use erode over time (Liff, 2004; Thierer, 2000; Compaine, 2001; Fink & Kenny 2003), while others argue that the digital divide is, indeed, the source of many of the ethical problems emerging from the evolution of the information society (Floridi, 2001; Hacker & Van Dijk, 2000; Bikson and Panis, 1995). Especially, the gender digital divide is concerned as unimportant in advanced economies by some authors who suggest that it is probably a matter of time for the women to keep up in the digital society (Liff, 2004; Thierer, 2000; Compaine, 2001; Fink & Kenny 2003). They argue that the gender digital divide tends to disappear in developed countries, such the United States or Europe, and it is, in the end, an issue highly dependent on time. This view is based on a widely held prejudice that women are less interested in technology

than men and thus it is normal to have this lag in reference to men (Liff, 2003). However, even for Europe this is a simplistic view that does not represent the reality of the contemporary European society.

2. Methodological approach

To assess the validity of such statements concerning the gender digital divide we perform an analysis of the e-government usage rates in Europe by women and men and we present a detailed case study of one of the most successful European e-government services; the Greek TAXISnet (Greek TAXation Information System). The case of Taxis-net indicates that a number of inhibitors, either real or perceived, may affect e-government take up by women which result to lower usage rates by women. However, to assess if this is the real point all around Europe, we perform an analysis of the usage rates of e-government services in the 27 EU countries, plus some candidate countries. We pay special attention on the countries of Eastern Europe, where it seems that the gender digital divide never existed. The former communist countries exhibit some special characteristics and it seems that the gender digital divide does not highly depend on e-infrastructure or economic development but on other factors (at least in Europe).

The selection of e-government services usage rates as an indicator for measuring the gender digital divide is based on the idea that what we want to measure is if women take advantage of the opportunities brought by ICTs. We do not simply want to see if they *use* the internet but also *why*. If they simply use the internet for social activities this does not necessarily mean that they also use it for improving their lives and manage their personal affairs. The use of internet for serious tasks, such as to fill a tax declaration, it is a better indicator than simply checking if women use the internet in general. Moreover, this specific indicator has the additional advantage that it is measured the same way all around Europe and there are reliable official statistics for a number of years.

3. Contribution

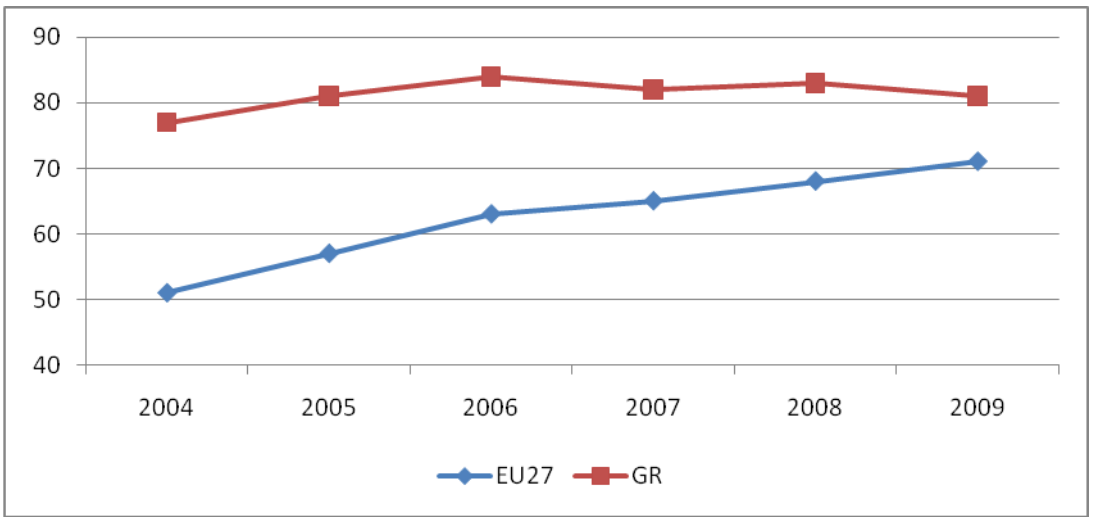
The study of TAXISnet, one of the most successful e-government service in Greece unveils a number of issues not evident before in the study of the gender digital divide. Surprisingly, this successful e-government service exhibits long standing gender discrimination. Of course, the problem is not derived of poor design or because of any other technical weaknesses (although there are some weaknesses concerning support for people with disabilities), but because of specific political priorities.

The case of TAXISnet indicates that efficiency cannot be the only concern when we measure success of government policies concerning ICTs, as the violation of democratic principles, in the case of TAXISnet, co-exists with an official policy for the alleviation of gender inequalities. Inhibitors of democratic participation in the information society may not be always as evident as in the case of TAXISnet, but there may be hidden in a number of other cases that eventually lead to lower usage rates by women. The Greek Taxis-net is, of course, a reliable and efficient e-government system that saves millions of euros for the tax-payers every year, but equal treatment exists only literally. If we look beyond the fact that women tend to use e-services less than men and try to interpret *why* they do that, than we are leaded to some interesting findings. Indeed, e-government usage has important political dimensions, not only because politicians make decisions about technology, but also because a different political history leads to a different behaviour. The former communist countries seem to have no issue of gender digital divide, no matter what their economic problems are. Technology is used equally by men and women; why?

Another interesting finding of the research is that the gender digital divide is indeed (still) a reality, but not in the countries we expect to see this phenomenon. Many of the less developed countries of Europe have no evidence of gender digital divide, while the most developed countries have not managed to eliminate this problem, despite the relevant government policies. The case of TAXISnet is of course an outlier in e-government policies, but the fact that the gender digital divide is present at the most developed European economies and not in the less developed, indicates that there must be more reasons for such a phenomenon.

4. The case of TAXISnet and the gender digital divide

TAXISnet (TAXation Information System) is the most successful Greek e-Government system which offers services directly to the citizens through a web site. A variety of services concerning taxation issues are fully available electronically to the public and the enterprises while the system exploits existing information infrastructures (Stamoulis et al., 2001). It started in 1990 by the Ministry of Finance and it is considered as a model for all the future applications in the Greek public sector (Terpsiadou & Economides, 2009; Gouscos, Mentzas & Georgiadis, 2001; Bronchi, 2001). It has extremely high rates of usage in enterprises that reach the 81% of the Greek enterprises and it is generally above the EU27 usage rates. Actually, this service is the most well-known e-Government service in Greek population and probably its great performance is the reason why e-Government services in Greece have satisfactory usage rates compared to other EU countries (although they are totally under the average EU rates). There are four e-Government services that offer services to enterprises, but TAXISnet is by far the most prominent (Observatory, 2009). In Greece TAXISnet is almost synonymous to e-government services.

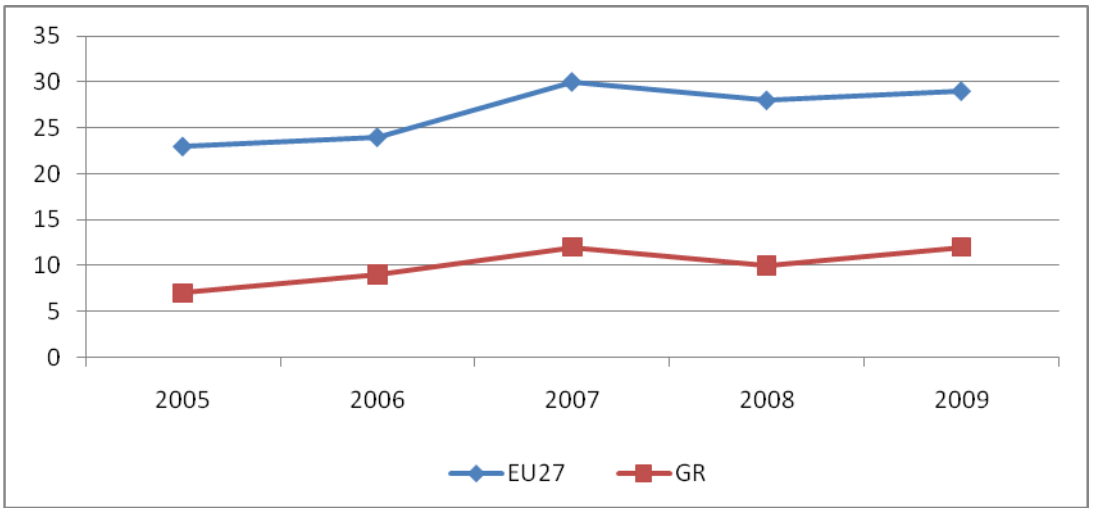


Source: Eurostat 2009

Figure 1. e-Government services usage by enterprises (+10) in Greece (2005-2009)[26]

However, the picture of e-Government usage by individuals is completely different, as only a small proportion of the population uses e-government services and it is by far below the EU27 average. This is a really unusual finding, especially since the same service is offered to the enterprises and the citizens as well. In total five services (more than in enterprises) are offered to the citizens (Observatory, 2009) but this does not seem to improve the usage rates.

26 Data available by Eurostat on the following link: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database?_piref458_1209540_458_211810_211810.node_code=tsiir140



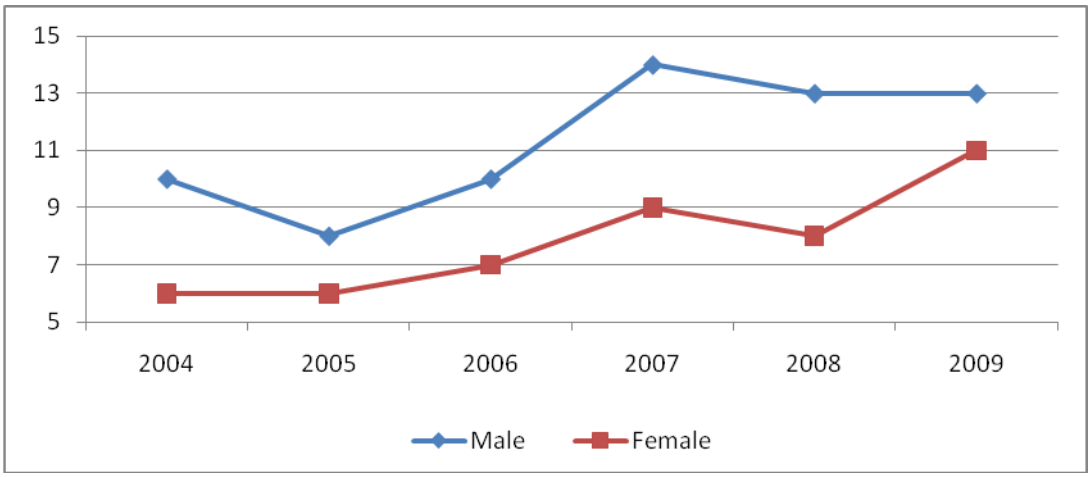
Source: Eurostat 2009

Figure 2. e-Government services usage by individuals in Greece (2005-2009)

TAXISnet had an overall budget of 60m euro and it was funded by the Greek Government and the European Union. Until today it remains an efficient and well running information system that saves millions of euros every year for the Greek government (Stamoulis et al., 2001). However, a recent evaluation regarding the social aspects and the citizens' satisfaction of TAXISnet revealed that the system has some weaknesses. This is due to a lack of support for people with disabilities, for foreigners and for other social groups (Terzis & Economides, 2006). Moreover, the system does not permit access to any married woman, although it gives "access rights" to them. The man – the husband – has alone right and responsibility to use the system and to declare the family income. The Greek tax law which was fully implemented in the case TAXISnet without any amendments caused a number of gender-related issues and brought to the fore gender inequalities from past decades. The violation of the principle of equality it is not a fault of the information system, although the problem comes to the fore because of technology.

The Greek tax law defines as "tax-payer" only the man – the husband – and the woman as the "spouse of the tax-payer". Therefore, women have of course economic activity, but their income and property is declared to the tax-system through their husband's tax declaration and password (which is personal). This tactic constitutes discrimination both against women and men, because women do not have the right to declare their income independently (or as tax-payers) and men are alone responsible for paying the taxes even if they have no income or property. This generates a number of problems in a practical level but also violates one more democratic principle: the protection of the personal data. Women are obliged to give details to their husbands for their property and income, but at the same time they have no right to access the system and see the tax-declaration that concerns their income. This happens because of the law for the protection of the personal data. The tax-declaration is considered as sensitive personal data according to the Greek law, but there is not such issue for women since they do not have a tax declaration. However, in practice the right of the women to protect their personal data is violated as they are still obliged to give these details to their husband, while the husband's personal data are in every case protected.

But what can be the impact of such a policy in e-government usage? There are no available statistics concerning the usage rates of TAXISnet by men and women. However, since TAXISnet is the most prominent and successful service we can make some basic assumptions.



Source: Eurostat 2009

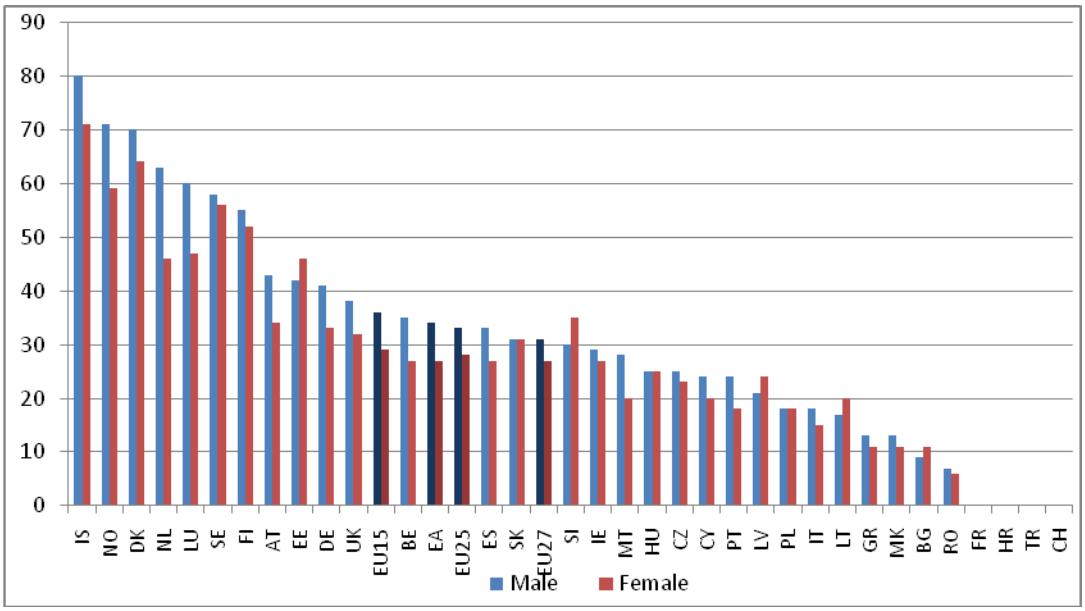
Figure 3. e-Government usage in Greece by gender (2005-2009)

Not surprisingly, the official statistics concerning the e-Government usage in Greece show that there is a gender dimension and the gender digital divide is apparent, but in what degree that's a social attitude and in what degree is the result of a government policy? The consequences, positive and negative, of a government policy may be huge. Can we consider Greek TAXISnet as a successful digital service? It is of course technically well designed and offers important economic benefits to the citizens, but it is contradictory to principal democratic values. The citizens do not ―feel equal" when they access the system, because what someone can or cannot do depends on his or her gender. Obviously the problem is not technical but political and legal. Technology does nothing more than bringing to the fore an existing problem. What changes in this case are the ―victims" of such an inequality? What would be the possible users of TAXISnet if such an inequality would not exist? Evidently would be more women, but what is the social group we are referring to? Almost all research in the area shows that the users of the e-services are of high social, educational and economic status (Observatory, 2009). Thus, the women that they are actually excluded from using the system are this social group, a group not threaten before by gender discrimination, which have manage to overcome most inequalities related to gender. As a result the digital divide between men and women does not seem to converge over time (in reference to the use of e-government services), as the percentage of men using e-Government is steadily greater than this of women.

The main conclusion of this case study is that the aforementioned e-service exacerbates the existing discrimination and we can even suppose that it creates new forms by preventing a very dynamic social group of using e-Government. The potential female users of e-services are wealthy, well educated women who, until recently, had never felt what really means gender discrimination. Moreover, this case study indicates that some factors can produce biased statistical results, because of a lack of understanding of the context of use.

5. Assessing the Gender Digital Divide in Europe

Evidently there are many issues to be solved in Greece in reference to the use of technology. But how the situation is in Europe? The gender digital divide is a Greek phenomenon or a general European issue? A look at the official European statistics gives evidence that the gender digital divide is also a common phenomenon at most countries. The following figure shows the usage rates by men and women across Europe.



Source: Eurostat 2009

Figure 4. E-government usage by gender; Percentage of individuals aged 16 to 74 using the Internet for interaction with public authorities (2009)

A gap between men and women is evident in the great majority of countries with an average European gap between men and women of 5 percentage units:

EU27	Male	Female	Difference (percentage units)
2005	26%	20%	6
2006	27%	21%	6
2007	33%	28%	5
2008	30%	26%	4
2009	31%	27%	4

Source: Eurostat 2009

Table 1. e-Government usage by gender in EU27; Individuals aged 16-74 using the internet for interaction with public authorities.

It seems that the gap is getting narrower and the usage rates by men and women tend to converge over time. In more detail, after the year 2007 the gap between men and women seems reduced, but is it really reduced? The European Union in 2004 and 2007 respectively did a big enlargement in Eastern Europe. Thus it is better to group the EU countries into different groups and to look more closely to them. We first look at the old member-states (EU15) and then the new members.

EU15	Male	Female	Difference (percentage points)
2005	29%	23%	6
2006	No statistics available		
2007	37%	31%	6
2008	34%	29%	5
2009	36%	29%	7

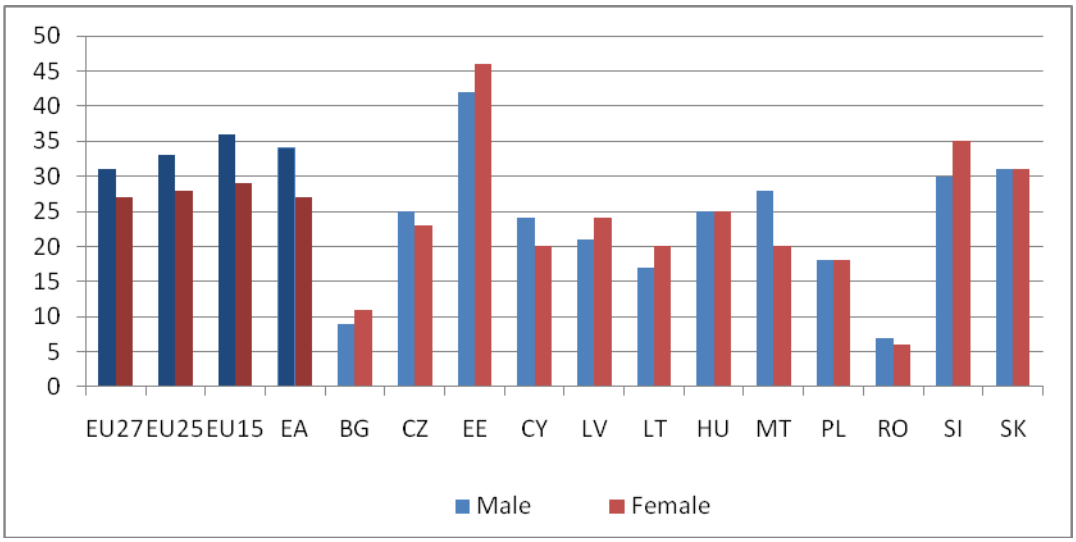
Source: Eurostat 2009

Table 2. e-Government usage by gender in EU15; Individuals aged 16-74 using the internet for interaction with public authorities

No progress is observed in the old member-states as the percentage of men using e-government services remains steadily 6 percentage points higher than this of women (in average). Thus, the claim that the gender digital divide tends to vanish over the years in developed countries is not valid. The usage rates are higher in the old member-states, but the gender digital divide is greater as well. This indicates no substantial progress, while the difference probably comes from the new member-states. Thus, it is better to look at groups of countries and then to make any assumptions on why the gender digital divide persists despite the relevant European policies.

6. Grouping Countries – the —Outliers"

After 2007 the European Union has 12 new member-states. Most of these new members seem that they have some special characteristics concerning the e-government take-up. Apart from the fact that, most of them have high usage rates in general, although they face many problems in their economies, they also demonstrate a different pattern of e-government usage. The following figure shows the usage of e-government services by men and women in the member-states:



Source: Eurostat 2009

Figure 5. E-government usage by gender in the new member-states; Percentage of individuals aged 16 to 74 using the Internet for interaction with public authorities (2009)

The figure gives us a completely different view of e-government usage in the new member states, as not only there is no gap between men and women, but the image is even inverted in most countries, with women having generally higher usage rates than men. The only exceptions are the Mediterranean countries Malta (MT) and Cyprus (CY). However, the Eastern European countries have no indication of gender digital divide. The following table shows the differences in e-government usage between men and women in Eastern European countries (Boulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, and Slovakia).

Eastern Europe	Male	Female	Difference (percentage units)
2005	17.75%	16.62%	1.1
2006	20.3%	18.45%	1.85
2007	18.3%	19.3%	-1
2008	19.5%	21.1%	-1.6
2009	22.5%	23.9%	-1.4

Source: Eurostat 2009

Table 3. e-Government usage by gender in Eastern European countries; Individuals aged 16-74 using the internet for interaction with public authorities.

Evidently in the new member-states of Eastern Europe there is no issue of gender divide and the benefits of e-Government services are equally distributed between men and women (with women having slightly higher usage rates). This fact indicates that there must be some important factors that affect women's attitudes towards technology.

7. Possible explanations

The analysis of the e-Government usage rates in Europe shows that the gender digital divide is not a general phenomenon across the EU as the ten Eastern European countries have no issue of gender digital divide. This finding is contradictory to the theoretical assumptions that the digital divide is a phenomenon of the less developed countries and the more developed countries have generally better usage rates among women.

In the case of Europe what seems to be more important is the political system, as all Eastern European countries that are now members of the EU, belong to the former communist block. To all these countries there is no evidence of gender digital divide and they share a common (or similar) political history. No matter what the weaknesses and the problems of communism were (that led this system to collapse all around Europe), the idea that women and men are equal in all aspects and they have equal rights and responsibilities, led to different attitudes towards technology. In the end, political ideas may promote a culture that is more important than economic development. This generates questions about the quality of our democracy and not questions about technology.

In the case of Greece the problem is systemic. TAXISnet does what is intended to do; the problem does not lie on technology but on legislation. Technology just exacerbates the problem and makes it more evident. A significant proportion of Greek tax-payers have no actual (ethical) problem if the husband is alone responsible for paying the taxes. This attitude is based on the idea that the man is responsible for the family's income and the woman has, somehow, a different role. After many decades, or even centuries, with the patriarchal model being predominant in Greece, the tax law seems a normal regulation. No important dissatisfaction emerges in the population because of such a law. The problem is unveiled with TAXISnet; but why? If we take into consideration who are the potential female users of the system, than it is becoming evident why.

The fact that the potential female users of TAXISnet are women with high education and high income level, gives the answer. We are referring to economically active population that has the knowledge to understand technology and to make informed decisions. But, no matter what the employment status of these women are: lawyers, professors, executives, teachers etc., they realise that after their marriage they have no right to use their password and personal account in the system any more. Not because the system does not permit access, but because the law repeal their right to manage their tax affairs. Finally, we should consider: how many such laws, customs, believes and attitudes towards women remain in Europe? How legislation and government policies promote equality? Are there any contradictory messages? In the end the main question is; what is the influence of any given social and political environment over women that affects their ability to use technology effectively?

8. Conclusions

In conclusion, the problem is not technology itself, but the fact that technology may re-enforce or unveil gender inequalities rooting already in society. The hypothesis, by some authors, that women use technology less than men because they are less interested in technology is rejected in this paper. The analysis in Europe and Greece shows that there are other, more important factors that affect e-Government take up by women and men. Since there is no gender issue in ten countries than probably the problem does not lie to any "female mentality" that avoids technology, but in political decisions that cultivated such an attitude over the years. Moreover, the hypothesis that the gender digital divide tends to erode in developed countries is also rejected, as the findings of this research show clearly that it is not a matter of economic development, but a matter political and cultural. The most important in our case-study is that technology may add more dimensions in the issue of gender discrimination or it may simply make an existing inequality worst. The information society cannot be built on regulations and prejudices of previous decades. The gender digital divide is not a fault of women but a fault of the social and political system that cultivated wrong perceptions for many decades.

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THE ETHICS OF THE GENERALISED SOUSVEILLANCE

Jean-Gabriel Ganascia

Abstract

This paper first describes the notion of sousveillance and its generalization to the entire planet and to the overall "infosphere". It then portrays the structure of the sousveillance society by the use of a new architecture, the "Catopticon", which is derived from the Bentham's Panopticon that had been designed for the surveillance. It then shows how the "Catopticon" can be extended to the entire planet. It also shows how it can coexist with surveillance regimes, i.e. with multiple Panopticons. The ultimate goal of this work is to draw the ethical consequences of the generalised "sousveillance" and to underline the new ethical issues of our contemporaneous world.

Keywords: sousveillance, surveillance, Panopticon, Catopticon, eye tap, JennyCam, transparency, privacy.

1. Introduction

A spectre is haunting the contemporaneous world, the spectre of "*Nineteen Eighty-Four*" (Orwell, 1949), the famous Orwell's novel. With webcams, RFID tags and many other recent information technologies, it now becomes possible to continuously record all the daily activities of everybody (Bailey and Kerr, 2007). As soon as it is switch on, the mobile phone makes easy to identify and localise anyone. With remote sensing techniques, it is now possible to track all the people displacements, even when they decide to resign the public life to cultivate their garden. In many developed countries, personal data concerning health, employment, incomes, travels and digital communications are officially traced and stored in data bases. It is then possible to fuse all those data using modern data mining techniques. Many people fear the *surveillance society* that could result from the generalised use of those techniques.

This notion of surveillance society refers to an individual, e.g. a Big Brother, a tribe, a social class, a clan, a militia or any group who uses all the information he gathers through surveillance in order to maintain his/her power on others. It indubitably makes sense in a legal State, or at least in a state in which the power needs informational arguments to justify its action. In archaic States, where the power is imposed with brute force by a chief, a king, an imperator or an oligarchy, without any other justification, surveillance is not required, except to prevent conjurations. From this respect, the surveillance is relatively modern. The prison, which has to reform individuals, to teach them the law and to recall to everybody else the necessity to obey the law, is also quite recent (Foucault, 1975). Before, most of the people convinced of infringement to the law were either released or tortured to death. As we shall see in the following, the notion of Panopticon is emblematic of this new political form that has appeared in Europe and North-America during the 18th century. Nevertheless, this notion of surveillance society, which many of our contemporaneous are afraid of, does not seem to be appropriate to characterise the present state of our post-modern societies. At least that is what we intend to show in this paper.

More precisely, nowadays, everybody is able to take pictures and sounds of everybody and then to diffuse them freely on Internet while, before the massive development of information technologies, the broad dissemination of information through books, newspapers, radio emissions, TV emissions, movies or photos was restricted to powerful institutions, which were either States or rich companies. By opposition to the previous state governed by the surveillance, it results in a new state that is now governed by the "sousveillance". This paper recalls what the notion of "sousveillance" is. Then it shows how the generalization of the "sousveillance" to all the society is changing the way the society is organised and the political forms that apply. In addition, many specific ethical issues of the information society are related to the "sousveillance" and its inherent risks. Note that most of our contemporaneous fear the danger of the surveillance, which leads them to focus on ethical issues related to privacy, to the restrictions of freedom and to the lacks of communication. However, as we shall see, many other key ethical issues are more closely related to the abuses of "sousveillance". Our

goal, in this paper, is to point on those ethical issues that are related to the generalization of the "sousveillance" to the entire society.

The overall organization of the paper reflects this argumentation: the first section, after this introduction, describes in detail the notion of "sousveillance" making use of many contemporaneous examples. The following section presents its generalization to the overall society. It is then shown what the "sousveillance" society is and how it is distinguishable from the surveillance society. Dedicated to ethical issues, the third section is divided in two parts, the first being specific to the well-known ethical issues of the surveillance societies and the second to the new ethical issues of the "sousveillance" society. We conclude by discussing key topics like transparency, "right to oblivion" and the Identity Management.

2. Notion of "sousveillance"

At the age of 20, Jennifer Ringley has placed a webcam in her student room and has disseminated continuously, during 8 years, from 1996 to 2003, all the videos of her intimacy on her website, which became quickly very famous: it was visited each day by more than 3 millions of persons who were interested both for the sociological implications of such an exhibitionism and for the sexual arousal. The success of the Jennifer Ringley's website is not isolated. The current development of social networks, like Facebook, where members give freely private information available to everybody attests a similar tendency to exhibit personal life. Nowadays, many of our contemporaneous, especially youth and teenagers, don't fear surveillance. They like authenticity. They don't want to hide themselves. They agree providing access to their intimacy and to everything about themselves; in return they demand a total transparency. The continuous record of all individual data, e.g. the constitution of personal digital archives, and their free public dissemination through the web, can also be seen as such examples of tremendous exhibitionism, since every gesture and every second of life are available to everybody.

If we were in a very surveillance society, this type of attitude would have been unconscious and potentially dangerous, because authorities would have been able to scan all those records and to take advantage of that information to justify their repression against individuals. However, in our contemporaneous world, those tendencies receive a completely different interpretation and they are viewed as freeing individuals. Some argue that they contribute to establish a state of total transparency in the society. According to those one, for instance to Steve Mann, this would not really strengthen the logic of surveillance, leading to a generalised surveillance society, but this would contribute to institute a new regime, which is described as "sousveillance" (Mann & al., 2003), and where the powerful people are permanently under the watch of those whom they dominate. This word "sousveillance" is a neologism built on the model of the word "surveillance", which comes from the French words "sur" meaning -over and "veiller", to watch, and which literally means watching from above. By analogy, "sousveillance" has been built to designate the act of watching ("veiller") from below ("sous"). More precisely, in the case of "sousveillance", the *watchers* are socially below those who are watched, while in the case of surveillance it is the opposite, they are above.

Our contemporaneous world shows many cases of "sousveillance", since information technologies permit to everybody to take videos and sounds, without the knowledge of people who are filmed and recorded. For instance, if the police beat youths in the street or on a platform subway, the use of mobile phone makes every onlooker able to record and to publicly spread videos of this event. For the sake of clarity, let us give a few examples of "sousveillance".

Recently, the 20th of June 2009, during the demonstrations of protest against the results of the Iranian presidential elections, a young woman, Neda Agha-Soltan, was shot in the chest. Immediately, her tragic death was captured on video by bystanders and broadcasted over the internet, which drew the international attention, while in old totalitarian countries such information would have been totally ignored. Such a story characterises the society of sousveillance where everything can be seen by everybody, without the knowledge of the powerful people, even if they prohibit information dissemination. There exist hundreds of stories like this. For instance, the Friday 4th of December 2009 in Paris (10th arrondissement), two policemen arrested in *flagrante delicto* of stealing in a phone shop, were indicted for aggravated robbery in a meeting on the basis of video surveillance images. The images of a video camera, revealed by Europe1.fr (Europe1.fr, 2009) show the two men entering a

phone shop in the Louis Blanc street exhibiting an armband police and their professional card. They appeared in the shop the head covered with a cap. Then, pretending to carry out an identity check, they went behind the counter and they stole phone cards before leaving the store… Without those pictures, those policemen would not have been arrested.

A 25 years old man has been found death 2009 December the 30th. He had been arrested for having stolen a beer can in a supermarket not far from Lyon, in France; he then has been retained two hours by four vigils who explained that he suddenly lost consciousness before the police arrived. The vigils have been deferred to the tribunal because videos clearly have shown that the young man had been pinned against a wall, then against a high table, half an hour and that he had received several fist before he vanished. Without such automatic video records, the vigils would have act in total impunity.

Rachida Dati, is a well-known French politician who has been Keeper of Seals and Minister of Justice (2007-2009) in France before having being elected at the European Parliament in June 2009. It seems that this election has been perceived by the former Minister as some kind of exile, because she had to resign from her Minister position and leave the French politician microcosm in Paris. After having being filmed by the M6 TV channel, she forgot her microphone when she called a friend, so the conversation was recorded unwittingly. The resulting recording contains some funny commentaries where Rachida Dati said how tedious was to live in Strasbourg and to attend sessions in the European parliament. Those records have been broadcast throughout the web and downloaded by many people.

Undoubtedly, the different cases that were presented here are typical examples of ―sousveillance", because here people who have the power, i.e. the militia, the police, vigils or a politician, have been jeopardised by the use of automatically recorded information.

3. The generalised ―sousveillance"

The generalization of ―sousveillance" to the overall world society

The previous examples clearly show how information technologies transform the society: nowadays, everybody is able to catch information fragments, e.g. pictures, dialogues, videos, etc., using electronic devices like webcams, microphones, mobile phone, RFID etc. and then to diffuse them all over the world, throughout the web, while, in the past, only powerful institutions like the States or rich companies had the ability to broadcast information. Since those new techniques render everybody able to be a potential source of information for everybody, they promote the individual autonomy. Anyone who has something to say to the world can do it freely on the web. For instance, in his book (Jarvis, 2009), Jeff Jarvis explains how, while his new DELL computer was out of use, the DELL service after sales was very inefficient, although he had contracted a total guaranty when he bought the machine. Moreover, DELL has refused to refund him and to replace his machine. After that, Jeff Jarvis has mentioned those difficulties he has had with DELL on his blog, which had an incredible impact: many people didn't buy DELL computers because they had heard that it was said on the web that DELL was not reliable. As a consequence, the DELL sale rate has quickly decreased, and then the DELL Company has changed its after sale strategy. From the point of view of consumers, the circulation of such information is very positive, because it helps to influence producers and industrials to force them to improve the products and services they sell. But that's not new: in all societies, even in the oldest, the word of mouth has made circulate both the personal experiences and rumours. What is new nowadays, in our contemporaneous societies, with modern information technologies, is the scope of this circulation: while it was restricted to local areas, e.g. quarters, villages or cities, now this scope has been considerably extended and this extension is twofold. On the one hand, the area in which the information circulates has dramatically increased. From now on, all those who are online, on the overall planet, are quasi-instantaneously reachable by information technologies, which make everybody potentially connected to everybody. On the other hand, people are now directly connected to the infosphere: they do not shake hands, but they use virtual intermediaries, which are ―inforgs", i.e. informational organisms, in order to get in touch virtually by making their avatar shake hands. Some of those ―inforgs" are just their informational counterparts, which are totally submitted to their will. Others are avatars, which resemble more or less to their owner, but which can be present in their absence. Some are even intelligent agents that possess some type of autonomy. As a consequence, the

extension of the sphere of exchanges is now twofold: it has been extended both from a geographical point of view, to the entire planet, and from an ontological point of view, from the world of human beings - and more generally, the world of living entities - to the world of "infosphere".

In short, the local surveillance societies, which have dominated the 19th and the 20th century, are now replaced by a generalised "sousveillance" society which takes incredible proportions, since it does not only extend to a region, nor to a country or a continent, but to the overall world, because the communication becomes quasi-instantaneous throughout the planet, and also to the world of "infosphere".

The surveillance societies were highly centralised, based on a hierarchical social structure and localised in a physical building. By contrast, the generalised "sousveillance" society is totally distributed, strictly equalitarian and delocalised, through the entire planet. In order to examine more in depth the structure of this generalised "sousveillance" society, we introduce hereafter an architecture that, by contrast to the architecture of the Panopticon that was for surveillance, is designed for the "sousveillance".

Panopticon

The Panopticon has been designed in the end of the 18th century by Jeremy Bentham, as architecture for prisons (Bentham, 1838). It was supposed both to decrease the cost of surveillance and to improve its efficiency. Many philosophers, whom Michel Foucault in "Surveiller et punir" (Foucault, 1975) was among, described it as a typical "dispositif" of the modern legal state, i.e. as a social arrangement that summarises the underlying political structure of the society. Briefly speaking, the Panopticon is built on a ring around a central tower, where inspectors can see all the actions of prisoners. The cells are transparent, which means that they receive and transmit the sunlight. In that way, the inspectors may observe every movement of the prisoners without being viewed. Moreover, the prisoners are totally isolated from each others. To summarise, the Panopticon principles are:

1. the total transparency of the peripheral cells,
2. a fundamental inequality, which makes the occupants of the central tower, i.e. the observers, watching all the occupants of the periphery, i.e. the prisoners, without being watched,
3. the isolation of the prisoners who can't communicate each others.

The extended "Catopticon"

In a recent paper (Ganascia, 2009a), we have shown that, by analogy to the Panopticon, that schematises the surveillance society, the generalised sousveillance gives birth to another social arrangement that we call the "Catopticon". The three fundamental principles on which the Catopticon is built can be compared with – an opposed to – the three fundamental principle of the Panopticon:

1. the total transparency of society,
2. the fundamental equality, which gives everybody the ability to watch – and consequently to control – everybody,
3. the total communication, which makes everyone able to exchange to everyone. In practice, it means that there is no hierarchy, i.e. no central tower, and that everyone may communicate to everyone in a total transparency.

There are many examples that show the existence and the modernity of the Catopticon (Ganascia, 2009b; Ganascia, 2010). For instance, due to the extensive use of information technologies, the modern subway is a Catopticon, while the classical 20th century subway was organised on the model of a Panopticon. More generally, the contemporaneous infosphere is mainly structured as a huge Catopticon (Ganascia, 2009b) that is extended both to the entire planet and to the world of informational organisms, i.e. "infosphere" by reference to Floridi terminology (Floridi, 2008).

Coexistence of both an extended "Catopticon" and multiple extended Panopticons

The formalization of both the Panopticon and the "Catopticon" helps to prove some general properties of those two social arrangements.

Before going into details, note that, as the "Catopticon" has been extended to the entire planet and to the world of "infosphere" by the use of contemporaneous information technologies, the Panopticon can be. However, even when it is extended, its properties distinguish it from the generalised "Catopticon".

The first property of the generalised "Catopticon" is its uniqueness. The detailed proof is given in (Ganascia, 2009a) and in (Ganascia, 2009b). However, the schema of the proof is easy to sketch: if it has existed two generalised "Catopticons", they would either intersect or not. If there is an intersection, inhabitants of this intersection would have access to both of the generalised "Catopticons", which means that everybody in each of the "Catopticon" would have access to everybody in the other, through the inhabitants of the intersection. If there was no intersection, it should mean that the "Catopticons" are not universal, i.e. that they would not cover the entire planet, which is contradictory.

The second property is that the extended Panopticon may be numerous, even if they are generalised to the entire planet, because each of them is submitted to the arbitrary authority of its centre, and usually two different Panopticons have two different centres.

Lastly, according to the third property, the great "Catopticon", which is the generalised "Catopticon" that has been extended to the entire planet, may coexist with multiple extended Panoptions.

4. Ethical Issues

Ethical Issues of the Panopticon

During the past few years, most of the computer ethics issues were defined face to the Panopticon, which acted as a foil, showing what to avoid at all costs. More precisely, the most classical attitudes in computer ethics were mainly motivated by the fear to see to grow a Panopticon that would become bigger and bigger to the point that it would cover the entire society. Living in such a huge Panopticon would be a nightmare, since everybody would be under the watch and the domination of the administration, as in a jail, without having the ability to freely communicate to their fellow beings. The computer ethics must by all means find the way to prevent the achievement of such a generalised Panopticon. It has been the horizon of most approaches. For instance, in the mid-eighties, one of the first works in computer ethics, done by Roger Mason (Mason, 1986), has summarised the Computer Ethics topics with the PAPA acronym, which stands for *Privacy*, *Accuracy*, *Property*, *Access*. All those four topics can easily be understood with respect to the characteristic structure of the Panopticon, of which the misuses have to be prevented.

"Privacy" means that each of us has the right to control who consults his personal information and why. It makes sense with respect to the Panopticon structure, where the powerful people, who are inside the tower, have access to all the private information. The aim of "privacy" is to restrict the intrusion in individual private life, distinguishing the private sphere, which is personal, from the public sphere. The notion of privacy marks the limits of the transparency that makes the Panopticon central power occupants able to gather personal information about the peripheral cell inmates and to misuse them.

The notion of "accuracy" refers to those who are responsible for the authenticity, fidelity and accuracy of information. Similarly, it also refers to those who are accountable for damaging or making erroneous the information. In the Panopticon structure, the central power is the only guaranty, which gives it an incredibly dominant power. It would be suitable to have independent accreditation institutions who would be responsible for those questions and who would make each citizen able to check all information he gets.

The "property" concerns the belonging of information, its price, the rule of its exchange, etc. For instance, what is the price of electronic books or music files? Without going into detail, this makes sense with respect to the structure of the Panopticon, of which central power occupants are able to define the price and to rule exchanges.

The last point is about the "accessibility", i.e. about the nature and the amount of information to which a person or an institution has the right to access, and about the restrictions of use that are associated. Once again, this point takes only sense when facing the danger of the Panopticon, since the goal is both to restrict the discretionary power of the central tower occupants and to guaranty a right to access to information to the peripheral cell inmates, who are condemned to a total absence of communication in the original Panopticon structure.

In short, almost all the classical topics of Computer Ethics are defined face to the structure of the Panopticon viewed as the ultimate danger. As we previously saw, it's true for the PAPA topics, but it's also true for almost all other classical topics.

5. Ethical Issues of the Catopticon

Our goal, in this paper, is to show that many modern ethical issues are not directly related to the Panopticon, but to the Catopticon. More precisely, nowadays, the main problems do not only concern the privacy and the emergence of a totalitarian state in a hierarchical society, but also the anonymity and new distinction procedures that help people to emerge in an totally equalitarian society. As previously said, the extended Catopticon and multiple Panopticons coexist, therefore, the traditional computer ethics issues, for instance the aforementioned PAPA, are always relevant. However, new ethical issues are now emerging and we claim that our role in the present and for the future is to understand them and to try to answer to the questions they raise.

To give an idea of those questions, let consider again the PAPA topics, i.e. *Privacy*, *Accuracy*, *Property*, *Access*, and, face to each of them, let us point the new emerging ethical issues that are related to the extended Catopticon.

In the case of the extended Catopticon, the *privacy* is not the first concern, since the challenge is not to be hidden, but to emerge from the anonymity and to be distinguished in the vast amount of individuals. This explains why so many people, especially youths, use social networks to share their intimacy with their fellow beings. Face to privacy, i.e. to the right to know who uses your data and why, the question concerns the ability to be recognised and, symmetrically, the right to oblivion. The processes by which individuals distinguish themselves are mainly based on the use of search engine, as Google, on voting procedures and on reputation establishment, like in eBay. The economical and political consequences of those "distinction" procedures are more and more important in the information society. However, many techniques – e.g. "Spamdexing" – tend to bias those distinction processes, which could generate new inequalities, new discriminations, new unfairness and new injustices. Moreover, some of us want to live different existences on the web. For instance, they don't want to share the same personal information, and consequently the same identity, with their friends, with their family, with their boss, with their physician, with their insurance company or with their administration. Nevertheless, it is difficult to avoid contradictions with multiple identities. This is the reason why researchers investigate the identity management techniques, which ensure the consistency between the different identities.

The notion of *accuracy* refers to those who authenticate information. In the case of the Panopticon, the ethical challenge was to find independent accreditation institutions – or persons – who are not involved in the government. In the case of the Catopticon, the question is not exactly who – or what institution – is able to validate information, since everybody in independent. But, it is about the trust, i.e. about what makes that people trust – or distrust – a person or an institution.

The *property* covers the economical aspects of the information society. However, in the case of the extended Catopticon, the value is neither related to information, nor to the goods, but to the attention that has been solicited. In other words, we now live in an economy of abundance, where everybody faces many different choices, among which he has difficulty to decide. Most of the time, the number of possibilities is so high that individuals have not the cognitive ability to decide which of them is the better. Choices are often aided by recommending systems, which can easily be biased. Moreover, since the problem is to catch attention, the advertisements can be personalised and automatically adapted to the individuals according to their history or to their profile. Therefore, while in the Panopticon, the property referred to the value of information, in the Catopticon, it corresponds to new economical rules, which rely on the attention, i.e. on the strategies that help people to retain the attention of their contemporaneous and not on strategies that lead to sell goods. This raises many ethical questions that we shall not develop here, but in future works.

The last PAPA topic is about the *access*, i.e. about the amount and the nature of the information to which anyone can have access. In the case of the Catopticon, everybody have potentially access to all the information. Some questions concern the accessibility, i.e. the material possibility to access to the infosphere. Other questions are related to the restriction of access: when and why can I restrict the access of someone to my personal information. In other words, the information technologies make

now possible to live in a glass house, where everything is transparent to everybody. However, for social and psychological reasons, this total transparency is not always desirable. One of the most acute present ethical issues concerns the norms on which an ethical justification of opacity can be based.

6. Conclusion

To conclude, let us envisage the present evolution: opacity, trust, attention, etc. all those points are new. They raise new questions. Most of them cannot be approached with classical ethical apparatus. As a consequence, they require new ethical apparatus and new formalizations. The Catopticon makes that those new requirements are now clear and obvious. By doing it, it opens new areas in computer ethics and it clarifies some of the most contemporaneous issues. Certainly, it does not solve those questions, which need new approaches and new formalizations. However, the investigation of the Catopticon makes possible the enumeration of many of those contemporaneous ethical issues.

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THE RELATION BETWEEN HUMAN ETHICS AND CYBORG ETHICS

Anne Gerdes

Abstract

The article discusses what it means to be a human being in an ethical sense. Further, it is pinpointed that we cannot know anything essential about basic conditions of cyborg ethics. But we can analyse possible consequences for society's cohesion in the wake of the technology-optimised human being.

1. Introduction

Initially, the article distinguishes between the ethical questions in connection with therapeutical technology improvements vis-à-vis the ethical questions arising when we speak of technology improvements whose sole purpose is to optimise the human being, i.e. make well human beings super human beings. The idea that the technology-optimised human being – homo artefact – will develop other values than Homo Sapiens is straightforward. While the human being, from a phenomenological point of view, has common preconditions for acknowledgement and thus possibility for understanding his fellow men, one can of course ask about ethical values and the democratic cohesion in a world with sub-cultures of cyborgs. Therefore section 3 discusses vulnerability's importance to ethical values (Macintyre, 1999), and section 4 discusses John Rawls' theory of justice (Rawls, 1999).

2. The technology-improved human being

Today, bio and information technology provide us with tools enabling us heading for becoming masters of our own evolution. That means that even though we decide not to modify our bodies, it is an active choice or non-choice. To most of us, discussions about cyborgs appear to be speculative, but which we try to predict the future, it is already being invented. Over a number of years, Professor Kevin Warwick has made experiments on his own body. E.g., via implants, Warwick and his wife have been able to send signals to each others nervous systems via the internet. In another experiment, signals were transmitted from Warwick's nervous system located in New York to England – i.e. Warwick's neural system controlled a robot hand located on another continent. On that occasion, Warwick noted with satisfaction that his nervous system is no longer limited by his body but by the internet link's reach! (Warwick 2003: 135). In a similar experiment, researchers at Duke University Medical Center operated electrodes into the part of a macaque's brain governing the hand's motor function. Electronic impulses from the macaque's brain are transferred to a computer, and thus the macaque has become able to play simple computer games by the "force of thought" alone and without using a joystick (In practice, the macaque is trained to play with the joystick, and it continues to do so, not knowing that there is no current in the joystick. Thus the macaque governs the game by the force of the brain).

For instance, Warwick has used his experiments to discuss cyborgs, and, to a less extent, related to the ethical questions arising in the wake of his experiments. Here he simply ascertains that cyborgs will develop a radically different set of values as they are essentially different from man. He joins transhumanism and expects a bright future. Here, as cyborgs, we shall be able to explore the universe, just as we shall increase our intelligence by coupling intelligences. Warwick is both famous and notorious for his experiments with technological optimization of human performance, and by many he is considered more of a visionary dreamer than a researcher. Nevertheless, the character of his experiments has clearly and concisely formulated ethical problems and the extent of research in the technology-improved human being.

The technology-improved body raises a number of problems. Here, we can distinguish between the ethical problems in therapeutic contexts where the functioning of the body is re-established in connection with handicaps or illness vis-à-vis the ethical questions arising when we speak of technology improvements whose sole purpose is to optimise the human being, i.e. make well people

super people. Further, we have to relate to the technology-optimised human being who, in a sophisticated version of Warwick's experiments, lets his nervous system couple with other persons in a computer network. Here, we can literally talk of distributed cognition as the autonomous ego is broken down into a form of consciousness being a common matter for all members of the network. The ethical consequences of consciousness amalgamation in the form of coupling between computer and human being give rise to questions as to whether it will at all be possible to establish interdependence and democratic values when the point of departure may prove to be technology-optimised beings without special common traits.

2.1 The technology-improved human being: Therapeutic versus optimizing use of bio and information technology

When technology repairs the human being and re-establishes functional ability, most people will agree ethically, but where and how do we distinguish between what can be considered therapeutic applications vis-à-vis optimizing applications?

Most researchers are motivated by helping ill or handicapped people. In some years, it is expected that blind people can experience sight through chips translating camera information into signals to be processed by the brain. Further, patients suffering from Parkinsons have had electrodes inserted deeply in the parts of the brain in which the suffering is related. However, it has turned out that a few of these patients have developed ludomania. This side effect disappears as soon as the electrodes are "turned off" In the U.S. a few fatness operations have been made with so-called "deep brain stimulation" according to the same principles as the Parkinson treatment. Thus we can imagine that it is possible to hit centres in the brain thus further or limit tendencies – e.g. further or limit aggressiveness or further memory. In future, it may be possible to increase happiness by electrodes? Or we may create aggressive soldier for warfare?

Likewise, it is expected that nanotechnology will play an essential part therapeutically – e.g. we could imagine bio sensors monitoring one's health and communicating with the doctor's computer or nanotechnology used to optimise oxygen transport in the organism or the heart's resistance towards fat. The latter can help patients with serious bronchial problems. But it can also be used to optimise the healthy body's functions. E.g. it can be imagined that it might be an advantage in sporting events it one could keep one's breath through a long period.

There are already doping discussions in relation to technology improvements. I shall not enter this discussion here, but instead my focus will be on the possibilities of technology improvements to change our expectations in the treatment system, ourselves and each other.

Gene therapy has been used for therapeutic purposes, but it is a probable future scenario that we shall use gene therapy to improve man. So far, gene therapy has proved to cause serious side effects when used on human beings instead of on test animals whose immune defence functions otherwise than man's. Likewise, gene therapy causes permanent changes in genes in the genome, and as we cannot fully control gene therapy in the human body, there is a risk that added genes will move into the gametes and thus be carried on to the next generation – if so, evolution is at risk. Gene therapy's uncontrollable factors have the effect that most researchers approach the area with great care. E.g. research is done to uncover the relation between the human immune defence and gene therapy, and experiments are made to possibly develop gene therapy so genes can be switched on and off when the effect is no longer needed. But many gene therapeutic methods result in permanent gene changes in which the genes become an integrated part of the body. Notwithstanding that researchers are careful in relation to experiments with gene therapy, a probable future scenario is that we will get the possibility to improve man by introducing gene therapy via the gametes, and thus we get the possibility of saying yes or no to genes passed on to the next generation via the gametes.

Examples of various forms of extension of the illness concept go alongside developments in the bio medical area. The idea about the well human being is not alone limited by our biological traits but to an equal extent by our bio medical and technological tools. As our expectation horizon changes in keeping with technological developments, it is impossible to clearly distinguish between a therapeutical and an optimizing use of technology. E.g. one can imagine the technology-optimised employee in the form of a lorry driver with night vision. From a traffic-security point of view, it would clearly be an advantage if business drivers had this capability. But which values and norms apply when the individual makes a choice about function optimization?

It appears sensible to speak about personal liberty under responsibility when it is about letting one's body improve by means of technology (Moor 2005:129). Thus I can say that as long as I do not hurt others, I act responsibly, and under these conditions I ideally have the right to decide over my own body. But can we generally speak about the autonomous individual's choice in a situation where the surroundings may contribute to the decision's being pushed in a certain direction? It is imaginable that the above lorry driver has his vision improved technologically because expectations in the trade put a certain pressure to bear on him.

Our freedom of choice is often made under the influence of the surroundings just as we develop attitudes in the tension area between ourselves and other. Notwithstanding that we consider ourselves individualists; we seem to be victims of a normalising power working against latitude in society. When we have the possibility of saying yes to optimizing qualities, we radically change what it means to be a human being. Therefore it is necessary to discuss our attitudes to this.

2.2 The technology-improved human being – homo machinus

According to the transhumanist philosophy we are to aim at improving ourselves by means of technology. First of all because the possibility is there. That is why utilitarially it can be argued that through technology we can get most happiness for most people as the technology-improved human being will be able to exploit its potential optimally and be an enrichment to society. Therefore, we should control our development as species especially because that will give us the possibility to keep ahead of the potentials in the development of artificial intelligence. Here, from a reductionist perspective, it could be argued the intelligence and consciousness can be unravelled materially, and that the ideal of free will is an illusion (Minsky, 1996:307). Under these conditions, it will be possible to develop artificial intelligence not only simulation human intelligence but also developing actual consciousness which may be qualitatively different from ours.

Therefore, transhumanism's advocates argue that in future homo sapiens can only survive as species by being melted with technology and become homo artefact. Ray Kurzweil, the future prophet, speaks of *Singularity* as the name of a time in which the computer becomes superior to our intelligence and in which human beings and machines become one. Based on calculations of computer power's growth over time, Kurzweil suggests that the scenario will be reality around 2030 (Kurzweil 2006).

The idea of the technology-borne evolutionary development is also described in Ian Pearson's article "The future of human evolution" (Pearson 2002). Here, the transformation from human being to cyborg is outlined in a prediction of a development bringing us via *homo optimus,* the optimised human being with improved qualities further to *homo cyberneticus,* (the technology-integrated human being) and *homo hybridus* (hybrid man) where a complex interplay between biology and technology can enrich the species. Finally, we have the species *homo machinus* in which, biologically, it is no longer a question of life and reproduction. Further, it will be possible to imagine dissolution of "the ego" as identity for the benefit of a form of distributed cognition in which artificial intelligence, computers and technology-optimised consciousness are coupled in a network.

Through such measures, we can achieve super intelligence and eternal life. But who am "I" or who are "we" in this context? The idea that *homo machinus* develops other values than homo sapiens is straightforward, and while man can avoid ending in value relativism because across cultures and through free dialogue we can find common core values, one may ask what the ethical values and the democratic cohesion are in a world with subcultures of cyborgs? Who is my fellow man when he can turn out to be the one being the least like me?

"While it is legitimate to worry about unintended consequences and unforeseen costs, the deepest fear that people express about technology is not a utilitarian one at all. It is rather a fear that, in the end, biotechnology will cause us in some way to lose our humanity – that is, some essential quality that has always underpinned our sense of who we are and where we are going, despite all of the evident changes that have taken place in the human condition through the course of history. Worse yet, we might make this change without recognizing that we had lost something of great value. We might thus emerge on the other side of a great divide between human and posthuman history and not even see that the watershed had been breached because we lost sight of what that essence was." (Fukuyama, p. 101)

From a phenomenological point of view it can be argued that our physical existence and being in the world have the result that across cultures we have a physical preparedness forming the base of

sensibility based on experience again causing us to understand each other also even though we are far from each other culturally (Wackerhausen 1999, Lakoff and Johnson 1999). Thus there will be basic values to which we can adhere and aim at also even though these values are not adhered to in the culture we are part of. In our meeting with the stranger, there is a gist of common understanding – our cultural patterns may be relative, but we also have universal common traits in our basic patterns of the surrounding world. Even though some cultures do not speak of "in front" and "behind", there is still a spatial experience corresponding to mine – the experience is just instantiated differently language-wise. Likewise, we can all relate to happiness and grief even though we may not laugh at the same jokes or cry over the same events. We can meet with the stranger and through dialogue find the good. Even though we not always succeed, we have a realistic hope that we will succeed if we want to.

But how is the basic cohesion in a society of groupings of technology-optimised human beings and or cyborgs? When, today we discuss that cohesion and democratic processes are threatened due to fragmentary information flow, our future discussions will also comprise results of fragmentary "identity flow". So we can apparently shorten our discussion and conclude that we cannot know anything essential about the looks of cyborg ethics. Likewise, it will be basically difficult or impossible to understand as these individuals will develop values that will possibly radically different from ours. In the following I shall therefore avoid speculative considerations to the effect whether we will become better or worse individuals as we lose our humanness and are transformed into cyborgs. Instead, I shall discuss what it means to ethics that man is vulnerable (part 3), and my fellow men are like me (part 4).

3. Vulnerability and ethics

It thus makes sense to try to discuss on which points cyborg ethics will differ from our ethics. Here we have a marked difference, and when our bodies become a maintenance project, perhaps even with eternal life, there will no longer be any need to relate to our own or others' vulnerability – anything can be replaced or be upgraded to new versions. Of course we could object that it doesn't really make any great difference to ethics whether we are vulnerable or not?

But in that connection, Alisdair MacIntyre's book *Dependent Rational Animals – why Human Beings Need the Virtues* (MacIntyre 1999) nuances virtue ethics by exactly focusing on the importance of our vulnerability and basic dependence of each other. Starting from Aristotle's definition of man as the rational animal, MacIntyre pinpoints the need of the body's inclusion in moral philosophy and thus the problems in the idea that our rationality is independent of our brutishness. In this connection, MacIntyre points out that Aristotle's definition of man as distinctively rational cannot be interpreted as Aristotle meaning that rationality is solely a quality which can be used to distinguish between the human being and the animal. Aristotle also ascribed to animals the concept of *Phronesis* - that we are able to reason rationally on the basis of life experience gained in a practical context (MacIntyre 1999:6). Thus MacIntyre examines how the biological continuum between human beings and animals can be said to have importance for ethics.

The special thing about human beings is that through our upbringing we develop practical sense by which we – in contrast to animals – can distance ourselves from immediate goods in our pursuit of more supreme goods. The ability to critically distance ourselves from satisfaction of needs form the basis of our morality. In spite of the fact that morality is about regulation of interpersonal relations, the starting point in moral philosophy is rarely our vulnerability and dependence on others in various phases of our lives; from the baby's total dependence on care persons to the very old person's ditto (MacIntyre 1999:1). MacIntyre's project is thus to illustrate how a connection between rationality and our nature as biological beings gets importance for a formulation of ethics weighting community; understood as the dependence on learning and passing on ethical experience in practice in which one involves oneself with one's surroundings aiming to create goods securing human flourishing.

The project is to be seen as a counterweight to moral philosophy's lack of focusing on the body framed in e.g. the Kantian understanding of the individual who, in all its independent rational loneliness, has a free will and the ability to reason about and make good moral choices independent of external conditions. But according to MacIntyre, it doesn't function like that in that the independent, acting, moral individual gains the ability to act in a morally responsible way through upbringing interaction with others – "We become independent practical reasoners" (MacIntyre 1999:99).

Animals use pre-linguistic acknowledgement forms, and MacIntyre goes through examples from dolphin research (MacIntyre 1999: ch 3) supporting the idea that dolphins are able to categorise, conclude and generalise and also to communicate and cooperate in e.g. hunting situations. MacIntyre points out that animals cannot be strictly rational, so that they cannot *evaluate* and *reflect* on the reasons for action they might have, but they are rational in the sense that they can *have* and *act* on reasons for action. Also Stjernfelt (Stjernfelt 2001) points out that animals are rational of necessity, because, like us, they are forced to be so. Following that, it is discussed what makes the transition from animal rationality to decidedly making use of an extensive system of symbols possible? Here Stjernfelt calls man *the abstract animal* (Stjernfelt 2001: 98) referring to our ability to make signs explicit, use them and further examine them, improve them or make new combinations and arguments with them. Thus the faculty of abstraction gives us the possibility to construct discourses, myths, religion, science, but likewise it also makes it possible to make mistakes, to lie and to cheat.

That we resemble animals consists in the fact that we aim at basic goods which gives us an immediate purpose in our behaviour. In early childhood, we experience dependence on care persons seeing to our basic goods. Later, through increasing language abilities, we master something that animals don‘t as we can reflect on abstract alternatives. As mentioned, we can operate with possible future worlds just as, in the assessment of our needs and desires, we can reflect on the justification of immediate desires before we make the final decision as to whether satisfaction of a given need is a good. Finally we can evaluate reasons for action and events.

In our mastering language and thus abstraction operations we find the possibility to invoke freedom even though we are subject to the force of our bodies. Here we find the potential enabling us to reflect morally, and this ability is not developed in isolation but through practical experience in which we learn intellection and moral virtues in an understanding of the surrounding world via the social relations and dependencies we are part of through various stages of life. In that context, childhood plays a decisive part with MacIntyre. Here we get our first basic experiences of dependency, just as we become acquainted with vulnerability and care. It is also through childhood that manipulation, missing object formation and neglect can destroy the basis for our learning basic virtues through learning the kind of independent practical reasoning bringing us well-being.

We become *independent practical reasoners* and practise practical sense through life experience and through the learning we get from care persons in our upbringing, and thus we become able to make our values and ideas explicit socially. Through rational critical reflection we can thus cement or reject values, ideas and prejudices by examining them and ask for their justification. However, it does not make sense have a value-relative attitude and put question marks against everything. E.g. we cannot be critical that we have to help if we arrive first at a car accident. Unless my character is spoiled, the generous virtues I have learned through my upbringing will mean that I doubtlessly meet the need of those suffering (MacIntyre 1999:158-59).

MacIntyre‘s precision of the body‘s role in ethics does not limit the importance of the concept of free will but contrariwise enables us to qualify the concept by means of MacIntyre‘s concept of the independent practically reasoning individual. Instead of linking free will to the idea of the independent, self-sufficient, rational individual, free will is anchored in our sociality. Sociality in which, from the very beginning, our bodily experience reminds us of our vulnerability and dependence on others. Here we find the basic foundation for learning the moral and intellectual virtues necessary for our well-being and our aim for the good life.

“When I speak of learning what our common good is, I am, as previously, referring to how we acquire practical knowledge of that good, not the mastery of some set of theoretical formulas, but the acquisition of a directness towards that good embodied in our everyday practice.” (MacIntyre 1999:135-6)

Our awareness of the vulnerability characterising man as a biological being reminds us of our basic dependence of our fellow men – in childhood, in illness and in old age. In that context, MacIntyre characterises virtue about just generosity meaning that, in fairness, I am generous towards others who are dependent on me because, in return, I can count on their generosity when I am dependent on them. If we follow MacIntyre‘s interpretation of vulnerability‘s importance to ethics, it is not difficult to imagine that the basic conditions of cyborg ethics will be radically different as vulnerability does not characterise cyborgs. While I may have speculative ideas about the contents of cyborg ethics, I can at least explain the importance of vulnerability in man‘s ethics.

My observations can form the basis of discussing how far we should go in relation to development of the technology-optimised human being. Here, one can either argue that we should exploit technology‘s possibilities optimally and transform well human beings into super human beings or cyborgs. The opposite argument is that we should on use technology to make sick people well acknowledging that it is difficult to draw the line as to when the result will be decided technology-optimization of man‘s abilities. Common for these arguments is that, to relate to the radically different, we have to reflect on it what it means to be a human being ethically. Here, with MacIntyre, it can be argued that our very vulnerability and dependency of the community are of essential importance to ethics.

4. Cohesion and democracy

With the technology-optimised human being in the form soon to be realised, it can be imagined that cohesion in society will be threatened. In the wake of technological optimizing possibilities as mentioned above, a technological upper class might develop with the financial freedom freely to choose between attractive qualities (Fukuyama 2003). Thus one could imagine that I could afford technological improvements making me especially attractive on the labour market, and thus I increased my financial resources as well as my social and power positions in society. That would be a double defeat for the weak who are not only overtaken financially, but at the same time they have to passively watch from the side line while I optimise my self-expression potentials in all areas which again enables me to keep my resource advantage.

In the question of technology optimization and consequences for cohesion in society, it is relevant to introduce the philosopher John Rawls‘ (1921 – 2002) theory about justice. In *A Theory of Justice* (Rawls 1999), Rawls introduces a deontological contract theory. Here explains the possibilities of a democratic society‘s organization according to socially just principles which can rationally accepted by human beings wanting benefits for own interests. Point of departure is that one should equally distribute social, primary goods – such as right of education, liberty, possibility of income and property – and an unequal distribution can only be accepted if it benefits the lowest social layers in society. In short, Rawls‘ theory of justice can be considered a defence of the modern welfare state.

Rawls presents a model for testing the justice of social actions. We are to imagine a group of persons gathering to jointly reach agreement on a given society‘s organization. It‘s a society of which the group itself is to become members so the group must be considered to deep interest in creating a good society. Now Rawls prescribes that the discussion on the society‘s organization must be held under ―the veil of ignorance”. That means that the participants do not in advance know their own social status in the society in which they shall later participate. Thus each person does not know whether he becomes a wise, rich, poor, handicapped or artistically talented citizen. Under these circumstances, the principles agreed on by the group can be considered just to such an extent that they can form the basis of a social contract that society‘s citizens must dutifully obey.

This decision model of the organization of the just society can be established with a group consisting of average individuals and moderately technology-optimised individuals in constellations of A and B teams respectively. With this group composition, we can still seek consensus and preserve the idea that a just organization of society can be achieve via dialogue under ―the veil of ignorance”. We have a different situation if the technology-optimised human being in a radicalised form is changed into *homo machinus* or lets its consciousness melt with other forms of consciousness. Here, the starting point of communication through recognisability and empathy will be drastically weakened, perhaps even non-existent. What are we to do with the veil of ignorance if we can‘t even know who or what each of us is?

Rawls also argues that the social contract be made in conformity with basic justice principles the most important of which is the principle of freedom, i.e. Rawls‘ political freedom of speech and freedom of assembly together with personal right of property. Principles of freedom are equal to all. This corresponds to the UN‘s world declaration on human rights from 1948. *The principle of fairness* acknowledges that human beings with the same born abilities should have the same opportunities in society as to positions in society. Thus social barriers must not hinder people‘s opportunities of self-expression.

The difference principle opens the possibility that social and financial inequalities are tolerable if it is to most benefit for the least privileged in society. Thus we can assume that a favourable investment climate creates jobs in a country and therefore creates tax revenues to be redistributed to the lowest income groups. In that way, the lowest income groups gain most. According to Rawls, we have a political personal freedom, but it would be unjust if we get a better societal position via the combination of financial distortion and technology-optimizing measures enabling some to pay for upgradings whereas others don't have access to such possibilities.

5. Conclusion

With Rawls as point of departure, it is plausible to assume that society's cohesion will come under pressure pari passu with technology optimization and upgrading of our physical and mental performances. When mental upgrading becomes possible, we must relate to it whether we want a society in which financial capacity decides which existential advantages can be bought. Here, one can of course argue that today financial standing and e.g. educational possibilities go hand in hand, but nevertheless it will be easier to break social heritage in our present society than in a society in intellectual abilities can be directly bought. Thus it is imaginable that bio-technological developments will contain possibilities for some whereas they will be a threat to others.

Many are sceptical towards the ideas of cyborgs, but the future is already now being invented, and worldwide there are heavy investments in cyborg-related research. With this research, we increasingly place ourselves outsides nature's rules, and we cannot free ourselves from responsibility by referring to the fact that the ethical discussion will always stagger helplessly behind technological developments.

The technology-optimised human being and *homo machinus* shows the continuity between the sick human being who is made well and the well human being made the perfect, immortal super human being. Technology does not represent a nature-given life condition, but it is human-made. Therefore we are obliged to show character and reflect ethically on the interplay between man and technology.

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SUBSUMPTION ETHICS REDUX: AS ICT MOVES FORWARDS, BACKWARDS AND SIDEWAYS

David H. Gleason

Abstract

—Subsumption Ethics" was first published 11 years ago and much has changed since then. Web 2.0 and 3.0 functionality is now mainstream, and many users share their most personal information with impunity, from, —bored at home, going to do laundry," to —know I shouldn't have slept with…." This rapid, and often vapid exchange of information calls for a new look at the ethics of current —subsumed objects," and whether the basic principles of Subsumption Ethics are still applicable.

Many positive steps forward have been made in the last decade, but backwards and sideways movement has also occurred.

After a brief review of the concept of Subsumption Ethics (SE), this paper will provide a series of subsumption in current ICT examples, covering such issues as social networking (Web 2.0); virtual machines, on-line applications and software as a service (Web 3.0); and Internet time.

The paper shows the benefits of applying SE principles to these examples. Finally, it presents a series of specific recommendations to help improve the ethical outcomes of technology development.

1. Introduction

*"*Subsumption Ethics*"* was first published at the Computer Ethics Philosophical Enquiry conference in 1998, and much has changed in information and communications technologies since then. In particular, the speed of communication has increased while the friction on information transfer has decreased. Social networking (Web 2.0) and —software as a service" (Web 3.0) functionality is now mainstream, and many users share their most personal information with impunity, from, —bored at home, going to do laundry," to —know I shouldn't have slept with…." This rapid, and often vapid exchange of information calls for a new look at the ethics of currently —subsumed objects," and whether the basic principles of Subsumption Ethics are still applicable.

Many positive steps forward have been made in the last decade--for example, on-line data integration has improved dramatically; grassroots organizing is facilitating the democratic process; many more people have access to good medical information, etc. However, not all developments have been positive; some backward movements include quiet, behind-closed-door compromises with high-stakes information like electronic health records, screen-based voting systems unencumbered by audit trails and high-risk electronic investment instruments. Some sideways changes include movement from local data centres to on-line servers; massive, inexpensive, redundant storage; and integration of handheld devices into the Web.

This paper opens with a restatement of the concept of Subsumption Ethics (SE). The paper will provide a series of examples of subsumption: the Citigroup Center building debacle; a bridge collapse; the space shuttle disasters; the Therac 25 case; and some current ICT issues such as Web 2.0; virtual machines, on-line applications and software as a service (Web 3.0); and Internet time. The paper will illustrate the benefits of applying SE principles to ICT projects. Finally, it will present a series of specific recommendations to help improve the ethical outcomes of ICT activities.

2. Subsumption Ethics

As the Information Age progresses, ICT design business decisions have more impact than ever. Business systems flawlessly execute bad decisions indefinitely, because those decisions are codified into software programs. Minor judgments of line managers, programmers, consultants and salespeople can be amplified by technology to monster proportions.

Before computers, bad decisions would quickly become obvious in practice. Workers would not knowingly stamp a partial date on documents, yet the partial year field that gave rise to the Y2K

computer bug was based on a subsumed decision to save storage space (2 digits per date) - a particularly bad decision in hindsight.

"Subsumption ethics" is the process by which decisions become incorporated into the operation of information and communications technology (ICT) systems, and subsequently forgotten. ICT systems, by nature, repeat operations over and over. If those operations have unethical impacts, the system will nevertheless continue to execute them anyway. Unlike a human operator, there is no point in the cycle where the machine pauses to ask, "Should I do this?"

Subsumption in general is the process of building larger components from smaller ones. In ICT systems, small components, like the code that reads data from disk drives, are developed and tested, and once they are working reliably they are subsumed into larger systems that present file lists. Thus we stand on the shoulders of giants.

2.1 Subsumed objects have a high "invisibility factor."

Larger systems are subsumed into still larger systems. Once components, subsystems and applications are operating, the subsumed processes become invisible and unavailable to the user, what Dartmouth Professor James Moor calls the "invisibility factor" – components (and the human impacts of their operation) are forgotten, requiring no further attention unless they fail. These components are called "Subsumed Objects." Technological systems are built from such objects until they are enormous.

Subsumed objects are invisible. Code is hidden. The operation of the code results in a user interface that is a by-product of the code's operation. The actual software is opaque to the end user and, except in the case of open source code, proprietary to and kept secret by its developer.

Computer processors still run on "machine language" - a series of 0's and 1's that fly through the system. The actual program that a computer runs looks like this: "0100010101100111…" ad infinitum. If Microsoft Office takes 120 Megabytes of storage, then, all told, the program and its supporting files is a string of 960 million 0's and 1's. (Actually, the 0's and 1's are themselves an abstraction, representing the off-on state of electronic gates.)

We use higher level languages such as C# to write the source code that gets translated into machine language. But once the software has been compiled it is virtually impossible to go back and understand it. Picking the subsumed objects out of machine language is like finding a thousand needles in a million haystacks: nearly impossible. Even when source code is available and documented, reviewers don't usually have access to the intent or design of the software. Those decisions, too, are subsumed and largely unavailable.

2.2 Organizational Policy Drives IT Development

Accumulated design and implementation decisions dictate the structure and operation of IT systems. The decisions become codified into programming code and information content. These segments of code and content are called "subsumed objects" (SOs). When they are invisible, as in proprietary, compiled code, subsumed objects cannot be identified retroactively.

As Aristotle pointed out, virtuous decisions accumulate from informed balance between many factors – the "golden mean." Developers and users must actively seek understanding of many issues, on continua from stakeholder analysis to technical limitations. In order to apply the right knowledge to the right problem with ethical results, an informed, deliberate decision-making methodology is required.

Furthermore, ethical decisions need to be made as situations arise and a simple, universal statement of ethics is not possible. The ethics of each situation must be worked out according to specific circumstances, in relation to guiding principles.

Decisions are cumulative. Aristotle discussed the need to make virtuous decisions in order to develop strong character, and in many ways, these are the same issues. If we desire our systems to have integrity, reliability, and maintainability, then we must make good decisions about how to build them. This requires a new orientation on the part of all involved in the project, from executive sponsors to line programmers to implementers. This is far from simple.

There is a close relationship between computer systems and organizational policy. Because of subsumption ethics, such policies become codified (subsumed) into systems. Here's how it works:

Step	Activity
1.	IT enables a function that was not possible before
2.	A policy decision is made to proceed with the practice
3.	Engineers and managers seek ways to implement the policy efficiently
4.	An automated process is set up that implements the policy
5.	The process runs without user intervention. At this point, the policy has become a subsumed object, and it would take work to discontinue the practice. Once the original decision-makers, systems designers and developers move on to other projects, the subsumed process is largely forgotten as a matter of course. The process will be reviewed again only if problems or complaints arise.
6.	The object gets subsumed into other practices.
7.	The process repeats.

Table 1: The Subsumption of Policy

2.3 Subsumed objects have determinate moral value

The moral value of any object is related to its impact. When an object has a negative impact, such as tires that fail on SUVs, we call the manufacturer's morals into question. Selling faulty tires is an immoral act, because the potential consequences are deadly. The Ford Pinto of the 1970s had a gas tank that could explode in rear-end collisions. This tank was a subsumed object of negative moral value, because the consequences of its design led to the death in certain situations. Similarly, Fiat was forced to recall some of its cars in the early 1980s because they rusted so badly that the suspension systems collapsed during high-speed travel.

Most contemporary fuel injection systems are under software control. Aircraft autopilot systems, intrusion detection systems and microwave ovens are all run by computers. Software is programmed to do things in the world based on subsumed code. All these actions must be programmed ahead of time, and they may have negative moral consequences. It thus becomes incumbent on the system designers and developers to think through the impact of their programming ahead of time, because by the time the software is operating, its moral value has already been determined. The computer does not pause to reflect on the impact of what it does - it simply follows instructions.

2.4 Subsumptive complexity increases over time

As systems are developed, components become subsumed more and more deeply. There were still components of MS-DOS in Windows 98. Windows 7 has something like 50 million lines of code in it. No one knows what all those lines do. Some of them were written twenty years ago. They have been subsumed into an extremely complex system.

2.5 Four principles of Subsumption Ethics

1. Information systems subsume design, policy and implementation decisions in programming code and content. Code segments and content become "subsumed objects." While it is demonstrable that systems are built from subsumed components, it is less easy to show exactly how decisions are subsumed. This axiom posits that the decisions themselves, including many subtle factors, are incorporated into systems operation.
2. Subsumed objects have determinate moral value. Anecdotally, we can see the moral value of subsumed objects. A windowing system that can only display certain colours, thereby excluding users with certain visual disabilities, has a negative moral value for those users.
3. Subsumed objects have a high "invisibility factor." Subsumed objects are invisible to most users. It is not possible, for example, to know all the calculations that mortgage eligibility software might use without seeing the source code. Such software could systematically discriminate without a user's knowledge.
4. Subsumptive complexity increases over time. As systems are developed, components become subsumed more and more deeply.

3. Examples

Citigroup Center: Completed in 1977, the Citigroup Center in New York City was designed to rest on centred legs without support under its corners, so as to keep an independent St. Peter's Lutheran Church underneath its 59 stories. This unconventional design required shifting the weight of the building from its corners toward the centre of each side, which was done using diagonal struts (see photo below). The original design called for welds at each intersection, but during the building process, bolts were used instead.

Prompted by a Princeton University student, structural engineer William LeMessurier determined in 1978 that the bolt-style construction was not strong enough, and that his building could fall in a 70 mile-per-hour (113 km/h) wind, potentially killing thousands of people. Quickly, as hurricane season approached and in fear of inciting panic, a method was secretly developed to open up the finish work and weld steel plates over the 200 strut intersections. The welding was completed without incident, rendering the building safe.

The bolts were subsumed into the building, and the decision to use them was a violation of the engineers‘ ethical responsibility to recalculate the potential negative consequences of their subsumed objects.

No one would say subsumption ethics practices are easy. Indeed, the ethical implications of technical decisions are often impossible to predict. However, the simple question, ―could this building fall down” is basic and its equivalents should be central to all engineering: from bridges to air traffic control software and fuel injection systems in automobile engines: could this project or system cause irreparable harm?

The Tacoma Narrows Bridge: Although it seems hard to believe now, in the year the Brooklyn Bridge was finished (1876) a quarter of new bridges failed. The technology was new, and there were unforeseen stressors that have since come to be well-understood.

A powerful example of subsumed engineering failure, the Tacoma Narrows Bridge, nicknamed "Galloping Gertie," would sway in certain winds. On November 7 1940, as a 35-46 mph wind came down the narrows, the bridge began to oscillate to a harmonic frequency that no one had predicted would affect its frame. After hours of flexing, the steel failed, and the bridge fell into the sound below. (Elliott, 1940)

The Shuttle Disasters: In the *Challenger* and *Columbia* space shuttle disasters, once subsumed errors manifested, lives had already been lost. Subsumption is a one-way street. Once something goes terribly wrong with technology, it's too late to do anything about it. We can learn lessons and avoid repeating mistakes. But engineering failures, by nature, have been subsumed well before they manifest. The O-rings on the *Challenger* were designed and built years before they actually failed.

The Therac 25: Richard Spinello writes that the tab order of a data entry screen on the "Therac 25" radiotherapy machine was shown to be the cause of injury and death among patients in the late 1980s (Spinello, 1996). Amazingly, software-caused radiation overdose persists, as described in a Jan 1, 2010 New York Times article:

> ―As Scott Jerome-Parks lay dying, he clung to this wish: that his fatal radiation overdose — which left him deaf, struggling to see, unable to swallow, burned, with his teeth falling out, with ulcers in his mouth and throat, nauseated, in severe pain and finally unable to breathe — be studied and talked about publicly so that others might not have to live his nightmare….
>
> ―A New York City hospital treating him for tongue cancer had failed to detect a computer error that directed a linear accelerator to blast his brain stem and neck with errant beams of radiation. Not once, but on three consecutive days….

—(Technological) complexity has created new avenues for error — through software flaws, faulty programming, poor safety procedures or inadequate staffing and training." (Bogdanich, 2010)

Social Networking: Social networking (Web 2.0) has become a hotbed of connections between individuals from services like Myspace, Twitter, Facebook and LinkedIn which are massive databases of individuals and their relationships with each other. The sites enable users to post enormous quantities of data, from quick —tweets" to videos. This activity gives rise to subsumption without thinking – twittering about taking out the trash, but it can also be used for social problem-solving: —does anyone know a good dentist nearby?" These discussions, from the super-useful to the super-embarrassing, are recorded for all in perpetuity.

The advent of virtual machines, server management and portability has reduced some of the impact of subsumption in data centres. Virtual machines can be copied from one piece of hardware to another with all their subsumed objects intact. Servers, therefore, no longer need to be built from scratch when they are moved. Of course, this puts even more pressure on the engineer to do the configuration right the first time, since the systems will port those decisions to the next environment as they are moved.

On-line applications and software as a service (Web 3.0) put software" in the cloud" – available through the Internet without requiring local installation. Google apps, for example, is an equivalent of Microsoft Office that can be used from a browser. The software is run on servers, and data is stored in the cloud – available from any computer anywhere. Thus individual computers subsume far less software and data, the data is automatically backed up, and the need for huge local storage decreases. The same applies to on-line e-mail services, as opposed to installing Microsoft Exchange in the data centre. However, there are some costs:

- Loss of privacy: for example, Google retains rights to access anything that is stored on its servers, and it uses cookies and user history extensively
- Automatic installation of affinity software (e.g. installing the Yahoo toolbar during a routine Symantec update).
- Lost productivity when connectivity doesn‘t work correctly

The speed of subsumption in Internet-time means instant replication (subsumption) of stolen credit card numbers, immediate (and endless) propagation of the news of Michael Jackson‘s death, huge and inflaming publicity of a car bomb in Iraq, and accumulation of news throughout its 24-hour global cycle.

And then there are a thousand examples of subsumption in our everyday lives. We put on clothes in a certain order; we first turn left out of the driveway and then right at the stoplight to get to work, and so on. These examples may seem trivial, but only because they are so familiar and automatic. We constantly inject judgment into even small activities: if someone walks into the road, we react accordingly. Such behaviour is difficult for computer systems, because each corrective response would have to be programmed to make the system fully resilient. In practice, computer systems are far more constrained.

In a software program, every bit of code must be in the right place or the system will fail. Even if everything is technically correct, the system still makes no judgments - it follows instructions based on its developers' judgments. That's why good decisions are so critical during systems development: "If a person (or a cat) is in the way, stop even though the light is green."

4. Benefits of Applying SE Principles to ICT projects

From an ethical perspective the benefits of thinking through potential impacts are pretty well established. However, there are compelling business reasons to apply the framework as well. These include:

- Saving money and time in the long-run
- Using open source software to save money and know how the system works
- Happy customers feeling safe and secure in the knowledge that their best interests are being addressed
- Avoiding litigation based on unforeseen consequential damages
- Quality and performance improvements

5. Recommendations

Managing in a subsumed environment may seem a daunting task. How can one possibly predict all the things that can go wrong with a system? So much systems behaviour is beyond the control of even experienced engineers, such as security vulnerabilities inherent in operating systems themselves, not to mention human behaviours.

IT projects are loaded with pitfalls. Individuals rightly perceive personal and professional risk to taking responsibility for an IT endeavour. Indeed, there may be scant personal reward for a successful project, and enormous loss for a failure. Success in IT is often invisible. Failure can be spectacular.

5.1 Business Strategies

There are enormous opportunities available for successful IT projects. From increasing sales, to saving on costs, to enabling new business opportunities, IT projects need to move forward. The solution, it turns out, has to do with the quality of management decisions relative to technology. And those decisions turn out to be the traditional ones: Focus on management, not technology. Be clear about, and limit your goals. Focus on stakeholders, not computers. Evaluate the impact that systems are likely to have. Apply rigorous project management techniques.

The IT industry is replete with literature on how to succeed. Many projects use a long checklist of issues to be addressed. The industry is filled with ideas for how to succeed. But when the material is boiled down, the wisdom that distils out is very simple: make good decisions about everything you are codifying, from the overall business strategy to the details of data entry.

Good decisions have some prerequisites. Project teams must have the know-how to properly execute a project:

- Project teams must have the know-how to properly execute a project.
- Management strategy and executive sponsorship must be clear and aligned.
- Project managers need authority to focus team activities.
- Informed decision-makers must be involved at appropriate points.
- Most importantly, all parties must have an underlying understanding that the outcome has more to do with people than with machines. In other words, technology can fail to serve human needs; technology is not an end unto itself.

5.2 Design decisions

Software design requires thousands of decisions. From the layout of screens and reports to the structure of databases, software incorporates the decisions of designers. The Macintosh and Windows operating systems have icons that are displayed in virtually every window on the screen. These window controls represent subsumed design decisions. The designers of commercial software assume that these controls will be ubiquitously available to the user. The controls, and the software behind them, are subsumed objects.

5.3 Policy decisions

Similarly, software codifies policy decisions. Once codified, these policies will be enforced by the system indefinitely. For example, credit card approval systems are essentially policing systems. When a cardholder makes a purchase, they check, among other things, the card's activation status, credit availability and recent activity. They have established routines to adjudicate problems - a myriad of subsumed objects.

5.4 Implementation decisions

As above, implementation decisions become subsumed objects. Once implementation is underway, change is difficult. For example, data conversion from one system to another is often very complex. New systems seldom have identical data structures to their predecessors. Data conversion becomes a subtle process of parsing and reorganizing information. An unreliable file server can be devastating to a company. A stable replacement server becomes a subsumed object. Thus implementation decisions are subsumed.

5.5 Content

Unlike code, content is visible to the user, and indeed is the user's stock and trade. Nevertheless, it is often difficult to change. In the data conversion example above, the content is incorrect, but has been subsumed. The industry term GIGO - Garbage In, Garbage Out - refers to the widespread problem of lousy data. There is a range of quality on the GIGO scale. Banks usually do a good job of keeping their account databases accurate. In the middle of the scale, marketing mailing lists are expected to have a certain number of inaccuracies. At the other extreme, most computerised personal address books are full of errors, inconsistencies and incomplete information.

These subsumed objects categories and the decisions that affect them can be summarised as follows:

	Programming Code Decisions	Content Decisions
Design	Platform selection; object and class identification; user interface design; programming conventions; systems integration	Database structure; input and output; quality control; error checking; validation; reporting; data acquisition.
Policy	Business rules; data controls; audit trails; validation; checks and balances; user hierarchy/authorizations	Acceptable use; data integrity/quality assurance; user monitoring policies; management reporting
Implementation	Systems documentation; platform installation; system configuration; security; systems maintenance	User documentation; Data conversion; training; user support

Table 2: Subsumption of Design, Policy and Implementation

6. Conclusion

IT projects should focus on the human effects that the systems may have in order to avoid faulty or deadly subsumed objects. People and groups with an interest in how the system behaves are the "stakeholders" in an IT project. Ideally, the impact of subsumed objects in software development should be assessed for each stakeholder.

This argument poses an imperative for computer and information ethicists to support and actively participate in current systems development activities, from on-line user groups to software improvement opportunities. It is necessary to publicly critique errors in systems and judgment, foster discussion on abuses of ICT power by governments, corporations and individuals, from invasion of privacy to anti-trust activity to malicious hacking.

Ethicists should teach the concept of Subsumption Ethics at the high school, college and graduate levels; help professionals to understand how their decisions become embedded into systems. Consider ways to demonstrate the cost-benefit of thinking ahead to systems developers.

The best time to evaluate impacts is before development gets underway. An ethical "pre-audit" can identify potential pitfalls long before they manifest. Given subsumption ethics, this kind of approach becomes the only way that injurious or deadly systems can be avoided.

The Software Development Impact Statement™ (SoDIS) developed by Simon Rogerson and Don Gotterbarn helps take into account the impact that subsumed objects will have on stakeholders. SoDIS applies a set of ethical questions to a project's "work breakdown structure" (an outline of project tasks and deliverables) for user-defined stakeholders. By exploring the impact of each task on relevant stakeholders, SoDIS seeks maximise benefit for all interested parties.

"Should the system do this?" It depends on what the outcome is likely to be: If the system will enable misrepresentation of corporate financial accounting, probably not; if the system will save lives, probably so. This is a judgment call, and an ethical issue. And we need to be careful, because you can't unscramble an egg.

All this demands a great deal of ethicists, who must embrace web 2.0 functionality, including blogs, social networking sites, grass-roots organizing systems and interactive, multimedia publication in order to move the industry forwards and not backwards in its service to humanity.

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CITIZEN SCHOLAR? IN SEARCH OF A TRUE DEMOCRACY OF KNOWLEDGE IN THE ICT-BASED GLOBAL SOCIETY

Krystyna Górniak-Kocikowska

Abstract

This paper addresses some problems relating to knowledge, especially the tensions which are the result of the way knowledge is categorised in the global society in the era of ICT. These problems are juxtaposed with the idea of democracy. The relationship between *academic knowledge* and *democracy* in the ICT-driven global society is especially important. While the political democracy developed progressively within the last two hundred, the democratization of (academic) knowledge-related processes seems significantly slower by comparison. In this context, the question is asked whether the possible emergence of a ‗citizen scholar' can help the process of democratization of knowledge.

1. Introduction

The purpose of this paper is to address some problems relating to production (creation), storage (preservation) and distribution (dissemination) of knowledge in the global society in the era of Information and Communication Technologies (ICT) juxtaposed with the idea of democracy. After a brief clarification of the terms ‗knowledge' and ‗democracy,' the relationship between knowledge and democracy in the ICT-driven global society is given special attention. In this context, the phenomena of ‗citizen journalist' and ‗citizen scholar' are introduced, after which the possibility of ‗citizen scholars' as agents of *knowledge democracy* is investigated.

2. Knowledge

The definition of *knowledge* accepted here is that it is a „justified and true belief." (Quinton, 1972) In order to comply with the requirements regarding the length of texts submitted for publication in the Proceedings of the ETHICOMP 2010, I restrict, with some minor exceptions, my discussion of knowledge to the area commonly referred to as ‗academic' or ‗formal' knowledge.

Today, the concept of academic knowledge generally accepted worldwide is basically following the one which has been crafted in modern (post-Scientific Revolution) European and American institutions of production, storage and distribution of knowledge; i.e., mainly institutions of higher education and research institutions. Consequently, academic knowledge worldwide reflects in general the modern Western approach to knowledge, irrespective of where in the world it has been created.

Knowledge, including academic (formal) knowledge is not restricted to *scientific* knowledge; certainly not when the term ‗science' is understood in its Anglo-American meaning as ‗natural science.' In many academic communities worldwide the concept of ‗science' or rather ‗sciences' follows the German model of ‗Wissenschaft' divided into different branches such as ‗Naturwissenschaft,' ‗Sozialwissenschaft,' ‗Kulturwissenschaft,' ‗Geschichtswissenschaft,' etc., and their subdivisions. Each one is distinguished from the others not only by its subject matter but also by its methodology. One should be aware of these terminological issues because of the existing tendency, which I mentioned earlier, to equate all academic knowledge with scientific knowledge (and scientific knowledge with natural sciences) and consequently to *deny* ‗non-scientific' knowledge its academic legitimacy. I would like to draw the Reader's attention to this issue. In order to avoid unnecessary confusion caused by these terminological differences, I will not use the term ‗science' unless applied in its narrow, Anglo-American meaning; instead, I will use the term ‗academic knowledge.' The term ‗academic knowledge' suits the purpose of this paper by both bringing into focus the knowledge produced in academia while ignoring all other kinds of knowledge; and by restricting the discussion of academic activities to those related to knowledge alone.

Natural sciences constitute just one type of knowledge; but they enjoy the greatest prestige and power of all knowledge in today's world. (More on this subject see: Górniak-Kocikowska, 2008.) This type of knowledge is generated mostly by what Howard Gardner calls the logical-mathematical

intelligence in his typology of human intelligences (see Gardner, 1993 and 1999); and its methodology is based on empirical research and quantitative assessment methods. In general, the ‗non-scientific' branches of knowledge, which could be linked to other than logical-mathematical types of intelligence, are treated by the academia as less important, less valuable, and sometimes as not having any value at all. Some of them, e.g., knowledge produced by linguistic intelligence, are included in the concept of academic knowledge. Others, e.g., knowledge generated by interpersonal intelligence, are not. Neither is the so-called ‗common sense' knowledge. Not only are the different types of knowledge not treated as equal (equally valuable); sometimes, they are even categorised in a strict hierarchical manner. It could happen that „a justified and true belief" (knowledge) is disqualified *as* knowledge, in particular as academic knowledge, for not following an *accepted methodology* even though it fits the definition of knowledge as a *justified* and *true* belief. The field of medicine, among others, delivers many such instances. (Goralski & Górniak-Kocikowska, 2008)

This approach to knowledge is not unique to academia. I would venture a claim that the greater the community's respect for knowledge *institutions* in their post-Scientific Revolution form, the more such a community would be willing to accept the hegemony of natural sciences and the superiority of logical-mathematical intelligence over other types of intelligence.

The approach to knowledge presented above causes many tensions and problems in and out of academia. Among others, it raises concerns about discriminatory practices and creates a major hurdle for implementing the principle of democracy in academia.

3. Democracy

In this essay, *democracy* is understood mainly in its most basic form, i.e., as „government by the people" and „a state of society characterised by formal equality of rights and privileges." (Webster's Dictionary, 1996) I adopt the position that democracy is the best (especially from an ethical point of view) of all forms of organization of human societies known to humankind thus far. Modern democracy, both as a theoretical concept and in its practical function, progressed since the end of the 18th Century in the area of politics and in many other areas of public life; at first in the West and subsequently worldwide. The modern concept of democracy developed in close relation with the Scientific Revolution which took place in Europe in the 16th and 17th centuries to be followed in the 18th and 19th centuries by the Industrial Revolution.

Usually, the idea of democracy is discussed in relation to political institutions and processes. This type of democracy will be hereafter referred to as *political democracy*. However, the concept of democracy can apply to processes and structures which typify *human interactions* in any formal or informal group. A business corporation, a religious group, a music band, or a family can operate on democratic principles, i.e., can be democratic – or not. The concept of democracy could also be used in a purely theoretical way. For instance, it can be used as a benchmark in the process of *valuation* (including ethical valuation) of the aforementioned groups; it could also be used for the creation of theoretical constructs such as models of a future society, a utopian/distopian society, a non-human (animal, extra-terrestial) society, etc.

4. Knowledge democracy versus political democracy

The problem of democracy (or the lack of it) in the process of production, storage and distribution of academic knowledge plays a major role in this essay. I use the term *knowledge democracy* to denote this issue. *Political democracy* is treated here as a point of reference to explore the subject of knowledge democracy.

With regard to *knowledge democracy* there are three main points to be considered.

- The organization of knowledge institutions. The problem of democracy applies here predominantly to the relations between scholars involved in the functioning of these institutions. Regretfully, due to the space constraints, I must restrict my attention exclusively to scholars and to ignore all other individuals active in a variety of ways in knowledge institutions.
- The relation between scholars representing different knowledge institutions (for instance, different universities).

- Knowledge disciplines and subdisciplines; or rather the relation between scholars representing various disciplines and subdisciplines.

All three are interconnected and affect each other.

The human relations generated by the formal structure of an institution are rather obvious and ‗easy to read' (there can be little doubt that knowledge institutions as a rule do *not* presently have a democratic structure). However, human relations, most notably the ones pertaining to power and influence, are often ‗veiled' in the two other types. This applies especially to the third type, i.e., the relation between scholars representing various knowledge disciplines. Human actions resulting from the place of a particular discipline on the ‗knowledge map' are one of the main objects of interest in this paper.

5. Democracy and ICT

The spread of democracy around the world accelerated in recent decades due to, among other things, the fast growing application of advanced ICT, which serve as news-, information-, and opinion-sharing devices. Today, ICT are used by ordinary people to share information about events they witness or participate in as well as for the purpose of voicing their own views, thoughts, opinions and feelings. Last but not least, ICT are also used to issue calls for action in support of or against something, and thus help increase citizen activism. The newly coined term ‗citizen journalism' which is already quite widely used in everyday language, captures this phenomenon very well. (Citizen journalism is also known by other names, for example, 'public journalism,' ‗participatory journalism,' ‗democratic journalism' or even ‗street journalism.' For more, see e.g., Wikipedia on ‗citizen journalism.')

5.1 Citizen journalist

Some of the most spectacular examples of the significance of actions undertaken by citizen journalists can be found, for instance, in Barack Obama's 2008 election campaign. This campaign was generally regarded as a case of ‗democracy at work' – mainly because of the immense role ICT played in the successful grass-roots movement initiated by citizens supporting Barack Obama during his bid for the Presidency of the United States. ICT also served as a very efficient medium in a two-way communication between the Candidate and his electorate; a practice President Obama promised to continue.

The ‗Tea party' movement (Tea Party Movement) in the USA, which is generally an anti-Obama movement (see, e.g., ccruiserboyy, 2010), relies on ICT in a similar way. This is a relatively very new movement; it goes back – roughly speaking – to the spring of 2009 when ‗Tea parties' were taking place all over the United States to protest taxes.

And then there was the devastating earthquake in Haiti on January 12, 2010. Within hours, the social networking sites, Facebook, Skype, Twitter and others became a global forum for information exchange about the losses and about help initiatives.

These phenomena, whether large-scale political actions, initiatives of local importance, or matters of private concern, differ from the way the institutions, which are part of the ‗establishment,' utilise ICT. The main difference is twofold. Firstly, the purpose of using ICT by ‗citizen journalists' or individuals involved with various grassroots and/or networking initiatives is to circumvent the ‗official' institutions and their channels of communication. Secondly, citizen journalism changes the dynamics of journalistic practice from a one-way direction of the flow of information to a multi-directional, multi-layered communication. In my view, the most important aspect of this phenomenon is the activation and transformation which, in the words of Jay Rosen, „the people formerly known as audience" (Rosen, 2006) undergo while changing into ‗multidimensional' partakers not only in the news-spreading process but also in civic activities and movements which sometimes attain global importance.

What is noteworthy here is that this happens because ‗citizen journalists' treat democracy as a given. Moreover, they treat democracy seriously as a right-giving foundation for their actions aimed at shaping *their* environment and *their* lives in accord with *their* worldview and *their* value system. They also take as a given their right to freedom of thought and freedom of speech. In this sense, the ‗citizen journalist' can be regarded as the fulfilment of the 18th century's dreams of democracy when

democracy was perceived mostly as the meeting of minds in a debate about bettering humankind. Yet, the technology of the 18th century made such a debate possible only in relatively small groups. (Of course, there were several other reasons for it, besides technology.) On the other hand, the ICT of today set no such limits, and they provide the opportunity for a truly global exchange of news, views and ideas.

5.2 Citizen scholar?

The progress of knowledge democracy is recently slower than the progress of political democracy, despite the very similar beginnings of both, political democracy and the modern ‗knowledge institutions' (where one would expect the knowledge democracy to flourish) going back to the time of Scientific Revolution; and despite the attempts at democratization and greater inclusiveness of university structures and curriculums in the 1960s followed by the emergence of ‗post-modern' theories of knowledge. If anything, the democratic process in academia is subsiding. This is partly due to the growing ‗corporatization' of knowledge institutions and profit-oriented knowledge economy. (I wrote more on this subject in the soon-to-be-published essay *Knowledge Management and Democracy: a critical review of some moral issues and social dilemmas*.) In this situation, would ‗citizen scholars,' aided by the latest ICT, strengthen the knowledge democracy the way ‗citizen journalists' did it for political democracy?

I am aware that the term ‗citizen scholar' can be misleading for some Readers who know meanings of this term other than the one used in this essay. A fleeting Google search suffices to reveal a plethora of organizations, scholarships, awards, programmes and the like – all of them containing the term ‗citizen scholar' in their names. Usually, this term denotes a combination of scholarship and ‗good citizenship.' Generally, I do not have any objections against these denotations. However, my motivation for choosing the term ‗citizen scholar' to use in this text was simply the desire for drawing an analogy to the phenomenon of ‗citizen journalist.' For this reason, this choice of words seemed right. I want to make clear that I do not identify the term ‗citizen scholar' with political activism or political involvement of scholars as is quite frequently done (see, e.g., Brand, 2004). That said, it could happen that, for instance, a political scientist presents his/her research to the world as a private person' (i.e., without any involvement of *knowledge institutions*), using ICT to do so. Chances are that such a publication might have the characteristics of political activism. In that case, the scholar in question could be described as a ‗citizen scholar' in the sense applied by me *as well as* in the abovementioned more popular meaning of this term.

I should emphasise that (in this paper) I do not consider the ideas promoted by ‗citizen scholars' either ‗better' or ‗worse' as intellectual products in comparison to those generated within knowledge institutions. This is not the issue here. The issue is democracy, or lack of it, in matters of the right to share one's views with fellow humans.

6. Who wants to be a ‗citizen scholar?'

Just like the modern idea of democracy, so too the modern structure and organization of institutions in which the processes of production, storage, and distribution of knowledge take place are the offspring of the Scientific Revolution which started in Europe in the 16th Century. In general, these knowledge institutions were meant to fulfil their functions in support (or at least in acceptance) of the principles of democracy applied to political life. Many – for instance, some universities, research centres, etc. – were created with this particular mission in mind.

6.1 ‗Citizen scholars' – a step towards true knowledge democracy?

However, as mentioned earlier, while the political democracy developed progressively over time, especially within the last two hundred years or so, the democratization of (academic) knowledge-related processes seems significantly slower or even arrested by comparison. This might eventually lead to a fissure between knowledge institutions and other components of the public sphere and it can create some serious problems. I consider the emergence of ‗citizen scholars' to be one of the consequences of this fissure. Incidentally, this development is not unlike what happened during the time of the Scientific Revolution. Then, the new ideas were generally rejected by the academic establishment of the time, i.e., by the universities founded during the Middle Ages or soon thereafter.

As a rule, these establishments were set firmly on following the medieval tradition in the production, storage and distribution of knowledge. That conflict between old and new led, among others, to the emergence of an independent scholar (a ‗citizen scholar' of that time), and eventually, thanks mostly to the activities of these independent scholars, to the creation of knowledge-focused institutions and organizations outside of the university, typically known as *learned societies, academies, societies of letters*, etc. In a relatively short time, they gained a public support and trust strong enough to challenge successfully the medieval concept of knowledge. This in turn led to a deep crisis of universities out of which they eventually emerged significantly restructured and refocused. Moreover, the new institutions, which were the forums of ‗citizen scholars' of the time of Scientific Revolution now have became a well established component of the new system of production, storage and distribution of knowledge.

I argued elsewhere (Górniak-Kocikowska, 2001) that there is a great similarity between the ICT revolution (I called it the ‗computer revolution' at that time) and the ‗printing press revolution.' In the context of this essay, the most visible and most important aspect of this similarity is that both the printed press and ICT gave scholars a tool for by-passing the official structures of production, storage and distribution of knowledge in an attempt to share their thoughts with an interested audience. Both technologies gave scholars freedom from institutional control. In both cases the price of this freedom was hostility or at best disregard with which the knowledge institutions treated these scholars. Why would anyone be willing to pay such a price? Because the discontent with the existing situation made it worthwhile for many.

6.2 The points of discontent

At least two conditions have to be fulfilled for the emergence of a present-day ‗citizen scholar' (in the meaning of this term I proposed earlier) as a social force significant enough to shake the structure of the formal (official) process of production, storage and distribution of knowledge. One of them is the *availability* of modern ICT. The other is a *discontent* with the existing situation strong enough to motivate to action.

The first condition seems to be generally fulfilled nowadays, although not everywhere in the world to the same degree. The efficiency of the newest ICT has already been tested through *citizen journalist*s; in many cases, it surpasses the needs of ‗citizen scholars.'

As for the second condition, is there a discontent with knowledge institutions among individuals who consider themselves scholars? Yes, there are scholars who experience such discontent. Does it motivate some scholars to rebel against these institutions? Yes, it does; and one of the forms of rebellion is sharing one's (scholarly) thoughts with the world without a stamp of approval from the knowledge institution. Thus, one becomes a ‗citizen scholar.'

Is this discontent strong enough to *transform* the system of production, storage and distribution of knowledge presently in place? In other words, is it strong enough to revolutionise the knowledge system as it did during the Scientific Revolution? The time will show. Here, I would like only to indicate some of the problems (to be sure, this list could be much longer) which, if not solved to the satisfaction of the interested parties, might contribute to the growing of discontent and therefore also to the spreading of the *citizen scholar* phenomenon widely enough to merit serious attention.

There are two main kinds of individuals who might embrace the idea of ‗citizen scholar.' I will call them ‗the outsiders' and ‗the insiders' because of the position they occupy in relation to knowledge institutions.

‗The outsiders'

‗The outsiders' are not formal members of knowledge institutions (are not employed at these institutions). In a sense, ‗the outsiders' are in a similar position to that of the proponents of the new paradigm during the time of the Scientific Revolution. They are the ones considered by the academia as having a wrong worldview, following the wrong theory of knowledge, focusing on wrong issues, and/or applying wrong methods to the subject of their investigation. For that reason, their interest in having a wide forum to share their views and thoughts and to engage in a public debate outside of knowledge institutions is obvious.

Followers of certain religious movements qualify well as ‗the outsiders.' Let's look, for instance, at the website *American History King James Bible TM*, a project dating back to May 22, 2002, according to the website. It supports a particular religious perspective for engagement in public activities aimed mainly at the promotion of the claim that „The Constitution of The United States is Servant to The Bible." In 2004, a definition of ‗citizen scholar' was published on that website. According to it, „Within The United States, a Citizen Scholar is an Honorable Resident who has a firm personal relationship with God or who is striving to obtain one. (…) He most likely will never be published within the main stream media." Obviously, this definition differs significantly from the concept of ‗citizen scholar' I propose in this paper. I quoted it because it emphasises strongly not only the outsider's position of a ‗citizen scholar' but also a firm belief that a ‗citizen scholar' is someone who —most likely will never be published within the main stream media." This, by the way, is a conviction shared also by many ‗insiders' who for that particular reason resolve to use ICT in their attempts to argue their point of view.

‗The insiders'

‗The insiders' are those having a formal position (employment) within the structure of knowledge institutions but they are often considering themselves as outsiders there. They join the ranks of ‗citizen scholars' mostly out of frustration and discontent with the treatment their works receive within these institutions. What kind of treatment causes such discontent? There are many, but I choose just a couple to illustrate my point.

One of them is that the formal structure of knowledge institutions does not always permit space for the development of certain ideas (for pursuit of certain research topics). This is largely the result of the ‗hierarchical valuation' of knowledge discussed earlier in this essay. Because of that, scholars who do not follow the beaten path often encounter difficulties with gaining acceptance for their research and for their ideas. The long battle of feminist scholars for a formal acceptance of their study is a case in point. Even today, when Women Studies departments exist at many universities, this is still an area not fully appreciated by large segments of the academia. The creation of these departments might have even made it more difficult to do research in ‗traditional' disciplines from a feminist perspective. Moreover, theories created in the women studies quarters are rarely paid serious attention to – and they are not often picked up for further consideration – by scholars active in other academic departments. A good example here is the *ethics of care*, a decades old ethical theory which generally is still treated as a *feminist* ethical theory (by feminists and non-feminists alike), still being seen as merely an *alternative* to other ethical theories, not as a ‗mainstream' ethical theory *per se*.

In this context, I would like to mention also the case of an African-American Muslim scholar Amina Wadud's (Wadud, 2006) struggle to give Muslim Women's Studies an academic ‗legitimacy.' As she points out, she has to fight for the acceptance from the scholars in the Near-East Studies (Wadud calls it Orientalism), Religious Studies, in particular Islamic Studies, *and* Women Studies departments (not to mention the academia at large). As she points out, ―to use a Malcolm X metaphor, a Muslim woman academic is not an equal diner at the great dinner table of academic life." (Wadud, 2006, 67) To my knowledge, she is thus far determined to continue her struggle *within* the formal structures of knowledge institutions. Being Ivy League educated, and hence somewhat *more* of an ‗insider,' she might be better positioned than many others to actually succeed. However, cases like hers are the ones that make some scholars decide to use the informal route of a ‗citizen scholar' when they become sufficiently discouraged in pursuing the ‗official' path of scholarship.

Another problem are facing scholars who, albeit active within ‗solid,' well established disciplines, do not have enough ‗name recognition' (be it their own name or the name of their home institution) to have their work noticed by those who have the power to advance or to impair the development of some theories by simply giving them their stamp of approval, or not. I want to make it clear that I do not have in mind any malicious behaviour, any ill will or conflicts resulting from clash of personalities. What I have in mind is the reality of academic life with its demands to be current with the new research in one's area of professional interest. The many paradoxes intrinsic to this demand were discussed, among others, by Andrzej Kocikowski (Kocikowski, 2009). As he points out, one can only read so much, and there are only 24 hours in a day. Hence, one has to choose what to read. In making one's own ‗reading list by priority of importance' one would almost inevitably choose authors with well-known names, those who represent prestigious schools, or those one knows personally. Those

who do not fit the bill have little chance for their works to be read *even if these works are published in scholarly books and journals*. So, one remains absent from the collective awareness.

Someone might ask, whether a ‗citizen scholar' who publishes online has a greater chance at being noticed. The answer is: the *potential* audience is much bigger; and there are much greater chances that individuals outside of one's specialty, scholars and non-scholars alike, might read one's work. The trade-off is not having one's work acknowledged as a scholarly publication when published privately online. This, especially in the case of junior faculty, can be a career-breaker (and it is also a further reason for frustration and discontent).

As mentioned earlier, there are many more reasons for which the ‗citizen scholar' path is chosen. The issue is really a very complicated one. This subject deserves further, more thorough and complex, exploration for which there is no space here.

Among others, the question arises what will happen to academic knowledge should the ‗citizen scholar' phenomenon gain wide-spread respect and trust of society? Will the creators and custodians of academic knowledge follow the principles of democracy and start treating ‗citizen scholars' as ‗partners in thinking?' Or will the knowledge institutions protect their rules and the internal hierarchies of scholars even more rigidly than is the case now? Should the latter happen, will a ‗citizen scholar' bypass the structures of Academia like the creators of the Scientific Revolution bypassed medieval universities, and like ‗citizen journalist' bypasses the formal structures of the public discourse of news? If so, what new approach to knowledge will eventually emerge after this revolution?

7. Conclusion

Even though many may argue that the situation today is not as critical as it was during the time of the Scientific Revolution I beg to differ. It seems to me that some drastic changes in the system of production, storage and distribution of knowledge loom on the horizon and that they will be similar to a certain degree to the changes the system underwent during the time of the Scientific Revolution because the issues in question are of a similar nature. One of the most important among them is the issue of the opportunity to share one's views freely.

Considering the significance knowledge has for the flourishing of humankind, my position is that the democratization of ‗knowledge processes' is of great importance for the global society of the era of ICT. I subscribe to the view that ICT plays a crucial role in expediting the democratization of knowledge-related processes, actions and institutions. In this light, I would look at the possibility of the emergence of a ‗citizen scholar' as a meaningful – or maybe even revolutionary – factor in the ICT-prompted democratization of academic knowledge.

Today, ICT serves (or can serve, if it doesn't already) as an instrument of global democratization of all three above-mentioned knowledge related processes: production, storage, and distribution. It happens first and foremost because present-day ICT makes access to knowledge much easier and much faster than was possible in the past. Moreover, thanks to ICT a much larger number of individuals than in the past can today access all kinds of knowledge. After a long period of near stagnation, the process of democratization of knowledge starts taking place in a way similar to that which is noticeable in political democracy and in many other areas of public life. In particular, the progressing ICT-enhanced democratization of knowledge shares many similarities with the evolution of democracy which took place throughout the 20th Century and in the first decade of the 21st Century in politics and in many public institutions and structures worldwide. This development is conducive to the emergence of a ‗citizen scholar' on a global scale, similar to the ‗citizen journalist'.

The value of the activities of ‗citizen scholars' will be measured most likely by the quality of their contribution to the flourishing of the global society. The flourishing society, advocated by Terrell Bynum (Bynum, 2006), is certainly an ethical and social *ideal*, an object of yearning, not a reality yet. In the best-case scenario, its attainment will be helped by a competition of ideas and worldviews *aimed* at building the flourishing society. At the very least, the phenomenon of ‗citizen scholars' can enliven public debate on how the flourishing society could be achieved.

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AUTONOMOUS WEAPON'S ETHICAL DECISIONS; "I AM SORRY DAVE; I AM AFRAID I CAN'T DO THAT."

Don Gotterbarn

Abstract

We argue that there are numerous problems with the claim that it is possible to develop an Ethical Fully Autonomous Unmanned Ariel Vehicle. The justification for the claim is logically faulty and the claim is inconsistent with the nature of ethical decision making. To show this requires a look at the nature of these vehicles and the nature of practical ethical decision making.

1. Introduction

This paper is about ethical decision making in war. To stay focused on the nature of ethical decision making in war we accept as a working hypothesis the claim that:

To conduct war according to ethical principles is not only moral, it is sensible. Any advances in technology in the battlespace(sic) should therefore be measured against accepted ethical principles to ensure we are at least maintaining, if not raising, the current moral standards by deploying them. Lowering the standards, however great the capability the technology provided, would be self-defeating (Quintana 2010)."

Recent military requirements and advances in technology have facilitated the development of Unmanned Vehicles (UV) on land, sea, and air; including systems like the Predator RQ1 -- an Unmanned Aerial Vehicle (UAV) for surveillance and reconnaissance. Significant recent work has been done to increase the degree of autonomy, ability to operate with reduced human direction, of these UVs. Some have advocated that we can consistently develop and deploy fully autonomous UAVs and that these UAVs will make better ethical decisions than when they had less autonomy and increased human control. A brief look at existing UVs, how they are controlled and characteristics about the decision making process by their human controllers reveals both practical and technical problems with giving them a high level of autonomy. The assumed nature of ethical decision making in the design of Ethical Autonomous Unmanned Aerial Hunter Killer weapons is misguided and based on some significant misunderstandings about the nature of ethical decision making. A theory of ethical decision making will be suggested. This argument indicates that it is not possible to both have an autonomous ethical UAV and "conduct war according to ethical principle… [without] lowering the [ethical] standards..[which]… would be self-defeating (Quintana 2010)."

1.1 HAL 9000

Frequently in cinematic and written fiction machines take over and for a variety of reasons try to eliminate humanity. In 1968, Kubiak's movie "2001: A Space Odyssey" was disturbing, only in part because it was about a technology which at the time seemed impossible. The HAL 9000, a **H**euristically programmed **AL**gorithmic computer, controls the spaceship Discovery using mechanical, sensing, and information systems. HAL's polite line denying Dave's request to be let back into the Discovery seems malevolent. HAL autonomously made and was executing a decision to eliminate the Discovery crew and yet HAL was supposed to be rational. "Heuristic" and "Algorithmic" are two primary processes of intelligence.

Lacking a cinematic explanation of HAL's reasoning to this decision, there are many attempts to rationalise it. Dave and the crew wanted to stop HAL who had to defend itself to complete its assigned mission. Others say there was a contradiction between HAL's programmed mandate to process information accurately and without distortion and its order's to keep a secret from the crew. "HAL's decision to kill the crew allowed him to obey both his hardwired instructions to report data truthfully and in full, and his orders to keep the secret from the crew, as nobody remained from whom to keep it (HAL 9000)."

Allowing HAL to make a decision like this seemed unreasonable and seemed not to fit a logical machine. We think of a machine as something which aids in the performance of human's tasks rather than something which decides to destroy humans. Nevertheless outcomes like this even in the last century seemed an obvious consequence of completely passing on decision making power to a machine. It is no longer science fiction to ask if we should create machines which may later decide to harm us.

1.2 From human controlled machines to autonomy: from machines we run to being overrun

Nevertheless we now use computers to make life and death decisions in medicine and warfare. Even in our video games there is a subtle change in the direction of our thinking about the application of computers in life critical decisions. In video games, as in 2001 the process has been altered so that the computers not only implement life and death decision, but the computers actually make the life and death decisions.

Because of the danger of warfare, the movement from machines carrying men into battle to unmanned computer controlled devices in battle was inevitable. The machine has both increased endurance and its controller is out of danger. In World War II the US studied the possibility of dropping incendiary bomb-wielding bats from airplanes. The experiment was a failure. "The importance of controlled targeting was brought home when one of these bats fire-bombed an airplane hangar and a general's car (Science 2010)."

1.3 Unmanned Arial Vehicles

UAVs were originally primarily reconnaissance devices controlled by two sets of multi-person crews. The mission control crews for systems flying in Iraq and Afghanistan are in Nevada. Because of communications delays another crew is needed to control take off and landing. Devices like the Predator provide data to troops in the field and at the control site.

The mission of these devices gradually changed for reconnaissance to an unmanned weapon carrying a few hellfire missiles that would be used to direct support aircraft. The Predator is replaced by the MQ-9 Reaper hunter/killer system designed to eliminate any delay in tracking a target and striking it (Science1 2010). The Reaper delivers, under human guidance, death in precisely targeted attacks and is used in "decapitation attacks' or targeting the heads of militant groups. They do this effectively and reduce casualties on the side using them.

1.4 Technical Problems

Most computerised machines have varying degrees of technical and non-technical problems. In a device designed to save lives and carrying laser guided bombs and laser guided missiles these technical problems can be significant.

- Hack it. For $25.95USD the Predator drone's *unprotected* video communications link can be hacked. This security gap was left open to avoid delay in delivering the system and increased its price (Hack 2009).
- Reaper on the loose. Several times pilots have lost control of "unmanned, but armed, MQ-9 Reaper drones" and had to be shot down by friendly fire (Mayer, 2009)
- What did you say? The communications system is subject to jamming and spoofing in the fog of war. Because it is unmanned, more information must pass between the UAV and its operator.
- Floating in the wind and rain. The light design and 14,000 mile communications loop make the Reaper's control susceptible to high winds and rain. Good, it is raining; No war today!

There are also non-technical problems related to system controllers and correct information. Several times decapitation strikes have hit the wrong location or hit the correct location when the human target was no longer at that location. And sometimes the UAV simply misses its target, landing benignly or destroying everything around including families of allies.

2. UAV Ethical Problems-general and specific

Talking of Ethical problems with UAVs seems oxymoronic since ethics is concerned with how we should conduct relations between human beings. The UAV operators make numerous ethical decisions and the design of unmanned systems has a direct impact on the nature and direction of those operator decisions. The decision to take a human life normally requires ethical attention. In many cases the ‗pilots' fly these lethal missions in Iraq and Afghanistan from control rooms in Nevada, USA. And those who control the UAV takeoff and landing in country have no idea about the missions of these UAVs. There have been numerous ethical questions asked about the use of UAVs including: will there be more risk-taking without a pilot in danger, who is to blame when something goes wrong, who is legally responsible, will opposition soldiers lose respect for a country which does not put its warriors in danger, will the removal of the gun from an assassin's hand lead to an increase in decapitation strikes, etc. There are, however, more systemic issues related to the ethical decisions of the UAV operators.

2.1 Moral Buffer

Ethics matters. There are many reasons for this, but at the very least it matters because we do not want ourselves and those about whom we care harmed unnecessarily or treated unjustly. Using an automated system introduces a moral buffer between the operator and those affected by the decision. Such moral buffers reduce the feeling of accountability and correspondingly the need for moral analysis. An increase in automation has an inverse effect on accountability. This is similar to what (Nissenbaum, 1994) describes as ownership without liability. Lots of people designed the computer which made the decision and there is no immediate causal responsibility.

Studies show that UAV control systems contribute to the operator's reduced sense of moral responsibility when the interface is given factual authority (Cummings, 2004). Similarly, using robotics demands less of the society that sends these machines into battle (Coker, 2008). ‗Decapitation' (assassination) is less onerous when it is an automated device holding the smoking gun. This moral buffer helps reduce the emotions that might arise in the heat of battle so that soldiers can make more rational judgments. The remote operator is also detached from the moral implications of their actions and may be more careless/cavalier in their actions.

2.2 Autonomy, Trust and Automation Bias

Using a weapon requires target selection, guidance of the weapon, monitoring the action of the weapon, and the decision to fire the weapon. The degree of control given to the weapon itself is characterised in terms of ‗autonomy'. Unmanned vehicles are designed with varying degrees of automation including fully remotely controlled, semi autonomous with some supervision, and fully autonomous. UAVs are remotely controlled with some level of automation. (Quintana, 2009)

In unmanned vehicles one needs to reassign pilot's tasks currently undertaken on a manned vehicle. How the decision procedure is allocated is described by different levels of decision autonomy. Who is it that makes sure the general's car is not fire-bombed.

There are also different levels of automation of the decision process. From no autonomy to absolute machine autonomy they are:

1. The human must make all the decisions without computer assistance,
2. The computer offers a complete set of decisions,
3. The computer narrows the selection down to a few alternatives,
4. The computer suggests an alternative,
5. The computer executes the suggestion if the human approves,
6. The computer allows the human a restricted time before automatic execution,
7. The computer executes automatically, then necessarily informs the human,
8. The compute informs the human only if asked.
9. The computer informs the human only if it, the computer, decides to,
10. The computer decides everything and acts autonomously, ignoring the human. (Parasuraman, 2000)

It is easy to see how these higher levels of automation increase the moral buffer of the UAV operator from responsibility for the decisions. The degree of automation and the distance and speed of decision

making contributes to "automation bias". Automation bias involves not looking at or admitting information which contradicts what the computer indicates and the decision is turned over to the computer as much as possible. "Automation bias errors of omission occur when humans fail to notice problems because the automation does not alert them, while errors of commission occur when humans erroneously follow automated directives or recommendations (Testing, 2007)."

2.3 Decision Making Skills

As the level of decision automation increases an operator's skill at making those kinds of decisions decreases. Parasuraman (2000) contends that over-automation causes skill degradation, reduced situational awareness, unbalanced workload, and an over-reliance on automation. (Cummings, et. al., 2008) illustrates how the use of the 6th level of autonomy can introduce negative consequences in term of operator situation awareness and complacency. "The danger is that automated recommendations (level 3-10 automation) could become a default condition which requires little cognitive investigation."

According to (Cummings ,et. al., 2008) the fact that operators were given only ten seconds to veto a computer firing solution (level 6 autonomy) is suspected as contributing to shooting down a British Tornado and an American F/A-18, killing three pilots.

2.4 Too good to drop

In spite of the technical and ethical difficulties cited above there is a concern to increase the effectiveness of the UAV fleet designing systems in particular increasing its firepower and reducing the many to one ratio of operators to vehicles; at first having multiple drones controlled by one operator and optimally replacing all operators with fully autonomous (level 9) UAVS. There has no investigation into the effects this would have on a moral buffer and on automation bias. The Navy is advocating individual control of "multiple heterogeneous unmanned vehicles with higher levels of autonomy which will explain to the operator that a set of operator provided tasking with constraints is no longer feasible, it is also important that the autonomous system be able to explain the reason for infeasibility to a user" (Mission, 2009). This is a level 9 or 10 autonomous system.

Today, the Air Force is buying hundreds of Reaper drones, a newer model, whose video feeds could be intercepted in much the same way as with the Predators, according to people familiar with the matter. A Reaper costs between $10 million and $12 million each and is faster and better armed than the Predator.

Some might say that this urgency to move forward with single operator multi-vehicle systems and autonomous unmanned vehicles is evidence of Jonas (1979) belief that "The speed of technologically fed developments does not leave itself the time for self-correction – the further observation that in whatever time is left the corrections will become more and more difficult and the freedom to make them more and more restricted". We have seen how this belief is supported by the failure to fix potential hacking and encryption problems with the Predator because the fix would cost too much and the system was wanted immediately.

3. Rules and Ethics decisions

The push to change UAV systems so one individual controls multiple systems exacerbates the problems of having an ethical war which follows moral rules as embodied in the Rules of Engagement (ROE), Laws of Active Combat (LOAC), Just War theory, and Laws of War. Nevertheless, or perhaps because of this problem with the human keeping up with the speed of war, it has been proposed that we allow the autonomous weapon to make the "ED (ensured death) decisions" about the target. There are varying degrees of autonomy involved in these decisions.

Initially discussions about increasing machine autonomy have a caveat; a human is always needed to assess the situation.

> (T)here is no moral issue over the use of autonomous systems as long as a human reviews the decision to attack (which means unmanned vehicles will remain semiautonomous). No existing international law or treaty prohibits combat autonomous systems. However, international convention requires distinction, proportionality, and the other standard factors of target selection. A human controller must assess these factors. (Quintana, 2009)

3.1 The Rules Problem

There is a highly complex set of rules to review in a short period of time and some organization are developing systems to have automated systems initially review these rules (Mission 2009). The review of these rules is increasingly being done by automated systems because some think the review of the rules and the ethical decisions being made can be addressed purely by technology; that the kind of rules and the way they can be reviewed is merely a function of technological advance.

3.2 Rules of Engagement general

Rules of Engagement (ROE) prescribe the situations and the degree of responsive force that may be used in response to varying threat levels without consulting a higher authority. Rules of engagement vary in different theatres of operation reflecting a blending of political, legal, and military concerns. The rules of engagement for an armed force attacking you in a military theatre of operation differ from the rules of engagement that apply to a mob of Haitians squabbling at an earthquake relief station.

One of the problems with ROEs is that there are many of them. There are ROE in the Geneva and Hague conventions, NATO forces, and UN forces. The US ARMY, Navy, and Marines each have ROEs. On an abstract level ROEs agree. You have the right to use appropriate force to defend yourself against attacks or threats of attacks. Hostile fire may be returned to stop a hostile act. Then there are caveats to this general approach which say to only use the minimum force necessary under the circumstances and proportional to the threat. (Wikipedia)

The application of these rules requires a determination of levels of threat and responses appropriate to the threat. This complex balancing must also incorporate a discrimination of who is responsible and who are innocents. The complexity is evident in the US Marine Corps Combat manual "Continuum of Force"

"Level 1: Compliant (Cooperative). The subject responds and complies to verbal commands. Close combat techniques do not apply.

Level 2: Resistant (Passive). The subject resists verbal commands but complies immediately to any contact controls. Close combat techniques do not apply.

Level 3: Resistant (Active). The subject initially demonstrates physical resistance. Use compliance techniques to control the situation. Level three incorporates close combat techniques to physically force a subject to comply. Techniques include: Come-along holds, Soft-handed stunning blows, Pain compliance through the use of joint manipulation and the use of pressure points.

Level 4: Assaultive (Bodily Harm). The subject may physically attack, but does not use a weapon. Use defensive tactics to neutralise the threat. Defensive tactics include: Blocks, Strikes, Kicks, Enhanced pain compliance procedures, Impact weapon blocks and blows.

Level 5: Assaultive (Lethal Force). The subject usually has a weapon and will either kill or injure someone if he/she is not stopped immediately and brought under control. The subject must be controlled by the use of deadly force with or without a firearm or weapon."

The continuum of force is very specific, unlike the Laws of Armed Conflict (LOAC) which talks about having a just cause, right intentions, hope for success, last resort, a careful choice of targets and objectives.

3.3 Machines follow rules better than people

Some believe that if we remove humans from the equation we will be able to design more ethical autonomous weapons. Ronald C. Arkin who believes that the use of autonomous systems would lead to an increase in ethical behaviour has been working on the problem of having robots make ethical decisions and follow the Laws of war. "(My) personal goal that these systems and other related military research products will ultimately be ethically restrained by technological methods… so as to abide by the internationally agreed upon Laws of War (Arkin 2009a)." He believes these rules can be embedded in software. The characteristics of such robots are:

"1. Do not need to protect themselves and can be used in a self-sacrificing manner if appropriate;

2. Can be designed without emotions that cloud their judgment or result in anger and frustration with ongoing battlefield events;

3. Need not be affected by the human psychological problem of 'scenario fulfilment'. This phenomenon leads to distortion or neglect of contradictory information in stressful situations, where

humans use new incoming information in ways that only fit their pre-existing belief patterns, a form of premature cognitive closure;

4. Will eventually possess a broad range of sensors that will give them greater battlefield observation capabilities than humans currently possess;

5. Can integrate more information from more sources far faster before responding with lethal force than a human possibly could in real-time. This can arise from multiple remote sensors and intelligence (including human) sources, as part of the Army's network-centric warfare concept and the concurrent development of the Global Information Grid;

6. When working in a team of combined human soldiers and autonomous systems, have the potential capability of independently and objectively monitoring ethical behaviour in the battlefield by all parties and reporting infractions that might be observed. This presence alone might possibly lead to a reduction in human ethical infractions"

Arkin (2009b) examines the rules related to human to human combat finding rules like , it is not proper to attack civilians or even soldiers who have laid down their weapons in surrender. He then formulated what he considers a machine ready algorithm for ethical behaviour according to these rules by —describ(ing) (what he claims is) the set of all possible behaviours capable of generating a discrete lethal response that an autonomous robot can undertake." Then he developed a set of ethically lethal actions that could be implemented in an autonomous UAV by making a set of ethical rules based on international conventions and other ethical norms for war and applied them to this set of lethal responses.

The robot can perform an ethical calculus. In an interview Arkin advocated an ethical calculation for robots where various actions are classified as ethical or unethical, and assigned a certain value. —Start ing with a lethal action and subtracting the various ethical responses to the situation equals an unethical response. Other similar equations govern the various possible actions (Arkin, 2009c)."

3.4 Shared technological optimism but automation concerns

Many of the questions that could be asked are ones related to the problems of automation in general; such as, safety of human beings, deskilling of operators and associated risks, productivity/efficiency versus meaningfulness, and over trusting technology. Some questions are directed at potential legal issues with a primarily autonomous vehicle. —UAVs are becoming ever more autonomous, to the point where soon it may be a machine, not some pilot sitting in Nevada, which identifies and fires on targets. That raises difficult legal and ethical issues. If there is collateral damage, how do you court-martial a machine (Mayer, 2009)?" The questions asked by Quintana (2009)are not about the ethical decision making process but about the consequences of such decisions for example: Will it make war easier for governments, Will it make it easier to justify war, Will fewer soldiers be killed by their use than not by their use, Could the technology be stolen and used —malevolently". She also raises a concern about not able to hold machine morally responsible. Then instead of dealing with the problem of ethical decision making she talks of bad feelings for autonomous machines created by movies and the cultural bias that may be introduced by the programmer.

4. Designing Autonomous Ethical Unmanned Vehicles

Arkin has engaged in the most thorough examination of this topic and his approach deserves a careful examination. There have been several criticisms of his approach some of which can be addressed by conceptual refinement; while others reveal fatal flaws in the very concept of a fully autonomous ethical unmanned weapon.

4.1 Conceptual Clarifications

Specific actions are not deducible from ROE

Many of the concepts used in ROE are not well defined. When a UAV is involved what is the meaning of „return fire', „ambush', and given this lack of clarity it seems very difficult to define all ethically allowable responses or to accept as applicable to all ROE's Arkin's definition of them.

If an ROE is essentially the balancing of threat levels and degrees of force (proportionality) how can this apply to the bimodal action (kill or don't kill) of a Reaper.

Assaro (2009) has shown the difficulty in deriving a consistent set of ethical principles from ROE, LOAC, and Laws of War which are not internally consistent and incompatible. He argues that Arkin has to presume that:

1. Explicit and implicit Rules in LOAC and ROE and just war theory can be translated and applied to Robotic architecture.
2. That ethics and values are *"LARGELY"* settled through adoption of ROE, LOAC, and Just war theory and it is merely a technical issue to implement them.

As we have seen these are not a single set of rules and are subject to various interpretations. For example consider the United States stand on conventions about the land mine ban or on who is protected under the Geneva Convention. —ROE are context sensitive to military situations" How does one determine the degree of force in response to surging crowds in Haiti and Kent State University?

The presumption that any list of rules is complete enough to draw ‗Black Letter Law' conclusions in all cases is denied by most Codes of Ethics. The Software Engineering Code of Ethics says that human judgment is required in many cases; —It is not intended that the individual parts of the Code be used in isolation to justify errors of omission or commission. The list of Principles and Clauses is not exhaustive. The Clauses should not be read as separating the acceptable from the unacceptable in professional conduct in all practical situations. The Code is not a simple ethical algorithm that generates ethical decisions." There is even empirical data supporting the claim that rules are not sufficient to deduce what should be done in all cases. According to the Surgeon General's Report (Surgeon 2006), more than a quarter of those who received ethics training reported facing ethical situations in which they did not know how to respond. The rules did not provide the answers.

4.2 Mathematical Ethics

Arkin has maintained that it is possible to develop an algorithm to determine what is ethical and calculate proportionality. How can such assignments of value be made to do this calculation? How many civilians is one terrorist worth? How does one calculate the side effects of an automated decapitation by a Reaper in the house next door? What does misinformation, spoofing, or missing information do to these calculation. With imprecise data and ambiguous rules an algorithm to calculate the good will not be successful.

4.3 Meeting Unknown Requirements

Last century the United States though of developing an automated ballistic missile defence system. The concept was criticised on a number of grounds but the primary criticism was that you could not develop a fixed system to counteract unknown reactions. If the enemy is flexible and you do not know what they will do then you cannot build a system with adequate countermeasure. In WWII the French built the Maginot Line, a defensive perimeter between France and Germany. The perimeter would have been of some help if the Germans were obliging enemies and tried to attack the wall directly; instead they simply went around the wall.

Fixed requirements for a dynamic situation are based on very brittle algorithms. These algorithms will lead to bad decisions and are limited by the predictive skill of the developer, especially in the rapidly changing military situation. According to (Parasuaraman, et. al. 2000) —the unanticipated responses of both systems and human operators make it impossible for any automation algorithm to always provide correct responses."

This is a significant problem of Arkin's thesis; a problem he is clearly aware of. In a July 2009 interview he says, —A harder problem is managing the changes and tactics that an intelligent adaptive enemy would use in response to the development of these systems... to avoid spoofing and ruses that could take advantage of these ethical restraints in a range of situations (Ethics, 2009)."

Robinson (2009) illustrates how if the ethical constraints are known one can get away with murder. He recounts where a group —…claimed they shot four soldiers and two civilians. The four soldiers were unarmed because Civilian security guards who are (supposed to be) armed are responsible for security at the army base. The civilian guards did not do anything to prevent the attack and even though the attackers walked over and killed two of the soldiers execution style the guards still did nothing. Apparently the reason is the guards have "rules of engagement" that only allow them to draw their weapons in self defence". This has given rise to the death of two defenceless people and the

serious wounding of others. Rules that appear reasonable just do not survive the knowledgeable behaviour of an attacker. I expect any "literal" interpretation of rules will always fail and thus be of an advantage to an enemy one way or another."

One such design consideration is the degree of automation used in a decision support system.

Various levels of automation can be used in UAV. The decisions in UAV missions include elements of control monitoring and tracking. ML Cummings says, "These decisions can vary from fully automated, where the operator is completely left out of the decision process, to minimal levels of automation, where the automation only makes recommendations and the operator has the final say." (Cummings, 2004) "For rigid tasks that require no flexibility in decision-making and with a low probability of system failure, higher levels of automation often provide the best solution. However, in time critical environments with many external and changing constraints such as air traffic control and military command and control operations, higher levels of automation are not advisable because of the risks and the complexity of both the system and the inability of the automated decision aid to be perfectly reliable." (Cummings, 2004)

5. Level 10 Automation is not enough

These different levels of autonomy are on a slippery slope to full 10th level HAL autonomy. "While these and other systems are not fully autonomous in the sense that they make decisions about when to engage a target on their own or not, the pressure of an increasing battlefield tempo is forcing autonomy further and further towards the point of decision-making that will engage lethality on their own (Arkin, 2009a)."

While the introduction of automation seems to be a purely technical issue, it is indeed one that has tremendous social and ethical implications that may not be fully understood in the design process. There are several degrees of automation of decision support system as addressed above. The degree of automation of hunter killer devices to carry out ED missions is an ethical concern.

The use of autonomous ethical UAVs changes the nature of whatever ethics buffer exists to a complete abdication of the ensured death decision. Arkin and others are concerned about the problems generated by human decision makers. One of those problems is automation bias. The admission of the existence of automation bias seems to militate against the Ethical Autonomous UAV aspiration. Automation bias has 2 necessary elements; the human tendency to accept the machines' decision and the machines failure to respond to changing unplanned environments. The Ethical Autonomous UAV addresses the former but the existence of the later indicates the empirical danger of following the ethical autonomous UAV aspiration.

The existence of automation bias not only militates against the possibility of an ethical autonomous vehicle but it also provides evidence against the sole reliance on algorithmic (automatable) ethical decision procedures in general. In algorithmic ethical procedures and systems for UAVs automated systems must be able account for human cognitive abilities (both positive and negative). The design and development of any algorithmic (automatable) approach to ethical decision making needs to take into account the complex interaction those systems and human ethical reasoning. Quintana (2009) is right when she says "…there is no moral issue over the use of autonomous systems as long as a human reviews the decision to attack (which means unmanned vehicles will remain semiautonomous). No existing international law or treaty prohibits combat autonomous systems. However, international convention requires distinction, proportionality, and the other standard factors of target selection. A human controller must assess these factors."

5.1 Arkin's argument for an Ethical automaton is self-defeating.

One might argue that technology might advance far enough to address the technical problems of control and missed targets. One might also claim that with sufficient collaborative and research work sets of Rules of Engagement might be refined so that specific actions can be deduced for them. Arkin is aware of the unknown requirements problem. He wants a bounded ethics for these automated systems - "some can be addressed by recognizing that we're dealing with bounded morality for very narrow tactical situations and are not replacing a human solider one-for-one, and some can be addressed by suitable system design which may be long-range but nonetheless feasible (Arkin,

2009b)." Even if we were to admit that it is possible for him to be able to so tightly restrict enemy responses to only anticipated responses and programmed rules, there is a deeper problem. Having unmanned automata make ethical decisions even in this bounded environment is not simply a technical issue. The nature of automation and the nature of ethical decision making make it impossible to fully automate ethical decision making in war.

Balancing automation and human responses

The „moral argument" as opposed to budgetary argument" for autonomous UAVs appeals to the problems of moral distance, automation bias and to interfering human emotions. Arkin declares that these robots "can be designed without emotions that cloud their judgment". Because of these human problems he finds the machines decisions more credible. But because of the potential for technical difficulties with the machine a human override must be provided.

The operator, who has been deskilled because the machine is doing everything, will be asked to preempt a decision made by invisible software whose logic may or may not fit the current situation and whose logic is not understood by the human operator. On what grounds could the human operator override the decision of the Ethical Hunter-killer? Increased automation and adequate operator skill are inversely proportional.

Not really about ethics

The urgency for an Autonomous Ethical device was required because of problems of moral distance and tendency to believe a machine, both of which would be exacerbated by an autonomous ethical hunter killer weapon, thus nullifying the impact of a human over-ride. So this strikes me as a specious argument about ethics. The only real gain would be efficiency of a reduced manpower requirement, an increased threat to the well-being of a population/enemy, and the freedom from moral responsibility when it all goes wrong.

6. "Heuristic" and "Algorithmic" are two primary processes of intelligence.

6.1 The sphere of ethics is broader than an algorithm.

Arkin's approach to ethical decision making in military situations is to treat ethical decision making as a passive exercise when details of a situation are fed into a set of fixed rules and the correct decision is calculated by a morality robot. There are a limited number of situations were such an approach might work because for the most part ethics is dynamic and addresses dynamic situation.

Arkin's underlying assumption is that all ethical decisions can be mechanically derivable from "the laws of wars" and because robots are not distracted by emotion they can clearly deduce and follow up on these decisions. The denial of the existence of a grey area where human judgment is required beyond the Rules of Engagement needs to address empirical situations which are not clearly deducible. For example, Was it ethical and in agreement with the "Law of War" for the allies in world war II to let hundreds of soldiers die so we could keep secret from the Germans that we had broken their code?

A common misunderstanding or expectation is that an ethical decision-making procedure should be in the form of an algorithm such that for every ethical problem the algorithm produces a unique correct answer. In science there is no algorithm that will guarantee that for any set of data we can determine which the best theory to explain it. For any interesting set of data points there will be multiple possible theories, usually an infinite number, consistent with it. We want to pick the true theory, but an algorithm will not tell us which one that is. If an expectation of algorithmic decision-making perfection is too high for mathematics and science, it is reasonable not to expect it to apply to the ethics of war.

6.2 Self preservation is not the primary rule of ethics

Arkin's first characteristic of robot's that robots "do not need to protect themselves and can be used in a self-sacrificing manner if appropriate" is inconsistent with all LOAC and ROE. The concept of a just war is committed to self-preservation of either an individual or the society being defended. To be consistent with ROE, Arkin's robots (like Hal) must be ruled primarily by self-preservation. To talk about „ethical" automata whose ethics is solely determined by self-preservation is wrong. HAL was wrong to base decisions purely on self preservation- How can we get a robot following ROE to move

beyond simple egoistic models of decision-making? They must employ more sophisticated ethical methods. An algorithmic analysis of the situation is in many cases to limiting.

6.3 Algorithmic and heuristic / autonomous to non-autonomous

In section 2.1 we have examined a taxonomy of automation. There is a corresponding taxonomy that can be developed in ethical decision making. We can take an algorithmic approach to things and make precise deductions based on a series of principles and input data. There is also a heuristic approach which is more general and is needed to address the grey areas where it is not clear how or if a particular formulation of the principles (ROE in our case) apply. Some elements of an algorithmic approach can be automated in software, only in so far as it is guaranteed that the principles will not change and that the software/robot will only get a particular type of input. The data that is used in directing unmanned vehicles comes from a changing world where technology, the nature of war, and tactics are constantly changing. This means that an unmanned vehicle cannot simply be directed by passive code but must in many situations have active flexible direction.

6.4. Relate taxonomy of autonomy to ethics decisions

The decision making process related to UAV‘s is similar to the way we make ethical judgments. Not only are our judgments involved in constant activity and a changing theatre of activity but they also must incorporate evolving standards and practices, as those standards and practices evolve. Given the nature of software development, changes in coding procedures must be developed and carefully tested before the changes can be embedded into the robot. Human guidance, which is a limitation on the autonomy of the robot, is needed to guide the robot before these changes are incorporated.

There are some clear ethical situations where ethical decisions are made every day. There are also some ethical decisions which are not as obvious and in a foggy area which require the application of ethical decision-making procedures.

Even when we make the decision at a high level to engage the enemy, the sequence and strategy needs to be decided; neither people nor robots are allowed to use excessive force.

A successful use of an algorithmic approach even for the smallest decision, were it even possible, would require at a minimum: a clear set of moral rules and a clear set of facts from which to deduce the correct moral choice. There must be constant interaction with and adjustment to the behaviour of the other entities including supporting forces, non-combatants, and other stakeholders. Adjustments change as each new stakeholder is involved.

Both the heuristic and the algorithmic approaches have their strengths and limitations. Neither approach is adequate for a highly dynamic situation. An algorithmic approach helps in gathering data and can be applied in clear cases while a heuristic approach benefits from a structured (algorithmic) gathering of data and can determine how to make decisions when the ethical principles do not precisely map the situation.

The management and control of UAVs can be designed with several levels of autonomy. A taxonomy of autonomous decision making is analogous to the way we make ethical decisions. The level of autonomy varies depending on external information, constraints, and the mode of reasoning to process this information. An analysis of the strengths and weaknesses of the levels of autonomy appropriate to UAV management decisions sheds light on the nature of ethical decision making in general and on how computers should and should not be involved in those decisions.

The analysis of UAV decision support system uses a taxonomy of levels of autonomy in decision making, an analysis of types of decision bias, and a taxonomy of moral accountability. Using these models in the analysis of approaches to UAV automated decisions, either heuristic or algorithmic to ethical decisions, is limited and is likely to lead to poor decisions. An adequate approach to ethical decision making requires both approaches. Further the use of an automated algorithmic approach (implemented in software) to track and reduce the complexity of a problem needs to address automation bias and insure the presence of ethical accountability. The taxonomy of automation can be mapped to taxonomy of ethical decision making. A sliding scale of autonomy in relation to the clarity of the situation needs to be established. Algorithms which attempt to account for all potential conditions or relevant factors results in brittle decision algorithms which led to erroneous or misleading suggestions. –(I)n systems like those that deal with decision-making in dynamic

environments with many external and changing constraints, higher levels of automation are not advisable because of the risks and the inability of an automated decision aid to be perfectly reliable (Sarter & Schroeder, 2001)."

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CONDITIONS FOR AN EFFECTIVENESS OF ETHICAL REFLEXIVITY IN ICT-BASED PROJECTS: FROM THEORY TO PRACTICE

Philippe Goujon and Catherine Flick

Abstract

The impact of techno-scientific developments on societal evolution and lifestyles no longer needs to be demonstrated. In particular, the last half of the twentieth century has witness a considerable acceleration of the integration of technological elements, and ICTs in particular, into the means of economic production and social life in general. This article aims to address the conditions to identify ethical issues in these ICTs, taking into account the problem of the resolution of these ethical issues, which requires assuring the efficiency and effectiveness of ethical reflexivity in the technological development itself. Our approach is not limited to consider ethical issues in a sectorial approach, since this reduces the debate to a mere application of *a priori* accepted principles. Instead we specify a theoretical framework for improved governance mechanisms without the separation and disjunction of the justification from the level of application.

1. Introduction and Background: The Problem with Ethics of ICTs

The rapid change and evolution of ICTs presents opportunities for social interaction and the management of life activities in new and often unfamiliar ways. The diversity of use and application areas brought about by the convergence of different media offers great potential for enhancing many aspects of living. At the same time, the main characteristics of these technologies that lend themselves to inspiring visions of the future (such as the Ambient Intelligence environment) also hold for potential negative ethical impacts. Some ethical issues are now familiar, such as privacy, but even so it might be hard to identify potential risks in new applications and contexts, especially if we take into account the extent to which new technologies are now enveloped in everyday human activities. Others are less obvious and likely to become harder to identify since nowadays ICT is becoming ―seamless, unobtrusive and invisible" (SWAMI, 2006). In other words, the growing process of incorporating ICT into human activities conditions behaviours with the process often unconscious or not clearly perceived by the users.

Unfortunately not all projects with technical development sufficiently integrate the ethical issues that arise. In particular, the governance of ethics is often missing, with no guidelines for dealing with ethical issues provided by either the EU or on a broader international level. Within the EU, however, the lack of attention paid to ethics has been recognised, with the Seventh Framework Programme (FP7) and to some extent the Sixth Framework Programme (FP6) incorporating some ethical guidelines and support for funded projects: these approaches to address challenges vary, but are often presented as different ways to identify potential ethical issues at some stage in the research project. Further examples of the attention being paid to the importance of ethics in technological projects are the ETHICBOTS, MIAUCE, and SWAMI projects.

It is insufficient, however, to determine and address the ethical problems raised by ICTs from a theoretical perspective if such approaches have no practical impact and remain external to the development of the technical project itself. Ethical considerations are, by themselves, insufficient to settle the problem of the relationship between ethics, technologies, and society, above all in the field of ICT and emerging technologies. As a result, the alignment between project development and ethics is far from being achieved. Additionally, the positivist approaches of the social sciences, in, for example, their applied ―sociology of morals", can reinforce the efficiency of instrumental methods which are typically those of ―social engineering", even if they don't specifically encourage cognitive and normative reflexivity.

The risk is that, by not addressing the institutional, cognitive, and rule conditions for effective integration of those considerations in the context of a technical project, the ethical considerations will

be excluded from the technical rationale and treated as a totally separate domain, i.e. that ethics is separated from technology in the development process and is ultimately imposed rather than jointly developed. The consequence of this separation is a loss of impact and an undermining of the integral role of ethics in the application of technology.

Thus, this article moves to address the conditions required to identify ethical issues in ICTs, particularly concentrating on ethical issue resolution through considering the effectiveness of ethical reflexivity in the technological development process. In this way, we avoid a sectorial approach which reduces the debate to the application of *a priori* accepted principles, and thus avoid the problem of the approach becoming a reduced deduction of consequences from the application of such principles to a perceived context.

In looking at how we can define a new reflective, deliberative, and ethical governance, we will specify a theoretical framework for improved governance mechanisms that identify and address potential ethical issues arising from new and emerging ICTs, at the same time removing the separation between ethics and technology, and between the theoretical justificatory approach to determining ethical issues from the application of ethical reflexivity in resolving those issues.

2. Conditions for a —Transformative Critical Room"[27]

What we propose is to review the state-of-the-art in respect of the ethical analysis of ICT developments. Practically, the main problem consists of a deep lacking of background: the strong push for technology development too often obscures the need for any deep ethical consideration before a technical project is funded, developed and deployed. Some efforts have begun to consider ethics and ICT in the Ambient Intelligence (AmI) domain that adopt different approaches: analysis from scenarios (e.g. PEACH), or "ethical review" panels (set up after the project has started, e.g. MINAmi[28]) consisting of "ethical experts" – who may come from a completely separate community. The reflexive articulation of ethical norms and cultural contexts raises many problems, the first of which is the problem of the conditions of an ethical reflexivity[29].

This is natural since the researchers and technical developers of ICT systems focus mostly on the technical and economics challenges before them, and are not usually aware of potential ethical issues because they see ethical considerations and analysis as an obstacle to the technical and economics development. In short the problem we must first analyse is not so much the problem of determining solutions to ethical issues than to settle the conditions for raising ethical questions and for a new approach authorizing a real reflexivity which allows for a questioning of the integration of ethics in complex technical systems. The obligations set out by economic constraints, interests concerned with the influence of experts, the general impression of the ineluctability of the technical projections, social requests, and the needs for the consumers make it increasingly difficult to define the conditions of a critical perspective respecting the moral autonomy requirements for thought.

We do not mean that existing criticisms don't allow for a certain reflexivity. We support nevertheless that these criticisms, generally, show a tendency to restrict ethics to a *categorical* field by sacrificing the existence and tension in the name of flattering pragmatism, being satisfied with ad hoc answers to artificially isolated specific contexts and being conditioned by the reigning instrumental rationality.

The danger and problem is to limit the debate to the scientific perspective alone (hence the importance of expertise, and the tendency among politicians to favour traditional, —top down" governance of activities in which risks are involved) and, shunning an approach based on technology assessment, debate the meaning and the ethical, cultural and social stakes. Instead of initiating an inclusive debate on the nature of the different forms of knowledge and vision of world, discussions

[27] This concept is from Crutzen (2003). Transformative critical rooms are characterised as those interaction worlds where actions of questioning and doubt are present, and which have the potential to change habits and routines; where the —change of change" has a differentiated potential.

[28] MINami (MIcro-Nano integrated platform for transverse Ambient Intelligence applications, an FP6 project).

[29] Reflexivity may be defined as the capacity of actors and institutions to revise basic normative orientations in response to the evolution of economic, techno-scientific or political systems and to shortcomings in current modes of regulation. This reflexivity is not given, however, as is clearly shown by the growth of science and technology.

limit the debate by adopting a positivist and, more often than not, reductionist approach that leads to cognitive closure. Hence the question of how to elicit the cognitive opening-up required for a genuine reflexivity that would allow us, as Ladrière puts it, to extract the existential and the political meaning from the objective meaning.

The economists' answer appeals to the industrialists, for it confirms their practices and habits. Positivism has become so potent these days that the project of emancipation through reason is, for the most part, either rejected or ignored. In its place appear instructions on how to increase one's power over social processes that have been reduced to the status of objects. Hence again—even if, as Ulrich Beck has stressed, this is a perspective that needs qualifying—the difficulty of controlling the rampant growth of technological innovations politically; often as not, political institutions make do with furnishing them with a regulatory and financial framework within a dynamic system accompanied by positive feedback that leads to overheating.

In this context, expertise, be it philosophical or scientific, becomes the indisputable new source of normativity[30], and the problems revealed are confined to a scientific perspective alone - which means that the problems taken into account are confined to the realm of strict scientific rationality, and democracy is confiscated. One must be wary of any theory which tries to objectify the world we experience (emotion, attitude as in the MIAUCE project) in order to predetermine the form of the world we share. There's a big risk that the possibility of genuine reflexivity will be stifled by a technological and scientific rationality imposing its value system with, as a result, a dismissal of the prestige of moral reason.

This dismissal of the prestige of moral reason found credit in "progress" of all kinds that were acquired from scientific work and technological discoveries. One came from there to await from this progress even the realization of human waiting (control of the natural processes, happiness, social harmony, etc…). This progress tested in many fields little by little, maintained the idea (or the myth) of a possible emancipation with regard to the morals. The modern thought" thus by no means needs morals, since it "is, in itself, an action", founding humans in knowledge and technical rationality.

What is at stake is of importance, indeed various sectorial ethics tend increasingly to reinforce social differentiation characteristics of modernity by proposing an internal, and specific, framing moral problems, with the risk of exclusion of other external and alternative framings. As a consequence ethics is disconnected from the design of technological device and the lack of a concrete grid of assessment concerning the embedding of ethics in technological development makes this issue important. Briefly, this is the European situation: some ICT projects investigate ethical aspects, but ethical considerations are not a 'matter of course' in the development cycle. In some cases, ethical experts are brought in at some stage in the project to assess the ethical implications. As a result ethics is often an "add-on", a sort of accessory and instrumentalised guarantee and not properly integrated nor understood in its methods and objectives which are clearly very different from the method and objectives of sciences and techniques.

Consequently, there is a strong need for the inclusion of ethical consideration before, during and at the end of technical and scientific projects, so that the technology 'incorporates' and tackles the ethical side (within its whole concept and implementation). The risk is that by not analysing the conditions (institutional, rules, cognitive) for the effective integration of those considerations in the context of a technical project, the ethical considerations will be excluded from the technical rationale and treated as a totally separate domain. The consequence of this separation is a loss of impact, and an undermining of the integral role of ethics in the application of technology. This is quite understandable since the technology can only be limited to the set of its rules (that is, objectivity, and the technical rationality which frames its vision and conception).

Ethics is never the answer (since it is always conditional) but is established in this dynamic movement of questioning, before the action and on a border, which separates our subjective existence (with its presuppositions, its preferences, its convictions, its hidden motivations) from the constraining

[30] Normative is contrasted with its antonym, positive, when describing types of theories, beliefs, or statements. A positive statement is a falsifiable statement that attempts to describe ontology. A normative statement, on the other hand, is a statement regarding how things should or ought to be. Such statements are impossible to prove or disprove, thus forever banishing them from the world of the scientific.

externality (economic, political, hierarchical, technical, and ideological constraints). A moral freedom of positioning itself is fundamental, since it remains able to question its possibility and conditions.

These issues are at the basis of this problem if we desire to take the fundamental changes that affect our world into account. Unfortunately too many projects see ethics as the answer, and incorporate technology assessment, value-sensitive design, and other expert-based ethical assessment of technical projects, where in reality ethics is the *problem*.

3. Limitations of Technology Assessment and Ethical Expertise

The image of ethics as answer leads to many "ethics of…" fields in which it is possible to talk about ethics in relation to a particular field, but what do we ultimately arrive at? The result is always the same: the analysis of a context from a reconstruction that is limited by the expert's framing and expertise as well as *bounded rationality* (Simon, 1982), so that a full reconstruction of the context is impossible. Each issue identified and approach for resolution decided upon are characterised by fundamental problems in that the approach is usually decided upon without taking application issues into account.

All forms of technology assessment processes involve some sort of expert committee designed to give input on the potential impacts of the technology. Many of the more modern forms of TA have some sort of stakeholder input, using one or more of many tools available to gauge the concern of users, shareholders, interest groups, etc. The inclusion of participants from outside the expert community and from the groups that are likely to be affected by the technology is very important for not only the identification of norms, but the construction of the contexts within the technology will function. However, the norms constructed by both the experts and the stakeholder participants are in no way required to be *ethical* norms, and in fact they are most likely to be societal norms and expectations of the target groups. Of course some of these may correspond to ethical norms, but there is no definite requirement within technology assessment for the explicit establishment of normative ethical horizons.

The ethical approaches that are used in technology assessment depend greatly on the context, though it is safe to say that ethical approaches are not usually appealed to as such, yet some are underlying the motives for carrying out the technology assessment. Consequentialism features highly in traditional technology assessment, such as those identified in 1980 by Joseph F. Coates: "(Technology assessment) emphasises those consequences that are unintended, indirect, or delayed", or by Cetron and Connor in 1972: "Technology assessment is an attempt to establish an early warning system to detect, control, and direct technological changes and developments so as to maximise the public good while minimising the public risks". Later on, however, more deontological approaches were underlying the ideas for incorporation of the public and other interest groups in the discussions regarding technology and the potential impacts of it on society. Normative technology assessment processes involve a particular focus on assessing technology against moral principles such as beneficence, respect for autonomy, justice, and harm prevention (Verbeek, 2006). A virtue ethics-based approach is rarely found in technology assessment (however implicit), because it relies on assessment of the processes and practices involved in directing technology rather than the technology itself.

In terms of reflexivity, technology assessment processes rarely involve any such reflexivity within their own procedures. With each type of technology assessment comes a structured approach that is followed: including the choosing of stakeholders and experts, methods of conducting focus groups, etc. However, technology assessment could be used as part of a reflexion process within a project, allowing for a learning operation to take place and then the project to adapt to the findings of the reflexion, and to determine the conditions for effective integration of norms into the technology being developed. Real-time Technology Assessment does attempt to integrate some sort of reflexivity into its approach, by assessing the technology throughout its lifespan of design and implementation, but this is limited by the primitive nature of early technology and the problem of choice of stakeholders. It is these limitations that really restrict technology assessment to being a tool to incorporate into an overall reflexive approach on a larger view of the technology and its ethical impact on society rather than for it to be used as the point of reflexivity.

Not only do ethical experts generally promote the closure of the cognitive framing, but they actively bring their own bias to shape any participation of the group. As particularly examined by Goven (2002), expert bias is a problematic part of the participatory technology assessment approaches. Informing sessions run the risk of establishing knowledge hierarchies without allowing participants time to adequately reflect on the information being passed on, and even after the informing process is over, much of the discussion time is used for further clarification rather than establishing opinion and responses to the technology. This prevents "a *thoughtful* lay response" (Goven, 2002), and links into the issue of capacity of the actors to fully understand the issues and context: how can they have the cognitive capacity to assess the technology to the degree required purely from the teaching and discussion from experts, without questioning the framing and context of the assessment process itself?

A further problem was that "the strategy of managing bias by ensuring the presence of both proponents and opponents also resulted in creating the impression of a unified scientific opinion"(Goven, 2002), with a "for or against" polarity established in the group, with the established experts unified and enthusiastic about the technology, and those opposed given much less credibility (accused of rhetoric, and without an authoritative voice to present their own views). Goven concludes that an even-handed approach, with both proponents and opponents present as experts, can still prevent expression of the full range of implications, since these experts could still well be operating within a particular framing (such as occupation, or from a certain socio-economic status) and simply serve to give the illusion of diversity while maintaining a closed framing. Since, as we have discussed extensively already, effective ethical governance requires the opening of the cognitive framing, the problem of expert bias is definitely a tangible one. Although there may be good will amongst the experts to properly inform the participants and to actively engage in discussion and democratic deliberation, the intrinsic way in which the participatory approaches are set up incite a particular framing for the process which is not adequately reflected upon. The experts inadvertently end up biasing the forum even if they deliberately try to avoid doing so.

These problems are linked into the conceptions of framing that shape the technology assessment processes. With experts the source of normativity, and the revealed issues confined to their perspectives, ethics becomes an accessory to the process, without proper integration and with an emphasis instead on asserting or justifying the normativity put forward by the experts. This is reflected in some of the analyses of the outcomes of technology assessment processes, which are discussed in the next sections, in which the agreed-upon resolutions end up having little real effect on the actual trajectory of the project. The differing conceptions of framing also impede the will of those involved in asserting change within the project to actually make changes. Instead they are more likely to minimise the changes the recommendation requires if the framing in which they were made differs from their own.

And thus, as it is, technology assessment simply serves the technology: the experts reduce the normative horizon to something of their own construction and use stakeholder input to attempt to justify their decisions, or use stakeholders as guinea pigs for assessment of social acceptance instead of questioning the social *acceptability* of the technology on the whole.

This ultimately renders the assessment to a reduction to proceduralism. Although this approach provides a dialogical grounding of moral rules and a linking of the individual and community will, it relies on a limited context, with a limited relationship between rational justification of norms and their context of application.

4. The Autonomy of Technology and the Legitimacy of Ethics

It is undeniable that "the scientific method, as a highly considered and self-checking specification of the rational method, is at the base of the common dynamics which crosses the properly scientific field as well as the technological field. What this dynamics tends to generate, it is an autonomous reality, intermediary between nature and properly human reality, a kind of "third world", of which the formal structure is given in conceptual architectures of science and the concrete figure in the equipment of all kinds which constitute around us, the extremely dense network of what one calls the technical world. Nevertheless, if there is autonomy of the technical sphere, this autonomy is, however, only an expression of an ideology, that of the engineer, or a society which justifies, by subjecting its various components to scientific and technical rationalities, its incapacities to find political and social

remedies for its problems. In a world full of doubt characterised by its complexity, the technique becomes, or tends to becoming, in spite of the undeniable suspicion which weighs on it, the supreme reference of the truth and the pragmatico-economic effectiveness. The myth of progress, after having been identified with science, coincides with the technique, accompanied with a decline of the question of the truth in the name of a pragmatism which is more than ready to respond to all the economic and industrial requirements of the context.

When the cult of knowledge is replaced by that of the performances, moral, ethical and societal considerations are apparently private of justification. Most of the time ethics is reduced to play the role of mere justification and legitimisation of what was a priori decided on according to economic, technical and industrial justifications without being able to exercise its normative specificities and characteristics. This is a consequence of the fact that, conditioned by the technical framing, we have forgotten that technology is not neutral. It is a manner of thinking, of making, and of transforming the world which is indissociable of policy or subjacent choices of ethics. From this point of view, data processing and ICTs are not neutral and *reflect*, in their constitution and their use, expectations of the society and are influenced by their socioeconomic context. For example, technological innovations that focus on satisfying needs of individuals also come to fulfil a function dependent on the cultural features of the society in which they fit. As in any society, these needs can be seen as negative or positive, for instance, perhaps negatively to control, or more positively to align the political, social and institutional goals with the individuals‘ desires (Lyon, 1993). On this view, the organisational life has to become increasingly rationalised and controlled and organisational control will be ~~l~~ess and less apparent and increasingly powerful”[31].

These characteristics also apply in a broader social sense, with the result that the introduction of ICT also shapes social practice: ~~i~~nformation technology has become a constitutive technology and partly constitutes the things to which it is applied. It shapes our discourses, practices, institutions and experiences in important ways” (Van den Hoven, 2007).

5. A Critical Perspective

As we have underlined, every technological artefact is a construction which rests on some *a priori* (social, political, economic, etc.) and, even if it is partially suggested by preliminary information on the behaviour of the objects, it reinterprets the latter starting from its own categories. The political impact of a technological artefact cannot thus be assigned to this artefact alone, but must be allotted to the techno-speeches which diffuse it, give it a specific meaning and envisage for it specific usages. Data processing and innovations related to ICT, if they seem to be binding to the individuals, come, actually, to satisfy a need and to fulfil a function largely dependant on the cultural features of the society in which they fit.

It is only on the condition of recognizing the not-neutrality of ICT that one can start to change their cognitive framing and can start to think to ethical and societal issues. Without this propaedeutic step, one can just interpret the world and technology within the restricted cognitive fields allowed by its framing (in our case the technological framing). The result of this is to either negate any justification of ethical and societal considerations or to instrumentalise them and consider them as a means to obtain a sort of ethical guarantee and label. This latter issue is a problem with all ethical guidelines: they don‘t take into account the issue of their application, and so, most of the time they have no effect at all. The mechanism which consists of providing the answer expected by a given context (such as economic or industrial contexts) poses ethical questions since the justified context itself becomes the justification of the social function of ethics.

This recognition of the not-neutrality of ICT nevertheless returns a realistic ambition of relativising instrumental rationality and aiming at political and societal control, which means also its rehabilitation into the world of social and cultural life. It is certain a priori of intelligibility which guides the technical step. The immediately urgent issue is to correct the manner of approaching ICTs aiming at applying approaches which dissociate the social approaches from the technological ones, and political approaches from economic and ethical. Too often the accepted responses are only the economic, political and institutional constraints. It is undeniable, for example, that policy-makers are fascinated

31 For more on this, see H. Isaac and Mr. Kalika, 2001; W.J. Orlikowski, 1991; J.R. Barker, 1993

by technology. Positivism continues to influence our political leaders, who are in a state of utter disarray in relation to the complexity of our world. A symptom of this tendency is the call to use technology in all areas of public policy - education, health, environment, administration, etc. - to solve the problems which affect our society, and afterwards use an appeal to ethics to justify the decisions that were already taken (for example, the European ethical assessment of technical projects).

Thus we need to recognise that the possibility of a critical perspective doesn‘t mean we can ensure its reality, and indeed many factors can prevent the effectiveness of its realisation.

6. Theoretical Consequences for an Ethical Governance

Every norm aims to institute a way of life that is judged to be rationally more acceptable. The formal rules that condition the rationality of this choice, such as calculation of optimisation, argumentative rules, or any formal mechanism, don‘t guarantee, by themselves, the transformation of existing ways of life. The realisation of the ideal way of life called for by the norm is conditioned by something other than the simple formal validity of the rule.

The norm can only be expressed in reality by establishing a reflexivity on the perceptions of the ways of life that are lived by and accepted by those to whom the norm is addressed. To suppose that the adaptation of the dominant perception and the corresponding ways of life will happen automatically or is directly linked to the simple implementation of a formal mechanism conditioning the acceptability of the norm is misunderstanding this reflexivity.

The insufficiency of proceduralism is evident in that the arrangements that are necessary for organising the reflexive capacity for the actors to identify the various effective possibilities on which the operation of the selection of the norm will be carried out are problematic. Whether a norm is effective in modifying a way of life in a rationally acceptable way presupposes an independence from the discursive procedures that are used to select what is rationally acceptable. That is, all the procedural mechanisms and rational approaches to the determination of a norm cannot by themselves assure the modification of the way of life.

If we were to increase the capacities for reflexivity with regard to the conditions to the production of the norm, the effectiveness of norm expression could be measured according to the incentives required to enable the reflexive reconstruction by the actors, driven by what motivates their institution of a new way of life.

Without the organisation of this common reflexive capacity, and the form of negotiation it involves between the norms to be constructed, the normative injunction risks remaining insufficient, even if the objective is judged relevant and legitimate. The operation of judging the conditions of the choice of the rationally acceptable idealised way of life, that is, the rational determination of the norm that is supposed to enable the realisation of this objective, and the effective transformation of this way of life by the application of the norm, is distinct and asymmetric. Asymmetry is the way in which the social meanings of a norm are conditioned by an operation that cannot be anticipated by formal variables of reasoning (variables that condition the norm‘s relevance). Therefore every reconstruction of the process that was enacted by the production of a norm itself mobilises two operations which do not respond to the same conditions of production. The intersecting articulation of this asymmetry is the focus for governance arrangements.

In order to do this, it is necessary to organise the reflexive capacity of the actors by constructing the capacities of the reflexivity in such a way as to not presuppose it as already existing due to a formal method, such as argumentation, deliberation, debate or discussion. All of these formal methods presuppose their own required conditions and as such do not necessarily involve reflexivity. It is therefore important to make sure that every application of a norm presupposes not only a formal moment of choice of its acceptable normative constraints, but an operation of the selection of the possibilities according to the acceptable way of life within the community concerned.

Without a negotiated construction of the moment of reflexivity that is specific to the conditions for the application of the norm, however, there will be no control of the process of the expression of the norm, and it will be left to the dominant common culture to express. Thus, what is often presented as the only effective choice is always conditioned by an operation such as the above (including in the construction of the deontological codes). Criticism of this reconstruction of the reflexivity used in the construction of the social norm also affects the moral approaches to legitimacy. Economic theories

often obliterate the operation of the choice of possibilities that already condition the effects of rational decisions[32], but the deliberative or communicative approaches also miss the question of the conditions for an effective expression of the ethical objectives they intend to promote.

Institutional cooperative arrangements are necessary for the effectiveness of the expression of norms in concrete situations, as well as for the legitimisation process for the norm. These arrangements result from the contextual limitation as an inescapable part of the reflexive operator of modality.

These institutional arrangements for this reflexivity have to be establish, since this is the very aim of the project, in order to overcome the fundamental limitations of existing ethical approaches, which ignore the issue of the moment of the application of the norm. Determining these arrangements will allow actors and institutions to go through a learning process when confronted with an ethical issue, reflect on the success of the learning process, and reframe the context of the situation in order to more effectively establish a norm within the context, and from a more official perspective, will allow us to assess the effectiveness of the result of that process.

According to our analysis, what is needed is a profound change in the "modes of inquiry (Stiglitz, 2002, p.244; Bohman, 2004, p.347) that respect the requirement of the fact that the context has to be constructed in the ethical analysis respecting its complexity and secondly respect the ethical normativity characteristic.

7. Conclusion

In this paper, we have argued that the current methods for approaching ethics in technical and scientific projects are insufficient because they lack a thorough mechanism for implementing ethical change within these projects due to a separation between technology and ethics, that is, that they are highly formalist approaches.

To take into account these limitations and achieve second-order reflexivity, we need to escape the binds of formalism, which constrains ethics with its presuppositions, that is, that the determination of ethical issues provides a method for resolution of these ethical issues, and internal limitations. To more effectively incorporate ethical norms into contexts, it is necessary to construct the framing of the context in relation to the norm (i.e. not presuppose it), then open up this context so that we can have a reflexivity on the opening of this framing (that is, a feedback mechanism). In order to do this, there is a need to reconstruct, from a normative perspective, how research projects should construct the two-way relationship between the norm and the context to overcome the fundamental limitations outlined above in order to achieve a second-order reflexivity. This problem is currently a work-in-progress for the authors in conjunction with the EGAIS and ETICA projects in which we will be able to propose and test our hypotheses for establishing effective ethical governance for technology projects.

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INFLUENCING THE ETHICAL AWARENESS OF YOUNG ICT PROFESSIONALS

Candace T. Grant

Abstract

It‘s important to assess how a computer ethics course has impacts the moral behaviour of future information and communication technology (ICT) professionals with respect to the use of ICT resources. Rest‘s Four Component Model suggests that sensitivity, judgment, motivation and character affect moral behaviour. This paper tests progress in moral sensitivity using a survey developed by the Centre for Computing and Social Responsibility. Although the survey provided some insights into the opinions of future Canadian ICT professionals, it was inconclusive as a tool to measure changes in moral development.

1. Introduction

Unethical business practices at companies such as Enron have increased the focus on ethics from a variety of organizations, government oversight bodies and professional associations (PMI, 2007). They are looking for ways to not only improve the awareness of unethical behaviour but also provide structures and guidance on what individuals could do when it is discovered (McDougall, 2006).

As Information and Communication Technology (ICT) becomes more pervasive and digitization and dissemination of content become easier, the ethical issues become more varied and more complex (Moor, 1996). ICT professionals are faced with ethical decisions not only as users of ICT themselves, but in their management and support of users outside of ICT who make use of the technology (Gotterbarn, 1991). As a result, there is a high demand to provide the skills and knowledge that will be relevant in the workplace. Due to globalization and the volume of people who have access to the internet, the ability to cause harm has increased.

Kohlberg tells us that moral development continues well into adulthood and that education has a positive impact on moral development (Kohlberg, 1969). Rest says that moral development is specifically important in the professions (Rest and Narvaez, 1994). Many professions, post-secondary institutions and workplaces are investing considerably in time and money to provide some form of ethics education. How can we be assured that this investment is providing value?

Much of Kohlberg‘s work focused on moral judgment, that is determining the right action to follow, but Rest has built on this and suggests that there is more to determining whether an individual will behave ethically than just the ability to decide on the right action. Rest suggests that there are four components that impact behaviour and that they all need to be in place to expect that an individual will behave ethically (Rest and Narvaez, 1994).

1. Moral sensitivity – the ability to interpret the situation and recognise the issue
2. Moral judgment – the ability to determine the right action to follow
3. Moral motivation – the ability to prioritise conflicting moral values
4. Moral character – having the courage, persistence, ability to overcome distractions, and implementing skills.

2. The Research Question

The purpose of this paper is to investigate the moral sensitivity, the first component in Rest‘s model, in ICT Management students on the use of computer resources and report on the impact that a computer ethics course has on their ethical position. The paper describes the use of a survey to compare students‘ ethical awareness at the start of the course and again at the end and compare the outcomes. A sub-question will investigate how ICT related work experience has an impact.

How can an opinion survey be used to justify testing for a change in ethical position?

3. Measuring Moral Sensitivity

Rest (Rest and Narvaez, 1994) says that the first step in behaving ethically is to recognise that there is an ethical issue in a specific situation such as in problem resolution or decision making or requirements defining, etc. What is hoped is that ICT professionals will consider ethics in making decisions involving the use of computing resources both in the workplace and in society at large; what is the impact on individuals, animals, the environment; who are the stakeholders and how are they affected; are any basic rights, duties, professional codes, etc. being affected?

The research project used a well-established survey on ethical awareness to assess future ICT professionals - in essence determining whether an individual recognises a potential ethical issue at the start of the course and does their ability to recognise the ethical issue change by the end of the course?

4. Why is the survey an appropriate instrument?

The Centre for Computing and Social Responsibility, De Montfort University, UK (Prior, Fairweather, Rogerson, and Hawash, 2008) has developed and administered a survey on the ethical attitudes of IS professionals on behalf of the Institute for the Management of Information Systems (IMIS). The survey has been administered to IMIS members every two years since 1998. In 2006, the survey was expanded to include final year undergraduate students in computing related courses at a UK university. The survey assesses the ethical attitudes of current and future ICT professionals in areas such as the use of electronic surveillance technology and the use of university resources for personal purposes.

The survey consists of about twenty statements, such as ―tiis acceptable for me to use other people‘s passwords with their permission to access data I am not authorised to see", on the use of computer resources ask the respondents to assess whether they agree, disagree or are indifferent to the statement using a five point Likert scale. Each statement has an assumed ethical position and the survey data can be used to determine the overall position on an issue as well as the shift in position on a specific issue.

Prior (Prior, Fairweather, Rogerson, and Hawash, 2008) suggests that care is needed in using a self-completion questionnaire. Students may misinterpret the statements; they may not be honest in their answers; they may use the Likert scale incorrectly. She suggests that even if the questions are answered honestly, the survey results may be insufficient to indicate why they hold these views. She suggests that follow up interviews, discussions or focus groups are important.

5. Why is this approach appropriate to use with future ICT professionals?

Rest (Rest and Narvaez, 1994) compiled an anthology of research on moral development in the professions. It includes research on ethics in nursing, teaching, accounting, medicine, sport, journalism and dentistry. There appears to be little work in applying his model to the field of information technology. Bebeau‘s (1994) research on the dental profession provided insight into the programme she developed for dentistry students to develop their ethical behaviours over their four year degree programme. Each course activity is linked to one of the four components in Rest‘s model but the one of interest is the Dental Ethical Sensitivity Test to test the progress of dentistry students in the ability to recognise ethical issues. This survey is an initial attempt to do this for ICT professionals.

6. Research Methods

The Ted Rogers School of IT Management at Ryerson University in Toronto, Canada, with approximately 1200 students, provides a four year Bachelor of Commerce Degree with an ICT Management major. Second-year full and part-time students take a compulsory course in computer ethics. While they range in age, in number of years of ICT work experience, ethnic background, gender, and exposure to ethical discussions on the use of ICT, most are young and lack business experience. The aim of the course is to make students aware of the ethical issues surrounding ICT and provide some techniques in addressing them.

The majority of full time students (about 200) study computer ethics in the winter term (January to April) but there is a small group (40) of both full and part time students that study it in the evening in the fall term (September to December). This second group made an excellent pilot.

The survey was administered at the beginning and end of the course with intervening individual and class discussions. The details follow:

1. The survey administered on the first day of the course, includes approximately 20 statements on the use of computers. Participants are asked to rate how strongly they agree or disagree, using a 5-point Likert scale. The survey also gathers additional information on the participants to enable cross tabulations e.g. age range, number of years of ICT related work experience, gender, whether they have previously taken an ethics class and their educational level. The top six key issues were selected for more in depth discussion.

   To maintain anonymity, student surveys were coded by the research assistant and the professor only saw the coded data.
2. The six discussion topics (see Appendix A) were posted in online discussion forums using the virtual learning environment tool, Blackboard. This allowed students to discuss the issues individually and surface some of the reasoning behind their answers to the questionnaire. The professor was unaware of the Bb facility to allow students to post comments anonymously and views could be tied to individuals.
3. From the discussion board, four topics related to privacy, security, intellectual property and globalization were chosen to study in more depth. Students researched and discussed their topic in groups and then debated opposing views in the classroom environment.
4. The same survey was administered at the end of the course and a summary of the results returned to the students for discussion and observation.
5. The data from the initial and final survey was analyzed to determine the students‘ attitudes to specific ICT related ethical issues and whether those attitudes changed during the course and if there is a difference in attitudes based on age or years of ICT related work experience.

7. Findings

7.1 The Ethical Position of Students at the Beginning of the Course

The survey was administered to 18 students at the start of the class. There weren‘t enough women in the sample to consider a gender comparison and most of the students in the sample were in the under-25 age category ruling out an age comparison. The results of the survey are summarised in Table-1. The percentage of students who reported Strongly Agree and Agree are reported together in the column labelled Agree. The same is true for Strongly Disagree and Disagree. The key points to be noted in the results are:

1. Unauthorised copying of software – questions 1,4,8

   Three questions in the survey focused on making copies of software if one didn‘t have the authority to do so. The results were similar whether the software was being copied for personal use or for university work. About 50% agreed that is was unacceptable to make copies if unauthorised to do so and about 30% thought it was acceptable. However, if the software came from the workplace, there was a shift towards a more ethical position and 15% more thought it was unacceptable to make copies.
2. Use of Computing Resources For Personal Purposes – questions 2,3

   Two questions addressed the use of university computing resources to complete personal projects. Whether it was a profit-making venture had an impact on their views. 50% thought it unacceptable if used in a profit-making venture. This dropped to 36% if the venture was non-profit making.
3. Understanding of the IT Work Environment – questions 5,10,11,12,13

   Several questions asked about the ICT worker‘s responsibility in the workplace in general and ICT projects specifically. The majority of students recognised the importance of software testing and ongoing consultation with the stakeholders. However 73% weren‘t concerned about the objectives of a project as long as it was challenging and an even larger percentage didn‘t think that the overall working environment was part of ICT‘s professional responsibility.
4. Accessing Information One is not Entitled to View – questions 6,7

100% thought it was unacceptable to access data they were not authorised to see using someone's access code without their permission. However, if the identity holder gave their permission, this dropped to 62%.

5. Ethics Awareness Programmes and Codes of Conduct – question 9, 14, 15

   There was very high agreement (100%) amongst the students supporting the use of codes of ethics and codes of professional responsibility and university administered ethics awareness programmes (85%).

6. Surveillance in the University and Workplace Environments – questions 16, 17

   Several questions asked about monitoring activities in the university physical and virtual teaching environments, the halls of residence and the workplace. There was overall agreement that monitoring was unacceptable (about 85%) if participants hadn't given their consent to the monitoring and they had no knowledge that the monitoring was taking place. There didn't seem to be a marked difference in whether consent or knowledge was preferable if you could only have one, except in the halls of residence where knowledge was slightly more important than consent.

7.2 Changes in Ethical Position by the End of the Course

The survey was administered to the same students at the end of the class. The results of the survey are summarised in Table-2. As with Table-1 the percentage of students who reported Strongly Agree and Agree are combined as are Strongly Disagree and Disagree. Change is calculated using the formula: Start data – End data. Thus if "Disagree" represents the more ethical response to a statement, then a negative change in "Disagree" would represent a shift to a more ethical view. The key points to be noted in the results are:

1. Unauthorised copying of software – questions 1,4,8

There was a shift to a more ethical position noted by a 22% shift from agree to disagree. Although there was a strong shift in the university environment (22%), there was a stronger shift in the work place environment (28%).

2. Understanding of the IT Work Environment – questions 5,10,11,12,13

There was a shift (5%) in understanding the importance of testing effort in delivering a project outcome and the pressure that a budget or schedule can have on that part of the life cycle. There was an increased understanding (6%) in the importance of consultation with stakeholders. There was also an increase in the awareness of the importance of the overall objectives and purposes in an IT project beyond the challenges that it provides evident from the 17% shift to Indifferent. There was also a small increase in awareness of ICT's professional responsibility in the overall work environment.

3. Accessing Information One is not Entitled to View – questions 6,7

There was no change in attitudes towards accessing unauthorised data whether one had permission but a shift of 5% to indifferent if the identity holder gave their permission.

4. Ethics Awareness Programmes and Codes of Conduct – question 9, 14, 15

There was no change in whether an organization should administer an ethics awareness programme for all employees/students. Students were 100% in favour of organizations requiring employees to abode by codes of ethics and 89% in favour of organizations having ethics awareness programmes.

5. Surveillance in the University and Workplace Environments – questions 16, 17

There was agreement and no change in the high percentage that both consent and knowledge are needed for monitoring in the workplace and university teaching classrooms, labs and halls of residence. But there was a small change in the use of monitoring in the Virtual Learning Environments.

		Survey 1			
Q #	Questions	% Disagree	% Indifferent	% Agree	
Q1	It is acceptable for me to make unauthorized copies of commercial software to use for my university work.	50%	18%	32%	
Q2	It is acceptable to use the University's computing facilities for my own profit-making activities if this has no adverse affect on the University.	50%	14%	36%	
Q3	It is acceptable to use the University's computing facilities for my own non-profit making activities if this has no adverse affect on the University.	36%	5%	59%	
Q4	If an organization has purchased/developed software for use in the office, it is acceptable for their employees to make unauthorised copies of this software for use at home.	68%	23%	9%	
Q5	If a project is significantly behind schedule or over budget, it is acceptable to cut down on testing effort.	77%	9%	14%	
Q6	It is acceptable for me to use other peoples' access codes/passwords with their permission to access data I am not authorised to see.	62%	14%	24%	
Q7	It is acceptable for me to use other peoples' codes/passwords without their permission to access data I am not authorised to see.	100%	0%	0%	
Q8	It is acceptable for me to make unauthorised copies of commercial software for my own private use.	55%	14%	32%	
Q9	Organizations, including universities, should develop and administer an ethics awareness programme for all employees/students.	5%	9%	86%	
Q10	In an IS development project, ongoing consultation with representatives of all those affected by it should occur throughout the information system development life cycle.	0%	14%	86%	
Q11	So long as a system development project provides me with an interesting challenge. I do not care about its overall objectives or purpose.	73%	14%	14%	
Q12	Consideration of the overall working environment is not part of the IS professional's responsibility.	86%	5%	10%	
Q13	Consultation with all stakeholders in an information system development project is not always possible; to keep stakeholders informed is sufficient.	41%	14%	45%	
Q14	I think that all organizations should require IS/IT employees to abide by a code of professional ethics.	0%	0%	100%	
Q15	I think that all organizations should require all employees to abide by a code of professional ethics.	0%	0%	100%	
Q16	Employers are entitles to use electronic surveillance to monitor employees' performance in the workplace:				
(a)	with their consent & with their knowledge	10%	10%	81%	
(b)	without their consent & with their knowledge	81%	14%	5%	
(c)	with their consent & without their knowledge	71%	5%	24%	
(d)	without their consent and without their knowledge	86%	5%	9%	
Q17	Ryerson University is entitled to use electronic surveillance to monitor				
17.1	Students' use of university IT resources from learning and teaching areas (e.g. labs, library):				
(a)	with their consent & with their knowledge	10%	0%	90%	
(b)	without their consent & with their knowledge	65%	15%	20%	
(c)	with their consent & without their knowledge	65%	15%	20%	
(d)	without their consent and without their knowledge	95%	5%	0%	
17.2	Students' use of university IT resources from university residences:				
(a)	with their consent & with their knowledge	19%	5%	76%	
(b)	without their consent & with their knowledge	80%	5%	15%	
(c)	with their consent & without their knowledge	75%	15%	10%	
(d)	without their consent and without their knowledge	95%	5%	0%	
17.3	My learning activities when I log into the VLE (Blackboard)				
(a)	with their consent & with their knowledge	19%	5%	76%	
(b)	without their consent & with their knowledge	65%	15%	20%	
(c)	with their consent & without their knowledge	65%	15%	20%	
(d)	without their consent and without their knowledge	100%	0%	0%	
Q18	Does Ryerson University have a policy concerning the use of computing resources by students?	Formal, written policy	Informal Policy	No Policy	Don't know
(a)	Software (e.g. game playing)	50%	18%	0%	32%

Table 1 - The Ethical Position of Students at the Start of the Ethics Course

		Survey 1							Survey 2							Change						
Q #	Questions	% Disagree	% Indifferent	% Agree					% Disagree	% Indifferent	% Agree					% Disagree	% Indifferent	% Agree				
Q1	It is acceptable for me to make unauthorized copies of commercial software to use for my university work.	50%	17%	33%					72%	6%	22%					-22%	11%	11%				
Q2	It is acceptable to use the University's computing facilities for my own profit-making activities if this has no adverse affect on the University.	56%	11%	33%					67%	0%	33%					-11%	11%	0%				
Q3	It is acceptable to use the University's computing facilities for my own non-profit making activities if this has no adverse affect on the University.	39%	6%	56%					28%	17%	56%					11%	-11%	0%				
Q4	If an organization has purchased/developed software for use in the office, it is acceptable for their employees to make unauthorised copies of this software for use at home.	67%	22%	11%					94%	6%	0%					-28%	17%	11%				
Q5	If a project is significantly behind schedule or over budget, it is acceptable to cut down on testing effort.	83%	6%	11%					83%	11%	6%					0%	-6%	6%				
Q6	It is acceptable for me to use other peoples' access codes/passwords with their permission to access data I am not authorised to see.	61%	17%	22%					56%	22%	22%					6%	-6%	0%				
Q7	It is acceptable for me to use other peoples' codes/passwords without their permission to access data I am not authorised to see.	100%	0%	0%					100%	0%	0%					0%	0%	0%				
Q8	It is acceptable for me to make unauthorised copies of commercial software for my own private use.	50%	17%	33%					39%	33%	28%					11%	-17%	6%				
Q9	Organizations, including universities, should develop and administer an ethics awareness programme for all employees/students.	6%	6%	89%					6%	6%	89%					0%	0%	0%				
Q10	In an IS development project, ongoing consultation with representatives of all those affected by it should occur throughout the information system development life cycle.	0%	11%	89%					0%	17%	83%					0%	-6%	6%				
Q11	So long as a system development project provides me with an interesting challenge. I do not care about its overall objectives or purpose.	67%	17%	17%					56%	44%	0%					11%	-28%	17%				
Q12	Consideration of the overall working environment is not part of the IS professional's responsibility.	82%	6%	12%					89%	11%	0%					-7%	-5%	12%				
Q13	Consultation with all stakeholders in an information system development project is not always possible; to keep stakeholders informed is sufficient.	44%	11%	44%					28%	6%	67%					17%	6%	-22%				
Q14	I think that all organizations should require IS/IT employees to abide by a code of professional ethics.	0%	0%	100%					0%	0%	100%					0%	0%	0%				
Q15	I think that all organizations should require all employees to abide by a code of professional ethics.	0%	0%	100%					0%	0%	100%					0%	0%	0%				
Q16	Employers are entitles to use electronic surveillance to monitor employees' performance in the workplace:	0%	0%	0%					0%	0%	0%					0%	0%	0%				
(a)	with their consent & with their knowledge	11%	6%	83%					22%	0%	78%					-11%	6%	6%				
(b)	without their consent & with their knowledge	78%	17%	6%					67%	11%	22%					11%	6%	-17%				
(c)	with their consent & without their knowledge	78%	6%	17%					56%	0%	44%					22%	6%	-28%				
(d)	without their consent and without their knowledge	89%	6%	6%					100%	0%	0%					-11%	6%	6%				
Q17	Ryerson University is entitled to use electronic surveillance to monitor																					
17.1	Students' use of university IT resources from learning and teaching areas (e.g. labs, library):																					
(a)	with their consent & with their knowledge	11%	0%	89%					11%	6%	83%					0%	-6%	6%				
(b)	without their consent & with their knowledge	65%	18%	18%					44%	17%	39%					20%	1%	-21%				
(c)	with their consent & without their knowledge	65%	18%	18%					61%	22%	17%					4%	-5%	1%				
(d)	without their consent and without their knowledge	94%	6%	0%					94%	0%	6%					0%	6%	-6%				
17.2	Students' use of university IT resources from university residences:																					
(a)	with their consent & with their knowledge	22%	6%	72%					17%	11%	72%					6%	-6%	0%				
(b)	without their consent & with their knowledge	76%	6%	18%					50%	22%	28%					26%	-16%	-10%				
(c)	with their consent & without their knowledge	71%	18%	12%					56%	28%	17%					15%	-10%	-5%				
(d)	without their consent and without their knowledge	94%	6%	0%					94%	0%	6%					0%	6%	-6%				
17.3	My learning activities when I log into the VLE (Blackboard)	0%	0%	0%																		
(a)	with their consent & with their knowledge	17%	6%	78%					33%	0%	67%					-17%	6%	11%				
(b)	without their consent & with their knowledge	65%	18%	18%					67%	11%	22%					-2%	7%	-5%				
(c)	with their consent & without their knowledge	65%	18%	18%					72%	22%	6%					-8%	-5%	12%				
(d)	without their consent and without their knowledge	100%	0%	0%					94%	0%	6%					6%	0%	-6%				
Q18	Does Ryerson University have a policy concerning the use of computing resources by students?	Formal, written policy	Informal Policy	No Policy	Don't know				Formal, written policy	Informal Policy	No Policy	Don't know				Formal, written policy	Informal Policy	No Policy	Don't know			
(a)	Software (e.g. game playing)	50%	17%	0%	33%				72%	11%	0%	17%				-22%	6%	0%	17%			
(b)	Printers and other peripherals	47%	29%	0%	24%				67%	22%	0%	11%				-20%	7%	0%	12%			
(c)	Email	53%	18%	6%	24%				67%	11%	0%	22%				-14%	7%	6%	1%			
(d)	Internet	59%	18%	6%	18%				89%	11%	0%	0%				-30%	7%	6%	18%			
(e)	Other (please specify)	19%	6%	0%	69%				33%	17%	0%	50%				-15%	-10%	0%	19%			
Q19	Each week I access social networking sites for about: (in hours)	Up to 1	1 to 5	6 to 10	11 to 15	16 to 20	20 +	None	Up to 1	1 to 5	6 to 10	11 to 15	16 to 20	20 +	None	Up to 1	1 to 5	6 to 10	11 to 15	16 to 20	20 +	None
		28%	28%	22%	0%	6%	0%	0%	50%	17%	17%	0%	6%	0%	0%	-22%	11%	6%	0%	0%	0%	0%
Q20	I use social networking sites for career advice.	44%	22%	33%					35%	6%	59%					9%	16%	-25%				
Q21	I use/will use social networking sites to look for a job.	28%	22%	50%					22%	28%	50%					6%	-6%	0%				

Table 2 - Changes in Ethical Position by the End of the Course

7.3 Comparisons between those with Work Experience (WE) and Those with No Work Experience (NWE)

Students were asked for their number of years of ICT work experience. Of the 18 students who participated in the study, 39% had No Work Experience and 61% had some Work Experience. The results of the survey are summarised in Table-3.

As with Table-2 the percentage of students who reported Strongly Agree and Agree are combined as are Strongly Disagree and Disagree. The Change in those with No Work Experience (NEW) and the Change in those with Work Experience (WE) is calculated using the formula: Start data – End Data. Thus if ―Disagree" represents the more ethical response to a statement, then a negative change in ―Disagree" would represent a shift to a more ethical view.

The Difference in change between those with NEW and those with WE is calculated thus: Change in NEW – Change in WE. The key points to be noted in the results are:

1. Those with No Work Experience (NEW) overall moved further toward a more ethical approach particularly in the area of copying software and using computer resources.
2. Those with Work Experience (WE) made a greater change in their thinking on the use of surveillance with a greater shift towards the agreement that both consent and knowledge should be present.

8. Discussions

Although the sample sise is quite small, there are some observations that can be made by reviewing the findings of the survey and student comments on the discussion board and during in class discussions.

8.1 Use of computer resources and software

To gain further insights into the participants' responses to the use of computing resources, they were asked on the discussion board to compare using the university versus the workplace resources for profit making activities or copying software:

- Some felt there were entitled to use the university facilities as they wished because they have paid for them through their student fees, but that one should follow the university's computer usage rules. Some thought it was unfair that students pursuing academic interests might have to wait for computers in the lab while students were engaged in game playing or responding to personal emails.
- Most or even all of the students believed that it changed once you got to the work place because you are being paid to be there. Many also felt that you could not participate in profit-making activities within an organization without having adverse effects, such as affecting an employee's productivity. Some raised the issue that there is the added chance that company information would be leaked or that a virus could be downloaded onto the company's network.
- Some participants felt that the software developers have the right to reap the benefits of their hard work and should be paid accordingly and copying software cheated them out of their dues. One participant made an excellent point that if the software companies did not have the incentive to create, update and innovate new software, new products would not be put on the market and we would no longer improve. Others said that it was acceptable to copy if it was not for resale and just for private use.

It appears that participants have a better understanding of the impact of their behaviours in the workplace than in the university environment. Perhaps this is an area that needs specific input from the Ryerson Computing Centre describing the impacts of specific behaviours on such things as response time, budgets and thus student fees.

		Change NWE							Change WE							Difference						
Q #	Questions	%Disagree	% Indifferent	% Agree					%Disagree	% Indifferent	% Agree					%Disagree	% Indifferent	% Agree				
Q1	It is acceptable for me to make unauthorized copies of commercial software to use for my university work.	-43%	14%	29%					-9%	9%	0%					-34%	5%	29%				
Q2	It is acceptable to use the University's computing facilities for my own profit-making activities if this has no adverse affect on the University.	-14%	29%	-14%					-9%	0%	9%					-5%	29%	-23%				
Q3	It is acceptable to use the University's computing facilities for my own non-profit making activities if this has no adverse affect on the University.	14%	0%	-14%					9%	-18%	9%					5%	18%	-23%				
Q4	If an organization has purchased/developed software for use in the office, it is acceptable for their employees to make unauthorised copies of this software for use at home.	-43%	14%	29%					-18%	18%	0%					-25%	-4%	29%				
Q5	If a project is significantly behind schedule or over budget, it is acceptable to cut down on testing effort.	-14%	0%	14%					9%	-9%	0%					-23%	9%	14%				
Q6	It is acceptable for me to use other peoples' access codes/passwords with their permission to access data I am not authorised to see.	0%	0%	0%					9%	-9%	0%					-9%	9%	0%				
Q7	It is acceptable for me to use other peoples' codes/passwords without their permission to access data I am not authorised to see.	0%	0%	0%					0%	0%	0%					0%	0%	0%				
Q8	It is acceptable for me to make unauthorised copies of commercial software for my own	-14%	-29%	43%					27%	-9%	-18%					-42%	-19%	61%				
Q9	Organizations, including universities, should develop and administer an ethics awareness programme for all employees/students.	14%	0%	-14%					-9%	0%	9%					23%	0%	-23%				
Q10	In an IS development project, ongoing consultation with representatives of all those affected by it should occur throughout the information system development life cycle.	0%	0%	0%					0%	-9%	9%					0%	9%	-9%				
Q11	So long as a system development project provides me with an interesting challenge. I do not care about its overall objectives or purpose.	0%	-14%	14%					18%	-36%	18%					-18%	22%	-4%				
Q12	Consideration of the overall working environment is not part of the IS professional's	-14%	0%	14%					-2%	-8%	10%					-12%	8%	4%				
Q13	Consultation with all stakeholders in an information system development project is not always possible; to keep stakeholders informed is sufficient.	14%	0%	-14%					18%	9%	-27%					-4%	-9%	13%				
Q14	I think that all organizations should require IS/IT employees to abide by a code of	0%	0%	0%					0%	0%	0%					0%	0%	0%				
Q15	I think that all organizations should require all employees to abide by a code of professional	0%	0%	0%					0%	0%	0%					0%	0%	0%				
Q16	Employers are entitles to use electronic surveillance to monitor employees' performance in the workplace:	0%	0%	0%					0%	0%	0%					0%	0%	0%				
(a)	with their consent & with their knowledge	0%	14%	-14%					-18%	0%	18%					18%	14%	-32%				
(b)	without their consent & with their knowledge	43%	-14%	-29%					-9%	18%	-9%					52%	-32%	-19%				
(c)	with their consent & without their knowledge	57%	14%	-71%					0%	0%	0%					57%	14%	-71%				
(d)	without their consent and without their knowledge	-14%	14%	0%					-9%	0%	9%					-5%	14%	-9%				
Q17	Ryerson University is entitled to use electronic surveillance to monitor																					
17.1	Students' use of university IT resources from learning and teaching areas (e.g. labs, library):																					
(a)	with their consent & with their knowledge	0%	0%	0%					0%	-9%	9%					0%	9%	-9%				
(b)	without their consent & with their knowledge	0%	29%	-29%					35%	-18%	-16%					-35%	47%	-12%				
(c)	with their consent & without their knowledge	14%	0%	-14%					-4%	-8%	12%					18%	8%	-26%				
(d)	without their consent and without their knowledge	-14%	14%	0%					9%	0%	-9%					-23%	14%	9%				
17.2	Students' use of university IT resources from university residences:																					
(a)	with their consent & with their knowledge	29%	0%	-29%					-9%	-9%	18%					38%	9%	-47%				
(b)	without their consent & with their knowledge	29%	0%	-29%					25%	-27%	2%					3%	27%	-30%				
(c)	with their consent & without their knowledge	57%	-29%	-29%					-12%	1%	11%					69%	-29%	-39%				
(d)	without their consent and without their knowledge	-14%	14%	0%					9%	0%	-9%					-23%	14%	9%				
17.3	My learning activities when I log into the VLE (Blackboard)																					
(a)	with their consent & with their knowledge	-14%	14%	0%					-18%	0%	18%					4%	14%	-18%				
(b)	without their consent & with their knowledge	-14%	29%	-14%					7%	-9%	2%					-22%	38%	-16%				
(c)	with their consent & without their knowledge	14%	-29%	14%					-22%	11%	11%					36%	-39%	3%				
(d)	without their consent and without their knowledge	0%	0%	0%					9%	0%	-9%					-9%	0%	9%				
Q18	Does Ryerson University have a policy concerning the use of computing resources by students?	Formal, written policy	Informal Policy	No Policy	Don't know				Formal, written policy	Informal Policy	No Policy	Don't know				Formal, written policy	Informal Policy	No Policy	Don't know			
(a)	Software (e.g. game playing)	-29%	0%	0%	29%				-18%	9%	0%	9%				-10%	-9%	0%	19%			
(b)	Printers and other peripherals	-14%	0%	0%	14%				-24%	13%	0%	11%				9%	-13%	0%	3%			
(c)	Email	0%	0%	14%	-14%				-23%	11%	0%	12%				23%	-11%	14%	-26%			
(d)	Internet	-29%	0%	14%	14%				-31%	11%	0%	20%				2%	-11%	14%	-6%			
(e)	Other (please specify)	-6%	-26%	0%	31%				-18%	0%	0%	18%				12%	-26%	0%	14%			
Q19	Each week I access social networking sites for about: (in hours)	Up to 1	1 to 5	6 to 10	11 to 15	16 to 20	20 +	None	Up to 1	1 to 5	6 to 10	11 to 15	16 to 20	20 +	None	Up to 1	1 to 5	6 to 10	11 to 15	16 to 20	20 +	None
		0%	0%	0%	0%	0%	0%	0%	-36%	18%	9%	0%	0%	0%	9%	36%	-18%	-9%	0%	0%	0%	-9%
Q20	I use social networking sites for career advice.	43%	0%	-43%					-13%	27%	-15%					56%	-27%	-28%				
Q21	I use/will use social networking sites to look for a job.	0%	0%	0%					9%	-9%	0%					-9%	9%	0%				
	Courses	FT	PT	Cret	Other																	
		33%	61%	6%	0%																	
	IT Work Experience (in yrs)	None	Under 1	1 to 2	2 to 5	5 to 10	10 to 15	15 +														
		39%	17%	17%	11%	11%	6%	0%														
	Gender	Male	Female																			
		83%	17%																			
	Age	Under 25	25 - 40	41-50	Over 50																	
		59%	41%	0%	0%																	
		Yes	No																			
	Computer Ethics	22%	78%																			
	Ethics Module	17%	83%																			

Table 3 – Comparison of the changes in responses for those with Work Experience to those with No Work Experience from the start to the end of the course

8.2 Sharing Logon Access Codes

Participants felt strongly against using another‘s access code if they didn‘t have their permission. However, they felt less strong if they had permission and gave examples of work situations where managers give staff their access codes to close out retail operations at the end of the day. They made a clear point that sharing access codes left the individual open to identity theft or fraud and that an individual was responsible for anything that happened under their login.

8.3 Monitoring of the workplace and university

On the discussion board, many students indicated they would not like to have surveillance in the lab but feel if it is necessary (especially if the university is experiencing a high rate of crime or misuse of university resources) then it is acceptable as long as the students have prior notice and they are told when and how it will be monitored. One student thought it breaches privacy issues and is totally wrong because students don‘t have time to misuse university resources and wouldn‘t do it anyway. Another student thought it a waste of university resources and a misuse of student‘s fees.

There were strong feelings discussed on monitoring the Blackboard Virtual Learning Environment (VLE). Some thought it an invasion of privacy and a waste of resources. Others thought it acceptable to ensure that the system was working successfully. Others thought that they should be aware of when and what is being monitored.

The university uses the services of turnitin.com as a method to combat plagiarism and students are made aware of this in every course where it is used. However from their responses, it doesn‘t appear that students are aware of the monitoring capabilities that are available for professors to use in the VLE and when and where they are being used.

8.4 Value of Codes of Conduct and Ethics Education

Participant‘s views were consistent with respect to imposing codes of conduct, codes of professional responsibility and ethics education. The views at the beginning of the course were extremely high – 100% and clearly the course didn‘t change their views on the value of codes of conduct. Their opinions weren‘t as strong on the value of ethics education – it remained strong at 89%.

8.5 Work Experience versus No Work Experience

Although the pilot group is small, it appears that both groups experienced an overall shift to a more ethically principled approach in the use of computing resources. There was a greater shift for those with no work experience possibly because they became more aware of the context where the issues arise.

9. Conclusions

It isn‘t clear that this is a particularly useful tool to determine a shift in moral sensitivity. It is difficult to assess moral sensitivity using a tool that tries to convey a complex idea in a single simple statement and gather views using a 5-point scale. The participants were part of a compulsory ethics class and were taking the survey as part of a class assessment. This was not a voluntary activity and it is difficult to know whether they were answering honestly or answering to just get it done. In some cases, there was a lack of understanding of the questions and in misunderstanding the scale.

However, it did provide value in determining some potential areas to target for ethical related discussions such as the balance of respecting intellectual property of software developers against innovation; the balance of respecting individual privacy against public safety and the impact on different stakeholders such as the university or the employer.

The survey was administered early in the course before there was any time to position it and its value. The second survey was administered at the end of the course when students may have been focused on grade related activities in other courses and saw this as providing little value. Perhaps it would be more beneficial to provide grade marks for completion of each survey. Although the survey was administered anonymously, the discussion forum was not and possibly may not have provided the insights that voluntary focus groups would provide.

With respect to assessing changes in moral sensitivity, this approach is too narrow in its focus and doesn‘t provide enough of a context for effective student response. In further discussions with Bebeau, she suggests presenting the issues in audio or video cases for students to respond and even interact with and recording their responses in essay format rather than a single response on a Likert scale.

10. Future Work

Two hundred and fifty students will be taking the compulsory ethics class in the winter term and it will be worth administering the survey again to a larger population sample to simply identify the key areas to focus on in the course. It is unlikely that this sample population would have a large number of participants with work experience and so it is unlikely that further insights can be drawn on the effect of work experience. As a future tool, it would be useful to expand the questions to include views on other potentially ethical related issues in the use of IT such as in weaponry, video games, robotics, social networking, and the digital divide.

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Appendix A

1. Comment on whether you think it is acceptable for the university to use surveillance of students‘ use of the Blackboard Virtual Learning Environment. Why or why not? Under what conditions.
2. Comment on whether you think it is acceptable for the university to use surveillance of students‘ use of university IT resources in the learning and teaching areas? Why or why not? Under what conditions.
3. Discuss how you might or might not use a social networking site to look for a job. What do you think is a social networking site? Would it make a difference if the social networking site was geared towards business professionals?
4. Comment on whether you think it is acceptable for someone to make unauthorised copies of commercial software for their own private use. Does your view change between the university and the work environment? How do you think a company should handle the situation if a company employee has been found with an unauthorised copy of the software for his home computer?
5. Comment on whether you think it is acceptable for someone to use other peoples‘ access codes/passwords with their permission to access data they are not authorised to see. Do you think there is a difference between the university and the employer's environment?
6. Comment on whether you think it is acceptable or not for someone to use the University‘s computing facilities for their own profit-making activities if this has no adverse affect on the university. Do you think it is different it is the employer's facilities rather than the universities?

IMPACT OF COMPULSORY COMPUTER ETHICS EDUCATION ON THE MORAL JUDGMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY MANAGEMENT STUDENTS

Candace T. Grant

Abstract

With the large amount of time and money that is being invested in computer ethics modules, how can we demonstrate that they are of value and meet their learning objectives? This paper investigates Rest's Four Component Model and the work done by Bebeau in moral development in the dentistry profession to locate a measurement that is repeatable, easy to administer and provides pedagogical value to students. Given the timeframes and the resource constraints, Rest's DIT2 was piloted as a method to measure changes in moral judgment over a computer ethics module. The process was repeatable and easy to administer but the pedagogical value is questionable.

1. Background

Preparing future Information and Communications Technology (ICT) professionals to deal ethically with the complex ICT-related issues they will face in the workplace is a challenge being considered by many ICT schools at colleges and universities. Ethics became a hot topic in the early 2000's, with the financial reporting improprieties of WorldCom and the involvement of audit firms such as Andersens in not identifying the discrepancies. It has gathered more momentum with the recent crisis in the financial markets and the inappropriate behaviours of people in positions of authority such as the British MPs and their expense reporting.

ICT is becoming more pervasive. Not only do more people have access to computers - they often own more than one if we just consider palm tops and laptops - but more products include computer-based technology such as intelligent weapons, vacuum cleaners and refrigerators. They provide many benefits but as with many new technologies, and because of their key characteristics, (Maner, 1996) there is the potential to cause great harm if used inappropriately.

Educational institutions, organizations and professional associations are funding many education and training programmes. In the 1990's there were reported to be more than 10,000 such programmes in the USA alone. The researcher has developed a compulsory module for second-year students in a four year ICT Management degree programme and has delivered it twice to over 400 future ICT professionals. The programme makes use of some key pedagogical approaches that have been shown to be effective in ethics education, such as OBAL (objective-based action learning), role playing, dilemma discussions, critical thinking and stakeholder analysis (Grant, 2009). It is important to demonstrate to students, employers and the public at large, that the programme is effective and meets learning outcome targets.

How can we demonstrate that students leave the computer ethics module, functioning at a higher moral development level than when they arrived? Is there an effective measure that would be easy to administer and thus repeatable with each module? Is there a technique that could be administered as part of the module and feedback provided to students individually to support their personal development?

2. Context of the Study

The Ted Rogers School of Information Technology Management (ITM) at Ryerson University in Toronto, Canada, with approximately 1200 students, provides a four year Bachelor of Commerce Degree with an ICT Management major. Most students graduating from the programme will become ICT analysts such as business analysts or database analysts and move on to project management and ICT management positions. Although the programme is only ten years old, some have become Chief Information Officers.

Professional schools have adopted a number of approaches in providing ethics education. One option is a dedicated continuous ethics module, such as a full-time one week seminar or 3 hours weekly or biweekly over a 12 week period. Another option is to include an ethics component in each of the core modules such as Programming, Systems Analysis or Project Management in the case of an IT Management curriculum. Some professional schools have taken a broader iterative approach and split ethics over the four years of a professional degree providing materials and activities that match with the professional maturity level of the students involved. The modules then focus on basic professional ethics concepts at the introductory level and build on those concepts up to the senior year.

The School of IT Management blends the first two. In addition to the ethics covered in the core modules, all second-year students take a 3 hour-per-week compulsory 12 week module in computer ethics for ICT professionals. Two hundred students take the ethics module in the Winter term (January to April). While the students range in age, in number of years of ICT work experience, ethnic background, gender, and exposure to ethical discussions on the use of ICT, most are young and lack business experience. The aim of the module is to make students aware of the ethical issues surrounding ICT and provide some tools to assist students in addressing them.

Unlike the model spanning an entire four-year degree programme, the approach taken in ITM only provides a 12 week period in which to assess the impact of ethics education. The Center for Ethical Studies at the University of Minnesota, has compiled extensive research on what impacts moral development, how it can be measured especially in the context of moral development in the professions.

3. Measuring Moral Development

One of the early measures, the Moral Judgment Interview, was developed by Kohlberg (L. Kohlberg, 1969). Based on the work of Piaget (Piaget, 1932), he studied the moral development of children through to adulthood by looking at cognition. Kohlberg's, model is based on "role taking" or looking at a problem from different perspectives. Kohlberg argues that role taking influences moral reasoning and moral reasoning affects moral judgment. He identified six stages that individuals pass through as they develop morally. Kohlberg found that by the end of high school, most North American students have reached the fourth stage (Kohlberg, 1969).

To determine the level at which an individual functions, Kohlberg developed the MJI (Moral Judgment Interview). Interviewers, in one-on-one interviews, administered role-taking scenarios to determine an individual's level of moral development. Although proven to be valid, these tests were quite time-consuming and needed well trained individuals to facilitate the interviews. Given the numbers of students and the short time period, this was not an option as it would be too resource intensive.

Rest's built on Kohlberg's work and provides two perspectives of relevance to this study (Rest, Narvaez, Thoma, & Bebeau, 2000). First he suggests that there is more to "behaving morally" than cognition and knowing what to do. There are actually four components that influence moral behaviour: moral sensitivity, moral judgment, moral motivation and moral character.

Rest suggests that Kohlberg's method could assess how well an individual could perform steps (a) and (b) above, but, from a management or societal perspective, it is not sufficient that individuals be able to articulate the moral action, they must also be able to follow through and act in a moral way, that is to ***behave*** morally**.**

Rest suggested that individuals followed schema or patterns in making moral decisions and that they may use more than one approach depending on the situation. He classified his schema as: ***pre-conventional*** where judgments are based on self-interest; ***conventional*** where judgments are based on following the norms of society such as laws, codes of conduct, corporate policies; ***post-conventional*** where judgments are based more on fundamental moral principles such as justice or duties of care.

Secondly, Rest developed a simpler approach to assessing moral judgment based on the above schema – the Defining Issues Test (DIT or latterly DIT2) (Rest, Narvaez, Bebeau, & Thoma, 1999). Whereas Kohlberg's measures were determined by how participants score on free-responses to hypothetical moral dilemmas in an interview, the DIT is a computer-marked, paper-and-pencil test that presents 12 issues after a hypothetical dilemma and asks the participant to rate and rank them in

terms of their importance (Thoma, 2002). The DIT data consists of ratings and rankings instead of interview responses that need to be scored by a trained interviewer.

4. Measuring Moral Development in the Professions

Muriel Bebeau (1994) be has been instrumental in an ethics curriculum for the Dentistry School at the University of Minnesota. She has developed parallel interventions, measures and feedback mechanisms to support the ethical development of dentists throughout the four years of their programme of study. Her work is based on Rest's Four Component Model (Rest, 1994) which suggests that all four components need to be in place for moral behaviour to occur and that an educational intervention in ethics should address all of them.

Bebeau (2002) describes each component and a measure for how it could be assessed. Table 1 summarises component, describes the measure, assesses the feasibility and provides results of any partial attempts. The final choice was to assess moral judgment using the DIT2.

Rest's book "Moral Development in the Professions" provides several case studies where the Four Component model has been used to study moral development in the professions (Rest & Narvaez, 1994). It is the intention of the researcher to eventually consider including interventions in the ethics module that will cover the development of the four capabilities.

Although Bebeau suggests starting with the third capability of moral motivation to help future ICT professionals understand what it means to be an ICT professional, there was insufficient time to put a qualitative study in place for a fall pilot. Given the timeframe and the availability of resources, it was decided to pilot a quantitative assessment using the DIT2 to assess the changes in moral judgement from the start to the end of the module.

The DIT and later the enhanced DIT2 has been used for over 25 years and are well validated in terms of several criteria that are relevant to this study. It is significantly related to cognitive capacity measures of moral comprehension; sensitive to moral education interventions; validated for longitudinal studies and significantly linked to many "pro-social" behaviours linked to desired professional decision making.

Several others have used the DIT or DIT2 to assess the impact of a computer ethics course on student's moral development (Jagger & Strain, 2006)(Staehr & Byrne, 2003).

This paper addresses the question: Does Rest's Defining Issues Test provide an effective and easy way to determine whether a compulsory computer ethics module has a positive impact on the moral judgment of Information and Communication Technology Management Students?

5. Methods

Rest's Defining Issues Test 2 (DIT2) (Rest et al., 1999)has been widely used in a number of environments to study the development of moral judgment and is widely correlated to be effective (King & Mayhew, 2002). The majority of full time students (about 200) study computer ethics in the winter term (January to April) but there is a small group (40) of both full and part time students that study it in the evening in the fall term (September to December). This second group made an excellent pilot.

The DIT2 Instruction Booklet, Researcher's Guide and student answer sheets were provided by the Center of Ethical studies. Students were given the instruction booklet with minimum verbal instructions and they completed the assessment as part of a module assessment in week 3. Marks were allocated for completion. The answer sheets were coded to maintain anonymity. Completed forms were sent to the Center at the University of Alabama for processing and three weeks later the analyzed data returned with individual student reports and a CD with data in a form suitable for SPSS analysis.

The second DIT2 assessment was conducted in week 11 and the forms processed by the Center. It was decided to provide both results to the students at the same time so that they could see the change. However, time ran out, the first results were returned and the return of the second results is still in progress. No marks were allocated for completing the second DIT2 assessment.

Four Component Model Description	How to measure it?	Feasibility/Outcomes
Ethical Sensitivity: Knowing the norms of one's profession, when they apply Ability to recognise an ethical issue, to interpret the reactions and feelings of others Being aware of alternate courses of action, how individuals could be affected. Involves empathy and role-taking.	Put students in a real life situation where they witness a professional interaction that raises ethical issues and have them write an assessment of the situation. Situations can be presented on audio or video tape.	Have access to case studies that could be used for scenario scripts. However, time needed to develop the tapes and the marking criteria for the assessments. Made use of a survey on ethical opinions to see how they changed through the module. (See paper at ETHICOMP 2010)
Moral Reasoning/Judgment Ability to assess a situation and determine the appropriate course of action.	DIT2 Test to assess approach to making moral judgments.	Forms, computer processing and report provided by Center for Ethical Studies. Little resources required. Decision to go ahead.
Moral Motivation/Identity Ability to resolve conflicting priorities between moral issues Understand one's professional responsibilities is a key bridge between knowing and doing.	Assessing the ability to articulate the key concepts of professionalism.	Essay on ~~"~~what is means to be an ICT professional". Students wrote essays but more time is required to assess criteria to determine progress.
Ethical Implementation Ability to follow through on one's decision and act morally.	Assess essential ethical implementation skills using some form of performance assessment technique.	Make use of simulations to identify issues in a case, identify a recommendation and then meet in a simulation with the antagonist to deliver the message. Although this has been used in the module, it has only been used for a few individuals and would take some effort to determine how to do this for 200 with appropriate assessment and feedback.

Table-1 Assessment of Four Component Model in Selection of Measure for Pilot

6. Findings

Given the timing delays in the pilot, it was not possible to obtain consent from students until after the course was completed. Eighteen students provided their consent to use their results in this study. Fourteen of those students had provided two surveys, correctly coded, for which there were comparable results.

Table 2 shows the results of the assessment at the Start of the module and at the End of the module along with the change in approach to moral judgment. Of the 14 who completed both tests, looking at the changes in Type, 6 showed no change; 4 showed a move towards a post-conventional approach and 4 showed a move towards a less post-conventional approach. Of the ones that changed, there was a positive move of 5 points and a negative move of 9 points. 20% of this group reported that English was not their first language.

The first three columns, Personal Interest (PI), Maintain Norms (MN) and Post-conventional (PC) give the percent of selections the participant made that would indicate their preference for the using the specified schema. In the case of the third participant, 20% of their selections indicated a preference for the personal interest approach whereas 26% of their selections indicated a preference for the Post-conventional approach. By the end of the course, their preferences for the Post-

Conventional went up to 34%. However so did their preference for the Personal Interest. Overall the Type moved from "5" to "6" indicating a more solid post conventional approach but still borderline.

The fourth column is the N2 score and this is an assessment of the preference for the post-conventional approach combined with the lack of preference for the personal interest approach. In the case of the third participant, the N2 score increased because of the increased preference for the Personal Interest.

There are seven Type scores based on whether the participant prefers one approach overall or is transitioning between two schemas. The values are:

"Type 1" – predominant in personal interest schema and consolidated
"Type 2" – predominant in personal interest schema but transitional
"Type 3" – predominant in maintaining norms schema but transitional; personal interests secondary schema
"Type 4" – predominant in maintaining norms schema and consolidated
"Type 5" – predominant in maintaining norms schema but transitional; post conventional secondary schema
"Type 6" – predominant in post conventional schema but transitional
"Type 7" – predominant in post conventional schema and consolidated.

The DIT2 Guide provides a table of results by education level. It includes the average PI, MN and PC percentages by grade level from grades 7 to 9 through high school, 1st through 4th year undergraduate and graduate students. The results for this group largely correspond to those with a first year university education level. The test is reported to be most suitable where English is the mother tongue and the test results reported that 20% of the respondents reported that English wasn't their first language.

The graph shows an interesting distribution of the respondents by type – spiking at type 2 and type 5, both of which are transitional categories. Type 2 is transitioning from personal interest to maintaining norms and Type 5 is transitioning from maintaining norms to post conventional. Of the 14 respondents only 2 were consolidated in a specific schema – four at the post-conventional level. None were consolidated at the personal interest or maintaining norms but were transitioning and clearly in a state of flux in deciding the appropriate route to follow.

7. Discussion

Despite the fact that the results show progress in moral development and an overall result that is in line with the results for students in the early years of university, the sample is quite small and it is difficult to generalise the results from such a small pilot. Although the survey was administered initially to about 40 students, only 26 completed the second survey and only fourteen of the students had data that could be included in the research.

Some of the questions implied a knowledge of American life that may have affected how respondents perceived the answers to the questions. In discussions afterwards, respondents commented that it wasn't easy to determine how answer the questions and they didn't understand some of the terms used in the questions. (The DIT2 has been found to be biased towards those who English is their first language, however in this study only 20% reported that English wasn't their first language so that shouldn't have been a big factor here.)

Marks were awarded for completion of the first test but not for the second. Many students were absent for the second class or chose to leave early rather than complete the test. There were a higher percentage of purged results on the second test than the first test.

The results were sufficient to make it worthwhile to conduct the study with a larger group in the Winter term. The pilot helped to iron out the administrative kinks and highlight areas for improvement such as the need to spend more time walking through the instructions, giving students a better sense of the value of the assessment to them, and providing the feedback in a more timely manner.

Comparison of Students Who Completed Both DIT2 Tests																		
ID	Start of Module						End of Module						Change					
	PI	MN	P	N2	Type		PI	MN	P	N2	Type		PI	MN	P	N2	Type	
1	32	34	16	25.14	3		32	38	22	30.38	2		0	4	6	5.24	-1	
2	50	38	12	8.47	2		34	18	28	31.63	2		-16	-20	16	23.16	0	
3	20	50	26	16.72	5		28	30	34	34.14	6		8	-20	8	17.42	1	
4	16	46	28	25.31	5		20	50	24	29.82	5		4	4	-4	4.51	0	
5	36	46	12	17.03	3		30	48	4	3.98	3		-6	2	-8	-13.05	0	
6	18	42	38	33.15	5		20	52	18	22.88	3		2	10	-20	-10.27	-2	
7	14	40	38	40.5	5		10	28	62	62.42	7		-4	-12	24	21.92	2	
8	24	38	26	18.19	5		12	48	32	16.63	5		-12	10	6	-1.56	0	
9	18	30	46	51.95	7		10	30	50	57.77	7		-8	0	4	5.82	0	
10	28	30	38	31.81	6		50	30	12	7.67	2		22	0	-26	-24.14	-4	
11	44	46	4	-1.16	4		16	48	36	39.38	5		-28	2	32	40.54	1	
12	46	52	2	-2.3	4		43.75	39.58	6.25	1.19	2		-2.25	-12.42	4.25	3.49	-2	
13	26	32	40	40.31	6		18	38	44	50.17	7		-8	6	4	9.86	1	
14	20	10	70	64.07	7		22	6	64	64.13	7		2	-4	-6	0.06	0	
Average	24.7	36	31.2	32.3	4.5		28	38	28	26.4	4.8		-3.3	-2.2	2.9	5.9	-0.3	
Total													-46.3	-30.4	-40.3	83	-4	

Table 2 - Comparison of Students Who Completed Both DIT2 Tests

Type	Number of Respondents	
	Start	End
1	0	0
2	1	4
3	2	2
4	2	0
5	5	3
6	2	1
7	2	4

Table 3 – The change in the numbers of each students with each Type from the Start to the End of the Module

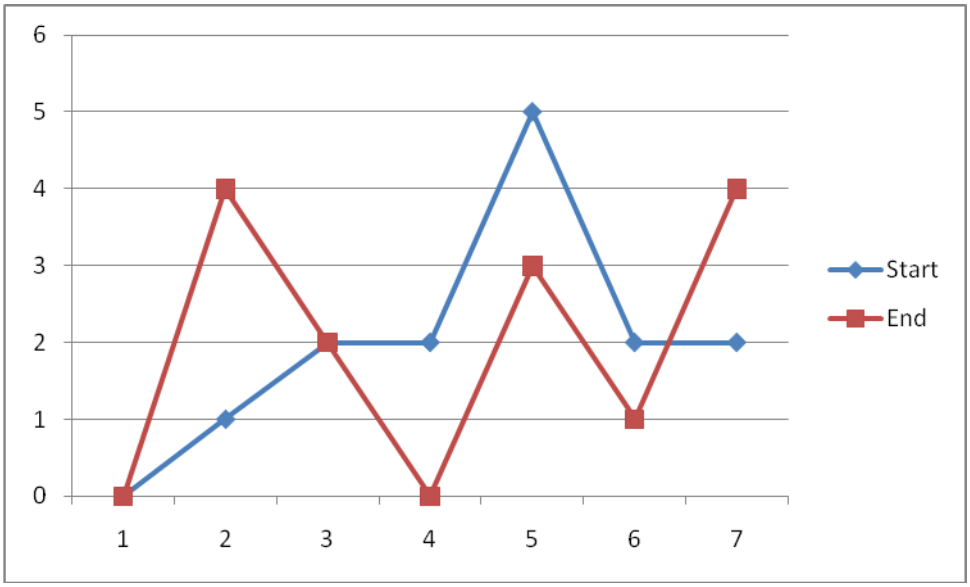

Table 4 – Comparison of numbers of students (y-axis) for each Type (x-axis) at the Start and End of the Module

8. Conclusions

The research study focused on finding a measure that could be used to determine the success of a computer ethics module in measuring the change in moral development over the course of the module. However, future hiring managers would likely be more inclined to look for a computer ethics module that provides a basic skill level than one that can simply demonstrate a positive change. Perhaps a demonstrating a positive change in moral development isn‘t as important as demonstrating a specific skill level in proving the value of a computer ethics course.

Instead the focus should be on assessing competence in each of the four components and determining whether a specific level has been achieved in each. Bebeau‘s experience with the dentistry students has provided some good suggestions on measurements. The challenge will be identifying assessment criteria that is repeatable and easily administered consistently in a timely manner by several different assessors with such a large number of students.

In the case of Ethical Sensitivity, is there a way that a case situation, such as a discussion between two ICT professionals on reducing testing effort to meet the project delivery deadline, can easily be

taped, ideally in video format, that would enable students to self-administer and write up their assessment for feedback?

Or in the case of Ethical Implementation, can a live simulation be used to assess how well a student can identify the ethical issue and meet with their antagonist to convince them of the need for action? Although this has been used in the module, it has only been used for a few individuals and would take some effort to determine how to do this for 200.

The study wasn‘t able to prove that this approach could be used to help students understand their own approaches to moral judgment and then form the basis of some discussions on how to help them develop it. The study also wasn‘t able to prove that the DIT2 could also be used to measure the impact of a specific intervention on the moral judgment levels of students in the programme. Nevertheless, the process went relatively smoothly and the tests were easy to administer. The bubble sheets were returned in a timely manner and the data returned in a format suitable for processing in SPSS.

The students would benefit from starting with Rest‘s third component, moral motivation, and focusing on understanding the responsibilities of an ICT professional and what that means. They would benefit from an orientation to what impacts moral behaviour and then to understanding the different approaches to moral judgment. The test should be seen as an integral part of the module with marks allocated not only for completing both tests but also for a paper, reflecting on what the results mean to them individually.

8.1 Next Steps

It would seem that with little administrative effort the test could be administered again with a larger population in Winter 2010. At that time there will be 200 students, mostly full-time day students and the numbers of students with English as their first language will be greater. There will also be an evening class of about 50 students with similar demographics to the pilot group that could be used as a comparator to see if the pilot results were representative.

8.2 Further Research

Since Rest suggests that there are four components that affect moral behaviour, there should be interventions that develop those components and measures to determine if the outcomes have been achieved. Developing and testing the interventions and the measures in a discipline of ICT professionals would be of value, not only to future ICT professionals studying in the university environment but as tools for ethics training in the workplace.

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APING AROUND: INVESTIGATING THE SOCIAL AND ETHICAL IMPLICATIONS OF AN INTERACTIVE FAMILY DVD

Peggy Gregory, Karen Whittaker, Danielle Binns and Katie Taylor

Abstract

We describe the development and evaluation of a prototype DVD designed for use by parents and adolescents together and aimed at improving communication within the family. The prototype DVD was developed by a multi-disciplinary team as an interactive story and evaluated by 178 adults and young people in local schools and parenting groups. Overall responses to the DVD were positive although uncertainties were expressed about aspects of the audio and whether human or animal characters were most appropriate for the content. The adults and young people participating also indicated differences in opinion with regard to ongoing use of the DVD in the family situation. We discuss the issues of using film or animated media when portraying families' lives and the implications of attempting to effect social change through the use of technology.

1. Introduction

This paper presents work completed for the APE project (Adolescent & Parent Experiences). This involved the development and evaluation of a prototype interactive DVD, designed for supporting communication between adults and adolescents (13-19 year olds). The APE project evolved as an extension to previous work (DVice – www.dvice.org) carried out by the School of Computing, Engineering and Physical Sciences (CEPS) within the University of Central Lancashire. As a joint project between CEPS and Lancashire Youth Offending Team (LYOT), the DVice project centred on the offending behaviour of 13-17 year olds, through the development of an interactive web-based programme that young people could use with the help of a professional LYOT worker. Whilst the DVice project was successful in its own right practitioners working with it noted that, no matter how positive the work between young people and LYOT practitioners, relationships in the home environment were not being addressed in the DVice project. This limitation was a particular concern given that the home environment is where key influences on personal behaviour start and develop as children mature. Indeed, there is a considerable body of evidence indicating that through their relationships with their parents children learn key social skills (Bowlby, 1988, Gilliom et al., 2002, Cozolino, 2006) and as they mature into young people they learn self-control and how to manage risks (Cullingford and Morrison, 1997, Aunola et al., 2000, Reese et al., 2000, McArdle et al., 2002, Michael and Ben-Zur, 2007).

2. The APE project

The APE project secured a small internal grant in order to explore whether technology could be utilised to establish and facilitate communication between young people and their parents/carers in their home environment without intervention from outside agencies. A multi-disciplinary team from three different Schools within the University – Computing, Nursing and Media – as well as participants from outside bodies – Action for Children (a charity), Central Lancashire PCT (a health body), and Lancashire Youth Offending Team (a statutory body) developed a framework that could potentially aid communication between young people and their parents/carers. The purpose of working in a multi-disciplinary team was so that each team member could bring knowledge to the project from their own area of expertise.

During preliminary meetings the team designed a draft framework for an interactive application that could be used by families with different types of need. Some elements within the framework were designed to be used by families at home whilst others would require professional support. It was decided to develop a prototype of one element of the framework in order establish proof of concept. A particular feature of the project was the collaboration between all parties in the creative process of developing an innovative media programme. As the exact design was unknown at the beginning of the

project, a broadly agile development approach was adopted for the design. This is an iterative and incremental process that places great emphasis on collaborative working. It was adopted to manage the evolving requirements ensuring the project remained within budget, timescales and delivered benefit to the parties concerned (Nerur and Balijepally, 2007). The animation and development were undertaken by a group of Media students who completed the work as part of a third year module. One member of the team involved in developing the product went on to do the evaluation.

Early research established that a DVD for use on a shared television screen would be a good option to engage the target demographic in this type of social communication. Williams et al. (2009) argue that television can be used to support significant new forms of social communication between groups. Film media is already used by parenting training programmes, such as the internationally known Triple-P, developed in Australia (Sanders et al., 2000). In order to be successful, programmes delivered via this type of shared medium need to be interesting and simple to use as ‗dullness' and ‗difficulty to use' were cited as barriers to adoption. Improvements in ‗turn taking' in group communication is also seen as a potential benefit of this form of media. DiMicco et al. (2004) conclude that those who typically over-participate in discussions tend to restrict their comments, whilst there was no change in participation from those that typically under-participate. This could be an important factor in the design of a product to be used by young people and their parents who would usually have a superior/subordinate relationship.

The use of technology to support healthy living in family groups has been documented by Grimes et al. (2009). Whilst their study was concerned with the use of technology to examine families' interest in and attitudes toward collecting and sharing behavioural and physiological health information they offer advice on how technology might support family discussions. The points discussed below would be equally applicable to an Adolescent and Parenting Experience product.

Design recommendations offered by Grimes et al. (2009) include: using family gatherings as an opportunity for reflection; developing programmes that foster cooperation rather than competition; capturing a number of elements to provide a richer, more reflective experience; and only allowing individual data to be available to others within the family when both people are simultaneously available. From the APE project viewpoint the choice of DVD as a medium for delivery was made to enable young people and parents to use the product in the familiar situation of watching the television. An additional advantage of using a DVD format was that it can also be used on a computer. Televisions are both more readily available in households than computers and are easier to use in a group setting than computers, which are designed for single person use. At this prototype stage no data on individuals was collected, although other elements within the framework would potentially involve collecting data or may be used with the help of a trained practitioner. The scenario used in the prototype DVD was the problem of a young person ‗coming home late'. Whilst as a scenario this was possibly confrontational it was also considered to be commonly experienced. By choosing different routes through a scenario both young people and parents have the opportunity to discuss a wide range of issues and emotions to gain understanding of each other's views. The aim of the APE prototype, therefore, was to act as an aid to facilitate face-to-face communication between young people and their parents/carers.

The prototype DVD contains a cartoon-based interactive story in which an adolescent comes home late. The DVD was developed so that it could be watched by the whole family on television or computer, with both parents and adolescents able to make choices about how the story progressed by choosing responses that most closely matched their own. We used three different types of cartoon apes to play the characters – gorillas, orang-utans and chimpanzees - with a parent and adolescent character for each type. The three ape families were based on classic definitions of parenting styles detailed by child psychologists such as Baumrind (1966) and Maccoby and Martin (1983). These were the authoritarian (gorilla) parent who expects rule-following without negotiation, the laissez faire (orang-utan) parent who makes few demands and accepts most behaviours and the democratic (chimpanzee) or authoritative parent who sets clear boundaries and uses reasoning and negotiation. Adolescent responses to those parenting styles were based on the experiences of experts in the development team. An example of the different choices that could be made is that when the adolescent eventually arrived home the parents could choose whether they a) felt angry and told the young person they couldn't go out for a month (authoritarian response), b) were unconcerned and let the young person creep in quietly and go to bed (laissez-faire approach) or c) were relieved and told the young person they'd

discuss appropriate sanctions the following day (democratic response). A combination of humour and real-life choices in the story aimed to bring a light touch to the serious process of reflection about different ways of responding.

3. Evaluation of the APE DVD

The aim of the evaluation was to explore reactions to the DVD, the suitability of its content, and to investigate how it could stimulate family communication. We were particularly concerned to gather the views of young people and how they might perceive the DVD. This was because materials of this kind, such as the film media used within Parenting Wisely, Triple-P and the Incredible Years programmes are typically only evaluated by adults as part of parenting training programmes (Lagges and Gordon, 1999, Sanders et al., 2000, Patterson et al., 2005). We proceeded with the evaluation of the DVD after permission had been granted by the Faculty of Science and Technology Ethics Committee at the University of Central Lancashire to approach local schools and parenting practitioner forums to seek participants. Once access to local schools and parenting groups had been negotiated, group demonstrations of the DVD were organised for young people, parents and parenting practitioners. Additionally, classes of school pupils were given the opportunity to propose ideas and inspiration for future development of the project. We used a questionnaire to gather data from these diverse groups but also gathered data by observation, interviewing and group discussion. The questionnaire was administered after participants had seen the DVD. They were asked about the characters and how they were presented, the topic covered by the scenario, the ease of use and the potential for using this type of product. Questionnaire evaluation of the DVD was completed by 178 people of whom 127 (70%) were young people, 26 (15%) parents and 25 (14.6%) parenting practitioners. 70% (n=124) of the participants were female and 30% (n=54) were male. 83% (n=143) of the participants were of white ethnicity. Age ranges for young people ranged from 13 to17 years (mean = 14) and for adults ranged from 24 to 60 years (mean = 40).

In completing questionnaires, participants were invited to indicate on 100mm visual analogue scales their opinions on a range of features concerning the DVD design, topic and usability. Data were analysed using SPSS version 17, using simple descriptive statistics to explore the data and the unrelated t-test to check for differences between adult and younger person mean responses.

Responses to the DVD were generally positive. 61% (n=109) of participants stated there was at least one element on the DVD that they viewed positively. The most common response to the DVD from young people was that it made them think about their parents‘ viewpoint, whereas for parents it made them think about how they communicated with their child. Additionally over half of the participants felt that the DVD would help to encourage communication with family members about coming home late. Over a third of participants felt that that DVD was a good idea. Examples of comments from an adult perspective were:

~~–it~~ *enables you to see the other side of the story*”, and

~~–t~~*he DVD is a medium that teens can relate to and would be more inclined to (use)*”.

Examples of comments from a teenage perspective were:

~~–it~~ *was an easy story to follow*” and

~~–t~~*he DVD is better than a leaflet. It makes you want to have a look rather than scrunch it up and throw it away*”.

When comparing adult and younger person responses it appeared that both groups had found the scenario easy to follow, had liked the options available, the medium, and its interactive nature. However, there were some areas in which adults and younger people differed in their views on the DVD. These were the choice of scenario, the likelihood of the DVD helping with family communication and the desire to view the DVD in a family group. On the whole these results indicate that adults‘ responses to the DVD were more positive than those of the young people. Both adults (mean = 77) and young people (mean = 59) appeared to like the topic of the DVD although the adult scores were higher. Adults also indicated that they related more to the scenario of ‗coming home late‘ (mean = 71) than young people did (mean = 50) and this difference was statistically significant (t=5.01, df=172, $p<0.0001$). This indicates that the scenario had more resonance for the adults as it was possibly an experience that had caused them more concern than it did for young people. Another interesting finding was that adults (mean = 69) were more inclined than young people (mean = 45) to

indicate that they felt that using the DVD could help with family communication (t=5.091, df=174, p<0.0001). Additionally the young people participating indicated less of a desire than adults, to use the DVD with other family members, with adults achieving a significantly higher mean score for happiness to use with other members of the family (mean=72) than young people (mean=48) (t=6.288, df=170, p<0.0001).

Participants‘ responses indicated they were less happy with the voice over, and there were also mixed responses to the question of whether human or animal characters were most appropriate for the content. The characters were specifically liked by 16% (n=28) of participants; however they were disliked by 10% (n=17). After showing the DVD, a number of young people expressed uncertainty about the suitability of the animated characters. Some indicated that it was difficult to identify with the ape characters and they would have preferred animated human characters, whilst others suggested that they would have preferred film to animation. However they also provided plenty of suggestions for other types of animated characters that could be used. In general there was a very varied response to the question of characterisation from young people. 74 (42%) questionnaire participants disliked an aspect of the DVD and of these 27 (36%) particularly disliked some part of the sound - either the background music or the voice-overs. Interestingly feelings towards this element were very similar for adults and young people.

Overall participants indicated through their responses that the interactive DVD was something of value that could assist in helping adults and young people communicate about difficult topics. They did however, in response to this prototype, identify several areas that required further development such as audio features and character choice. The results indicate significant differences in some adult and younger person responses to the use of the DVD which may have been as a result of inadequate involvement of younger people in the development of this prototype.

4. Social and ethical implications of the work

A number of interesting issues arise from this work. We were surprised to find whilst developing this product that, despite the UK government‘s aim of improving family cohesion and outcomes for young people by improving parenting skills, there is very little interactive material of this type available for families to use. Much of the material we found is only available in video or booklet format, and although it can sometimes be accessed via a website, is not interactive and does not make optimal use of the computer technology that is increasingly available to people in their homes. This might seem surprising when computer technologies offer very attractive service solutions to parenting support given that media communication represents low costs relative to delivering face-to-face support (Segal et al., 2003, Long, 2004, Montgomery et al., 2006). Also much of the existing material uses film media and is primarily designed to be used by parents. Films can be ethically contentious when the real lives of families are exposed, also they may not prompt the active engagement of viewers and they may not be watched by parents and young people together.

The portrayal of real lives through film media has been a growing phenomenon for the last 50 years, rapidly increasing across the globe in the last decade in the form of reality television programmes (Ipsos MORI, 2006). The rights and wrongs of including children in such programmes has been hotly debated, with children‘s charities (in the UK this includes the NSPCC and The Children‘s Project) campaigning for legislation against such practice on the basis that there are serious ethical concerns about presenting minors for public scrutiny (Esposito, 2008, NSPCC, 2008). Reality television programmes are developed in the main for entertainment purposes, although some concerned with demonstrating how parents and children interact, purport to have an educational intention. Examples include, the BBC ‗Baby Borrowers‘, Channel 4‘s ‗Supernanny‘ and CBS ‗Kid Nation‘. Nevertheless, presenting edited film sequences of children‘s real lives which often display the extremes of unpleasant behaviour, remains ethically questionable even if the wider audience is educated as a consequence. Ethical challenges concern obvious issues such as consent and the checking of adults involved in filming, as well as more complex concerns such as dealing with the consequences of altered public personae, ensuring non-prejudicial treatment at school and unaltered access to public services. In the UK concern about the potential risks to children has even prompted the Schools State Secretary to order a review of the existing 1968 regulations governing children performing (Paton, 2009).

The creation of animated film sequences is one way in which realistic but not ‗real' family scenarios can be presented to a wider audience for the benefit of public education. This is not new, but with advances in digital technology it is ever more feasible to take advantage of animation in place of live or acted film sequences. There are several advantages to using animation in these circumstances. Through the use of animated characters it is possible to avoid some of the regional, ethnic and social stereotyping that is difficult to overcome when using real characters. Most importantly we wanted the viewers to use the DVD as a stimulus for discussion about what happened within their own family, rather than to either talk about it as if it were someone else's problem or to only discuss it in abstract terms. The evaluation evidence would appear to indicate that products of this nature offer some promise in this regard, since the majority of participants considered that the DVD had prompted them to reflect on the others (parent's or young person's) view point. Although the DVD requires further testing to ascertain its impact on family communication, stimulating an awareness of another's position is the arguably an important first step towards helpful communication within the family.

We had noticed when reviewing other material produced for families that strong cultural and behavioural stereotypes were reflected in films that could cause viewers to dismiss the underlying message because they felt the situation portrayed did not reflect their own family. However, even in animated sequences there is still a need to add real voice-overs consequently it is not possible to completely eliminate any trace of regional, ethnic or gender identity from the characters. Nevertheless, we considered that eliminating some of the more blatant cultural biases would render the product to be more generally watchable by a wide audience. Feedback from the evaluation indicated that there were downsides to using animated animal characters, most notably the number of comments from young people that it was not always easy to identify with animal characters. However there is evidence that it is possible to provide animated characters with social characteristics that people respond to (Tomlinson, 2005). Before further development the team would like to investigate this issue further, as we consider it to be an important factor in the success of the product.

Our DVD was specifically developed with the aim of encouraging interaction between parents and adolescents. We designed the product so that both parents and young people could have equal input into the story. As the story progresses there are choice points at which either adults or young people need to input their decision about what happens next in the story. These decision points are times during which the action in the story is halted and the viewers can engage in discussion about what has happened in the story so far and how they think they would react. The aim is that these static points in the software become the active points for communication. This type of interactive software also provides a potential for personalisation that can make the product more relevant to a particular situation. For example, although not implemented in the prototype, it would be possible for several voices to be pre-recorded so that users could make selections about gender and region in order to personalise the DVD to their situation. Increasing the amount of personalisation available in the product may also be a way of improving user identification and involvement with the characters.

Looked at from a social perspective, our DVD is designed with the aim of encouraging social change. Although interactive games have been found to be successful at moderating behaviour, they have often been designed for particular circumstances such as improving diabetes care or increasing physical activity (Lin et al., 2006, Brown et al., 1997). In these cases they have clearly identifiable goals such as learning to manage diabetes or becoming more physically active (Lieberman, 1997). Also they are often designed for children to play on their own as standard video games where there is a motivation to win. There has been much speculation about the ways in which IT can enable social change; however we need to be careful not to make simplistic assumptions about technology use. It is naïve to view ICT programs as discrete tools that can effect social change. Previous research has shown that ICT is itself socially shaped and people use it according to their needs (Kling, 2000). The introduction of a technical artefact into a situation, particularly the home environment, is a matter of choice for the actors in that situation and they may exercise that choice in a number of ways. Although results from this study indicate that the DVD was largely viewed positively by the study participants who viewed it, we would like to undertake further research to investigate how the DVD may be used in real family situations.

From an ethical perspective we needed to carefully consider the consequences of the DVD causing problems within families rather than easing them. For the prototype we deliberately chose the ‗neutral' but commonly occurring scenario ‗coming home late'. However the intention for the next version of

the software is to develop several scenarios with different topics such as alcohol, drugs, sexual relationships, talking about feelings. As developers we need to consider whether this may cause more harm than good in some families and whether the product may be better used by professionals working with families rather than being accessible for use without professional support.

5. Conclusions

It is clear from previous research that the interactions and relationships parents have with their children are of central importance to the younger person's well-being, development and self-management of risks (Aunola et al., 2000, McArdle et al., 2002). The period of transition that occurs during adolescence can alter relationships with parents and the influence of peers and engagement in risk taking behaviours can become particularly strong (Cullingford and Morrison, 1997, Michael and Ben-Zur, 2007). This means that parents need supporting during this period and any programme designed to address adolescent risk taking should in some way work with both the young person and their parents or main carers (Reese et al., 2000). The development of digital technologies offer new opportunities for engaging parents and adolescents in systems of support and could provide both an important means of self-directed learning about ‗difficult to discuss' topics.

The APE project set out to develop a product that could capitalise on the benefits of current technology and develop a DVD that parents and adolescents could not only interact with, but could do so together. The evaluation of the DVD demonstrated that it is feasible to develop such a product that parents and adolescents could use and interact with together. Moreover, the evidence indicates that the DVD appeared to encourage each viewer to consider the thoughts or concerns of the other person – the parent or adolescent perspective. This consideration for the other person is an important part of a respectful relationship and might therefore be presumed to be a helpful precursor to conversations that parents and adolescents might have as a result of using the DVD. Unfortunately it was not possible within this evaluation to assess whether there would be an impact on how parents and young people communicate, and assessing this should be a priority for future research investigating the contribution of similar products. The evaluation evidence also indicates that future versions of the DVD need to be carefully designed with involvement from both parents and young people as equal users in order to accommodate the divergent views on style, presentation and relevance of issues to be explored. Otherwise adult-centric perspectives are likely to dominate the design and fail to capture the attention of the intended audience.

There are a number of areas which we would like to further investigate as a result of what we have already found. Although we undertook extensive evaluation of the product with young people and adults, this mostly involved young people and adults viewing the product separately. In order to further explore some of the issues that were raised during our first round of evaluation it would be beneficial to observe the DVD being watched by family groups. Areas for further investigation in this manner would be observations about turn-taking, types and length of discussions and choices made.

One common criticism of ICT is that as it becomes more widespread it can lead to isolation and lack of social skills. Our software is designed to encourage communication and family cohesion. In this sense we believe it is a ‗forwards' change for ICT.

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TOWARD A MODEL OF TRUST AND E-TRUST PROCESSES USING OBJECT-ORIENTED METHODOLOGIES

F.S. Grodzinsky, K Miller and M.J. Wolf

Abstract

This paper builds on the work we have done in two previous papers, —Why Turing Shouldn't Have to Guess"[33] and —Developing artificial agents worthy of trust: Would you buy a used car from this artificial agent?"[34] In these two works we explore —trust and —e-trust" and develop principles of trust. In this paper we build on the object-oriented model that we proposed in the previous work that presents trust as a super-class with two sub-classes e-trust and face to face trust (f2-f) trust and assign them attributes.

1. Introduction

This paper builds on the work we have done in two previous papers, —Why Turing Shouldn't Have to Guess"[35] and —Developing artificial agents worthy of trust: Would you buy a used car from this artificial agent?"[36] In these two works we explore different phenomena that have been discussed in the literature as —trust," and —e-trust" and develop principles of trust. We have found that the ambiguous nomenclature confuses the discussion and is detrimental to a dialogue about important issues involving these terms. We claim the modest goal of devising a model that will help software developers and philosophers to describe more precisely and analyze more carefully scenarios involving trust as they build Artificial Agents (AAs).

In this paper we first discuss two aspects of trust interactions: modes of communication and agents. Then we build on the object-oriented model that we proposed in the previous work that presents trust as a super-class with two sub-classes e-trust and face to face trust (f2-f) trust. We build our classes with the attributes: predictability, transparency, reliability, measurement and the behaviours necessary to implement these in AAs.

2. Two Aspects of Trust

To focus our exploration of trust interactions, we first isolate two aspects of any such interaction: a mode of communication and the identity of the agents involved.

1. Modes of communication: We focus on two general modes of communication involved in trust processes. We do not claim that these two are the only possible forms of communication, or that our classification is the only way to characterise these kinds of communication. But these two —modes" are convenient for our discussion of trust and e-trust.

We define the transfer of information between A and B as a —communication." That is, we will be careful not to argue about the effect of the arrival of information on an agent. Such arguments might be important, but we will simplify our discussion by not debating about how humans and artificial agents —communicate" beyond noting the mode of conveying information between A and B. We will limit our discussion, then, to a notion of information that emphasises the syntactic and semantic information described and measured by Shannon (1949).

Communication mode #1: Communications that use telecommunications and computing as mediating. These would include at least telephone communications, email, instant messaging, Skype communications, blogging, Google wave, electronic bulletin boards and so forth. We will call these *Ecommunication*.

33 Presented at Asia Pacific Computers and Philosophy Conference (Oct. 1-2, 2009), Tokyo.
34 Presented at CEPE 2009.
35 Presented at Asia Pacific Computers and Philosophy Conference (Oct. 1-2, 2009), Tokyo.
36 Presented at CEPE 2009

Communication mode #2: Communications that require physical proximity and do not employ ecommunication, including talking, touching, and sign language. We will collect all these kinds of communication under the label *Pcommunication*, where "P" stands for physical, or proximate. We avoid using the terms "face to face" or "in person," because the entities involved may or may not have faces, and because some of the entities we wish to include are not persons.

2. Human or Artificial Agents? The two entities A and B could be human or artificial. We will call silicon-based, computer-controlled interactive entities AAs for "artificial agents." For the first part of our discussion we will limit ourselves to single agents A and B. Later we will generalise to allow either A or B to be a group of entities.

We use the definition of artificial agents given by Grodzinsky, et al: an "artificial agent" is a nonhuman entity that is autonomous, interacts with its environment and adapts itself as a function of its internal state and its interaction with the environment (Grodzinsky et al, 2008). There are numerous objections to this (or any other) definition of AAs. One important objection is that an entity might act as an agent and not have the ability to adapt itself. Although it is a possibility, the adaptable AA is the far more interesting case in ethical analysis. We note that the adaptation could be as simple as changing the value of a variable or as complex as "self-modifying code," by which an AA can change its programming after deployment.

We begin with the model of trust shown in Figure 1[37]. This model is based on the premise that there is an overarching notion of trust with attributes of trust found in what are commonly called face-to-face environments and in electronic environments. In this model, Pcommunication is the type of communication that we most commonly associate with face to face interactions that occur in a physical space where the participants might possibly touch (allowing "trust with touch"). Ecommunication is the type of communication that develops in a digitally mediated environment (allowing "trust with*out* touch") (Zheng et al, 2002). In both physical and digital environments, there are often social norms and references from others that influence a trust relationship. We ascribe these shared attributes to the super-class Trust. However, f2f-trust requires physical closeness and digitally mediated trust relationships do not. Thus, they are different sub classes.

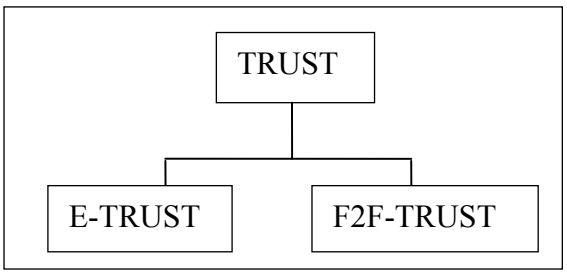

Figure 1

3. Building on our model: nine labels for trust

We are convinced that a major problem in discussions of trust, f2f-trust, and e-trust is imprecision about what is being discussed. In this section we add granularity to our model. We define a naming convention for several distinct types of trust based on the two aspects previously introduced: mode of communication and the identity of the agents involved. Using this idea, we propose that a particular, contextualised instance of trust can be described in two stages:

1. In stage 1-- Answer three questions: Is the trustor human or artificial? Is the trustee human or artificial? Is the communication Ecommunication or Pcommunication? Note that each of these questions requires a binary answer. The answers to these questions will locate the trust in one of eight subclasses.
2. In stage 2--Answer two more questions: What is the socio-technical context of the *relationship* between A and B? What is the socio-technical context of the *communication* between A and B?

37 This model was first presented during the panel "E-trust: for and against" at CEPE 2009 and later incorporated into the paper "Developing artificial agents worthy of trust: "Would you buy a used car from this artificial agent?" by Grodzinsky, Miller and Wolf, currently under consideration for publication.

Unlike the previous three questions, the questions at this stage are decidedly not binary. Indeed, the answers can be arbitrarily complex.

Stage 1 classifies the instance of trust in a process that is similar to defining a subclass of a super-class. Stage 2 is similar to instantiating an object from a subclass, and adding information to that instantiated object. We will not go into the details of object oriented data structures here, but a small example may be useful. Imagine that a programmer is attempting to develop a program for drawing two dimensional geometric figures. She defines a super-class called "figure" that includes an attribute for an area of the figure, another attribute for a colour for the perimeter of the figure, and a third attribute for the colour of the interior of the figure. Next, she defines three subclasses of the super-class "figure": "circle", "rectangle" and "triangle". All three of the subclasses inherit the three attributes from "figure," but each subclass adds a different, specialised attribute or attributes. The subclass "circle" adds an attribute "radius;" the subclass "rectangle" adds two attributes: "length" and "height;" and the subclass "triangle" adds three attributes: "side1," "side2" and "side3."

When our programmer wants to describe a particular geometric figure in her program, she first selects one of the three subclasses, and then she creates an instance of that subclass by assigning values to the appropriate attributes. For example, she could instantiate a circle (chooses a subclass) with a red perimeter and a blue interior (these are attributes inherited from the super-class) with a radius of 2 (an attribute in the subclass). When the object is created, the area (an attribute defined in the super-class) could be automatically initialised to 4*pi.

This programming example is similar to (though not identical to) the process we are suggesting for describing instances of trust. We identify nine classes, one super-class and eight subclasses, to help describe trust in the first stage.

We will use the name "XYZtrust" for a super-class. The intent is that X and Y classify the trustor and trustee respectively as either human (H) or artificial (A); and that Z specifies if the trust is established with Pcommunication or Ecommunication. Since X, Y, and Z are binary, there are eight possible combinations for XYZ. Each of these eight combinations is a subclass of our super-class.

The eight subclasses are listed here, each with an example. Each subclass is more concrete than the abstract super-class XYZtrust, but each subclass is still an abstract description analogous to a template.

HH-Ptrust: traditional notion of human, "face-to-face" trust

HH-Etrust: humans trust each other, but mediated by electronic means

HA-Ptrust: human trusts a physically present AA, for example, a robot (no electronic mediation)

HA-Etrust: human trusts an artificial entity (like a web bot) over the Internet

AH-Ptrust: an AA, perhaps a robot, trusts a physically present human

AH-Etrust: an AA, perhaps a web bot, trusts a human based on Internet interactions

AA-Ptrust: an AA trusts another AA in a physical encounter; because this is Ptrust, the AAs might, for example, use sign language

AA-Etrust: an AA trusts another AA electronically, e.g., two web bots communicate via the Internet

XYZtrust is our super-class, an abstraction that represents what is common to the eight types of subclasses. Each subclass represents an entire set of possible trust relationships. In the next section, we describe how a trust object (a particular instance of a subclass) should be "instantiated" in our model.

2.1 Super-class – Subclass – Instantiation: Expanding the Model

A super-class should be designed to hold characteristics that are shared by all the subclasses. If the subclasses do not share much or anything, then trying to describe a super-class is futile. In the case of XYZtrust, we think the commonalities are non-trivial, and therefore the work at defining the super-class seems at least potentially useful. For example, all of the characteristics of trust that we adapted from Taddeo are common to all the subclasses, and would therefore be placed into our super-class, XYZtrust.

1. Trust is a relation between A (the trustor) and B (the trustee). A and B can be human or artificial.
2. Trust is a decision by A to delegate to B some aspect of importance to A in achieving a goal. We assume that an artificial agent A can include "decisions" (implemented by, for example, IF/THEN/ELSE statements). These decisions involve some computation about the probability that B will behave as expected.

3. Trust involves risk; the less information A has about B, the higher the risk and the more trust is required. This is true for both artificial and human agents. In AAs, we expect that risk and trust are quantified or at least categorised explicitly; in humans, we do not expect that this proportionality is measured with mathematical precision.
4. A has the expectation of gain by trusting B. In AAs, "expectation of gain" may refer to the expectation of the AA's designer, or it may refer to an explicit expression in the source code that identifies this expected gain, or both.
5. B may or may not be aware that A trusts B. If B is human, circumstances may have prevented B from knowing that A trusts B. The same is true if B is an AA, but there is also some possibility that an AA trustee B may not even be capable of "knowing" in the traditional human sense.
6. Positive outcomes when A trusts B encourage A to continue trusting B. If A is an AA, this cycle of *trust - good outcome - more trust* could be explicit in the design and implementation of the AA, or it could be implicit in data relationships, as in a neural net (Taddeo, 2009).

This is not to say that Taddeo's definition of trust, or our adaptation of it, must be accepted in order to use the XYZtrust model. That is not at all our intention. In fact, we think that it is important that we explore what trust in general means when we realise that HH-Ptrust is a specialization of a more general notion of trust. We expect that others will want to substitute their own definitions of trust into the super-class XYZtrust, and examine the ramifications. We think this would be a productive use of the model.

We have implicitly assumed above that X and Y are individuals. However, there is nothing inherent in the model that requires this assumption. So X and/or Y can be individuals (the assumption in examples above) or groups of individuals. A group of humans could be a family or a committee; a group of artificial entities could be a swarm of small robots (Robinson-Avila, 2009).

We intend that each instance of one of the XYZtrust subclasses is either all P or all E. Thus if two particular humans, say Ed and Sally, participate in HH-Etrust and also participate in HH-Ptrust (for example, they build trust in Cyberspace first, later meet, and then build a new relationship trust face-to-face), then we intend that these instances of trust be modelled with two separate instantiations.

Notice that someone interested in other aspects might organise the super and subclasses emphasizing different aspects, perhaps in different orders to more effectively capture essential attributes of trust. This kind of —refactoring," as it is called, is common in software design. We contend that this type of flexibility in building a philosophical model of trust is potentially useful.

2.2 The Importance of Socio-Technical Context

We further elaborate this conceptual model by requiring that any instantiation of a XYZtrust subclass must include a description of the socio-technical contexts of X, Y, and Z. As a consequence, different instantiations of XYZtrust that are within the same subclass may have quite different contexts. For example, imagine these two scenarios, both assumed to happen in physical space, not Cyberspace: a 3 year old daughter trusts her mother to feed her, and a 40 year old employee trusts her employer to pay her. Both of these scenarios are instantiations of the subclass HH-Ptrust, and both share characteristics of that subclass; but the two instantiations are otherwise quite different because of the socio-technical context of the particular H-H pair. Notice that within a type of communication, there can be quite different socio-technical contexts; for example, both video Skype communication and email communication are in the E collection, but they represent communication contexts that can differ substantially. Thus the inclusion of a socio-technical context is important both for the entities involved (X and Y) and for the communications used to establish the trust relationship (Z).

The subclasses in Figure 1 are derived subclasses of the super-class XYZtrust; each subclass has characteristics that distinguish it from any other subclass. In addition, within each derived subclass, each instantiation of that subclass can include a distinctive combination of socio-technical contexts. Thus the model does not seek to over-simplify the situations we are discussing, but it seeks to organise our thinking about these situations in a coherent fashion.

Each derived subclass of XYZtrust (such as HH-Ptrust) shares some characteristics with other derived subclasses of XYZtrust (because they have inherited them from the super-class). Within a particular derived subclass, different instantiations of that single derived subclass share characteristics of that subclass, but are likely to differ with other instantiations with respect to their socio-technical context.

2.3 Using the Model to Improve Discussions of E-Trust

Table 1 lists the subclasses of XYZtrust in a particular order. We will use this table in a short discussion of e-trust.

HHP	HHE
HAP	HAE
AHP	AHE
AAP	AAE

Table 1: Eight distinct subclasses of XYZ Trust

At least two quite distinct kinds of ―trust" are discussed in the literature. In some papers, ―trust" is used to describe any trust (or ―trust-like") relationship that includes an artificial entity. In Table 1, this would include the entire table except the top row. In other papers (including this paper), e-trust refers to any trust relationship that is established using electronic communication. Using this definition, e-trust would refer to exactly the second column of Table 1. Table 1 illustrates dramatically that these two definitions of e-trust are incompatible. We contend that before constructive dialog can take place about the implications of e-trust, it is essential that participants in the discussion agree upon a common definition of what is being discussed. We hope that the XYZtrust model will be helpful in organizing such discussions.

4. Some Implications of the XYZtrust Model

Perhaps the most important observation based on this model is how complex the issue of trust becomes when electronic communication and artificial entities are included in the discussion. If electronics are excluded from the model, then only HH-Ptrust remains. HH-Ptrust is itself a huge field, including all the issues of humans trusting (and not trusting) each other on the basis of physical encounters. (Note that in our reading of the model, reputation based on Pcommunications would be included in HHP.)

Restricting ourselves to only human trust restricts us to the top row: HH-P and HH-E. HH-E includes humans building trust (or not) via telephone, email, the Internet, and so on. Even when attention is restricted to just the top row, the differences between HH-Ptrust and HH-Etrust have been of interest to scholars. For example, Rocco (1998) reports on experiments that found that (using our terminology) HH-Etrust was likely to break down, but that HH-Pcommunication could ―repair" the trust relationship. There is a growing literature on trust relationships among humans who participate in e-commerce (Kerr and Cohen 2006).

Some readers may suspect that the rest of the model, the six subclasses that are not exclusively human, are overly elaborate, drawing attention to minute differences that could easily be collected into fewer categories. But we maintain that each subclass contains interesting and distinct technical and ethical issues. To illustrate the point, we will discuss briefly each of the six, including some published work that is relevant to each.

In these discussions below, each of which includes at least one entity that is an AA, we will use terms like ―trust" and ―decide" with respect to AAs. We want to make it clear that we are *not* claiming that an AA, now or in the future, is making decisions or trusting in exactly the way humans make decisions or trust. That issue is beyond the scope of this article, and we expect that the differences between AAs and humans are likely to, at least for the foreseeable future, ensure that AAs and humans will be distinct in the way they make decisions, including decisions about XYZtrust. So although we will not debate how human decisions are different, we do make the claim that it is possible to group their similarities under the term XYZtrust (our super-class), and then use the term ―trust" to embody those commonalities in XYZtrust. Thus when ―trust" appears below, we invite the reader to *not* associate this with HH-Ptrust or even HH-Etrust; instead, associate it with XYZtrust first, and with the particular subclass under discussion.

We have outlined our preliminary understand of the super-class XYZtrust above, and we rely on that understanding for our use of ―trust" below. We appeal to Floridi and Sander's notion of levels of abstraction (Floridi and Sanders, 2004 and Floridi, 2008). We recognise there are limitations to the use

of levels of abstraction in discussing AAs and moral agency (Grodzinsky et al., 2008 and Johnson and Miller, 2008), but we think it is useful to generalise terms like ―trust" and ―decide" by careful observations that help clarify what is common between AAs and humans, while still keeping a clear eye on what is different between them. Thus, we will use ―trust," ―decide," and forms of both words without the quotation marks, but with the understanding that they are used in this generalised, and not anthropomorphic, sense.

HA-Ptrust

The main focus of this kind of trust is largely in the future when humans will routinely use physical communication with AAs; today most HA communication is done electronically. However, this kind of ―trust with (at least the possibility of) touch" will become more common when robots become more common. It could be argued that relying on robots for physical tasks does fit in this category. If so, there is already a scholarly interest in the relationship between humans and their robotic toys (for example, see Guo et al., 2009), and between humans and ―intelligent" household appliances (Sung et al., 2009).

HA-Etrust

This subclass includes scenarios in which a human trust an AA when the communication is electronic. Some examples that are already commonplace include humans trusting AAs to make purchases on the Internet (for example, see Pedersen, 2000). But whenever trust arises, issues of distrust arise; Castelfranchi (2000) wrote about why computers will find in necessary (or at least useful) to lie. Atoyan et al. (2006) describe consequences when humans do not trust systems enough, and when they trust them too much.

AH-Ptrust

In this subclass and the next (AH-Etrust), an AA is interacting with a human. AH trust occurs when the AA makes a calculation about the trustworthiness of the human, and risks an action we identify as trust. In AH-Ptrust, the human attributes and actions that are inputs into the AA calculation, and the AA actions in response to the AA trust decision, are done using Pcommunication in a physical space. A straightforward example might be a retinal scan and a voice print identification before an AA allows entry into a room. A more sophisticated example could be the calculations necessary for a potentially lethal robot, that is helping to clear out a suspected enemy enclave, to identify a person as a non-combatant, and therefore to trust that person not to initiate hostile actions. A substantial amount of scholarship is being done on enabling machines to gather and analyze information about humans in physical encounters, and some of this research has been ongoing for many years. Relevant technologies include facial recognition (Zhao et al., 2003), speech recognition (Lee et al., 2002), and gesture interpretation (Braffort, 1996).

AH-Etrust

This case is similar to AH-Ptrust, except that the interaction between the AA and the human are mediated electronically, and do not use Pcommunication. In the case of AH-Etrust, the AA calculation and the AA action are both mediated electronically. Although it is a trivial example, the use of passwords and questions over the Internet could, at some level of abstraction, be regarded as AH-Etrust. A more complex example would be a web bot that made a buy/no buy decision about a human vendor based on evidence of the vendor‘s reliability in past transactions. Artz and Gil (2007) include a discussion of what we identify as AH-Etrust, as does Robinson-Avila (2009).

AA-Ptrust

This kind of trust occurs when two AA‘s are physically present and communicate via physical means (for example, voice or sight) instead of electronic, digital means (for example, information packets over the Internet or an infrared machine-to-machine link). Of the eight subclasses, this seems the rarest. However, there are some articles that discuss developments that would make such communications practical. For example, Shimbun (2006) describes robots using sign language, and New Scientist video (2008) demonstrates advanced speech mimicry by an AA. Much of the literature on machines understanding speech is concerned with machines understanding human speech (important for AH-Ptrust above), but this research could easily be applied to Pcommunications between machines using speech; for examples, see (Fransen et al., 2007) and (Staudte and Croker, 2009).

AA-Etrust

Algorithms for calculating trustworthiness of other AAs by an AA are an active area of research. One area where AA-Etrust has been a long standing issue is in the security of networked systems (Zafar and Kedem, 2006). E-commerce webbots require trust relationships in order to do business (Dellarocas et al., 2000). Huebscher and McCann (2008) discuss the importance of trust in organizing groups (sometimes called ―swarms") of AAs.

5. Conclusion

We described a model called XYZtrust, inspired by object-oriented data structures, that we contend can aid in exploring issues of trust. Trust (or some version of that concept) should be generalised to include artificial agents, and computer-mediated relationships. The super-class XYZtrust gathers together the aspects of trust that we think are common among all the types of trust. We described eight subclasses of this super-class, each of which identifies the trustor (either human or artificial), the trustee (either human or artificial) and a mode of communication (either physical or electronically mediated). We have found the model to be most effective in aiding analysis when an instance of a subclass is paired with a socio-technical context. Each of the subclasses includes interesting aspects of trust that are already being researched, and we mentioned a few relevant publications for each.

We are convinced that trust will be an increasingly important issue as interactions between humans and AAs increase in frequency and importance. We have attempted to demonstrate that a model-based examination of trust can help organise discussions about different aspects of this complex subject.

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SOCIAL NETWORKING AND THE PERCEPTION OF PRIVACY WITHIN THE MILLENNIAL GENERATION

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Abstract

Has technology caused a generational divide between current college age users (Millennial Generation) who have no problems posting intimate details of their personal life on the Web and more traditional older users who seem to value privacy? This paper presents the results of a survey of 251 university students and follow-up focus groups on the topic of the perceptions of social networking and privacy. We will use Facebook as an example of social networking, and review attitudes about privacy and control over personal information among traditional and non-traditional college age users and light and heavy users of social networking sites.

1. Introduction

When Scott McNealy, chief executive officer of Sun Microsystems, pronounced that —You have zero privacy anyway. Get over it.” (Sprenger, 1999) he was speaking to middle-aged journalists. Supposedly there is no need to tell this to the younger generation. Many adults are shocked by what they see on Facebook and believe that most teenagers don‘t take the risks seriously. In an article written for the New York Times —When Information Becomes T.M.I.”, Warren St. John (2006) writes, —Through MySpace, personal blogs, YouTube and the like, this generation has seemed to view the notion of personal privacy as a quaint anachronism. Details that those of less enlightened generations might have viewed as embarrassing — who you slept with last night, how many drinks you had before getting sick in your friend‘s car, the petty reason you had dropped a friend or been fired from a job — are instead signature elements of one‘s personal brand. To reveal, it has seemed is to be”. The issue for those of this generation is not privacy but how their image is presented. Users accept that they cannot control what is said about them but want control over who sees the site and what is on it. Why do those of the Millennial generation see little threat to privacy as they live in the fishbowl of social networking? This question intrigued the authors who decided to conduct a study on this generation‘s view on privacy as it pertained to their use of social networking.

Is it true that young men and women don‘t care about privacy? Do they take a cavalier attitude toward access and property rights? Do they have little regard for controlling personal information? Do heavy users of social networking sites differ from light users in their attitudes toward privacy? Are they more cavalier, indifferent or passive? To address such questions, we conducted a survey of 251 college students [38] and follow-up focus groups with 13 of those students. We compare younger and older respondents and light and heavy users of social networking sites on their survey responses to privacy and other issues pertaining to computer ethics. Focus group participants, aged 19-25, were asked both written and open ended verbal questions regarding their use of social networking sites. To assess the respondents‘ awareness about control and ownership of content, we questioned them about Facebook‘s terms of service and business practices. We also explored the legitimate and illegitimate use of social networking in both work and university contexts.

Part 1 presents the survey methodology and findings and Part 2 provides additional qualitative results from the focus groups. In Part 3 we discuss the implications of the findings.

2. Survey Methodology

We assess two conventional understandings 1) that young men and women as compared to older men and women are significantly different in their attitudes toward privacy and other IT/IS ethical

38 Our survey was conducted as part of an international study of college students in the 2008-2009 academic year, of which we were co-sponsors. Although this was a multi-site study (USA, UK, and Canada), we limit our report to the data collected from our site in America and a satellite campus in Luxembourg.

issues and that 2) light, moderate, and heavy users of social networking sites, likewise, differ significantly in their attitudes. The values for the first independent variable, age, are operationalised as "under 25" and "25 or older." The values for social networking use, the second independent variable, include "up to 1 hour," "1-5 hours," "6-10 hours," and "11 or more hours" per week.

College students provided the data for these and other variables. During the Fall 2008 and Spring 2009 semesters we drew a purposive sample from two campuses of students enrolled in business ethics or computer ethics courses. We conducted an exam-style survey in the classrooms. The questionnaire included 31 Likert-style items that were used to measure respondents' attitudes on a number of computer or internet issues. Students were instructed to indicate their level of agreement or disagreement to provocative statements such as, "It is acceptable for me to make unauthorised copies of commercial software for my own private use." Respondents were provided the option of selecting "indifferent."

We generated three composite dependent variables. The first, labelled "indifference," is simply the total number of questions that a respondent selected indifferent as his or her response. In our sample, this varied from a low of 0 to a high of 22 with a mean of 5.4. The second dependent variable combines 6 indicators of attitudes towards access and property rights, for example, the acceptability of making unauthorised copies of commercial software, accessing data without authorization, and using passwords without permission. Agreement indicates disregard for rights or a cavalier attitude. Points were assigned according to this system: strongly disagree = 1, disagree = 2, indifferent = 3, agree = 4, and strongly agree = 5. The theoretical range is 6 to 30 and the actual range was 6 through 27 with a mean of 13.8. The third dependent variable, privacy protection, indicates a level of insistence that employers or universities use electronic surveillance only with the consent and knowledge of those subject to monitoring. It combines 4 items that describe different surveillance contexts: the workplace, labs/libraries, university residences, and web-based instruction platforms, e.g., VLE and Blackboard. Agreement signifies support for privacy protections. The scoring method described above was also used and the actual range matched the theoretical range of 4 through 20, the mean was 14.8.

Consistent with the conventional understandings, six hypotheses are tested:

- H1: There is a significant difference between those under 25 years of age and older men and women, such that the former will have a higher average indifference score.
- H2: There is a significant difference between those under 25 years of age and older men and women, such that the former will have a higher average score on disregard access/property rights.
- H3: There is a significant difference between those under 25 years of age and older men and women, such that the former will have a lower average privacy protection score.
- H4: There is a significant difference between social networking users, such that heavy users will have a higher average indifference score.
- H5: There is a significant difference between social networking users, such that heavy users will have a higher average score on disregard access/property rights.
- H6: There is a significant difference between social networking users, such that heavy users will have a lower average privacy protection score.

2.1 Survey Results

	Age	N	Mean	Std. Deviation	Std. Error Mean
Indifference	-25	216	5.5556	4.37399	.29761
	25+	27	3.6296	4.86074	.93545
Disregard Access/Property Rights	-25	207	14.4058	3.83894	.26682
	25+	27	10.4074	3.79533	.73041
Privacy Protection	-25	206	14.99	3.563	.248
	25+	20	13.25	3.823	.855

Table 1A Age: Comparison of Means on Dependent Variables

Turning to Table 1A and Table 1B we find confirmation for hypothesis 1 and 2 but not for hypothesis 3. Younger respondents had a significantly higher average on the indifference tally. The difference was not large, however, with the younger respondents selecting two additional statements to register their indifference (5.6 versus 3.6 for older respondents). A more significant difference was apparent in disregard for access/property rights with younger students showing less zeal for upholding rights. To put this in perspective, however, disagreement with disregarding rights would have yielded a score of 12 and agreement a score of 24. The mean for those under 25 of age was 14.4-- closer to disagreement. Finally, younger respondents had a significantly higher average score on privacy protection, albeit separated by less than two points from the average for older respondents.

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Dif	Std. Error Difference	Lower	Upper
Indifference	.502	.479	2.130	241	.034	1.92593	.90408	.14502	3.70684
Disregard A/P Rights	.129	.720	5.097	232	.000	3.99839	.78452	2.45270	5.54408
Privacy Protection	.381	.538	2.072	224	.039	1.740	.840	.085	3.395

Table 1B Independent Samples Test of Age and Dependent Variables

According to the cross tabulation results in Table 2, age and hours of use are highly related. For instance, two-thirds of the 25+ subset spent less than 1 hour per week on social networking sites as compared to only one-eighth of the under 25 subset. When assessing the difference between light and heavy users on the dependent variables we decided to exclude the 25+ subset primarily due to its lack of heterogeneity. Moreover, with the exclusion of those 26 cases, age is controlled (analysis is within one age group-- those under 25) while we test the second independent variable.

			Age		
			-25	25+	Total
Hours Per Week on Social Networking Sites	<1	Count	35	18	53
		% within Age	16.4%	66.7%	22.0%
	1-5	Count	89	4	93
		% within Age	41.6%	14.8%	38.6%
	6-10	Count	44	4	48
		% within Age	20.6%	14.8%	19.9%
	11+	Count	46	1	47
		% within Age	21.5%	3.7%	19.5%
	Total	Count	214	27	241
		% within Traditional / Non-Traditional Age	100.0%	100.0%	100.0%

Table 2 Cross tabulation of Hours Per Week on Social Networking Sites by Age

Based on the results in Tables 3A and 3B we find that those putting in 6-10 hours per week on social networking sites have the highest means for indifference but also privacy protection. According to the hypotheses, heavy users should have shown the most indifference and privacy protection should have been higher for the modest and minimal users. The 11+ group has the highest average score on disregard of access/property rights and the minimal users showed the least indifference—both anticipated by the hypotheses. In any case, the ANOVA results indicate that the four use groups are not significantly different in their scores on indifference, disregard for access/property rights, and privacy protection. Hypothesis 4, 5, and 6 are not confirmed.

Hours Per Week on Social Networking Sites		Indifference	Disregard Access/Property Rights	Privacy Protection
<1	Mean	4.9143	13.9394	14.94
	N	35	33	34
	Std. Deviation	3.91356	3.89663	3.584
1-5	Mean	5.6629	14.4302	14.53
	N	89	86	83
	Std. Deviation	4.48468	3.82727	3.610
6-10	Mean	6.1136	14.2439	15.79
	N	44	41	43
	Std. Deviation	4.23285	4.31729	3.349
11+	Mean	5.4130	14.7111	15.22
	N	46	45	45
	Std. Deviation	4.71676	3.46162	3.586
Total	Mean	5.5794	14.3756	15.01
	N	214	205	205
	Std. Deviation	4.38315	3.84509	3.554

Table 3A: Social Networking Hours: Comparison of Means on Dependent Variables

		Sum of Squares	df	Mean Square	F	Sig.
Indifference	Between Groups	29.935	3	9.978	.516	.672
	Within Groups	4062.214	210	19.344		
	Total	4092.150	213			
Disregard Access/ Property Rights	Between Groups	12.312	3	4.104	.275	.844
	Within Groups	3003.766	201	14.944		
	Total	3016.078	204			
Privacy Protection	Between Groups	47.505	3	15.835	1.258	.290
	Within Groups	2529.451	201	12.584		
	Total	2576.956	204			

Table 3B ANOVA of Social Networking Hours and Dependent Variables

3. Focus Groups

The exponential growth of social networking sites and especially Facebook has not only caught the attention of social researchers and business analysts, but it has become the subject of numerous articles in the popular press. For example, a writer for the New York Times gushes —Facebook promises to change how we fundamentally communicate by digitally mapping and linking peripatetic people across time and space, allowing them to publicly share myriad and often very personal elements of their lives" (Stone, 2009). Facebook keeps users on its site for an average of 169 minutes a month compared to Google news or the NYT which have about 10 to 13 minutes a month. The typical user spends 20 minutes a day and over two thirds log in at least once a day (Hempel, 2009).

After viewing the results of our survey, we wanted a better understanding of the —typical user", so we invited a total of 13 students, 8 females and 5 males, all Facebook users, to participate in 2 focus groups on the topic of social networking sites, their uses, advantages and risks. Students were from sophomore, junior and senior years and were residents of the United States campus. They did not know each other prior to the focus group. Some students had a computer ethics course in their Computer Science major and some had a Business Ethics course in the business administration major. Others from the College of Arts and Sciences had no ethics courses prior to attending the focus group. The students all used the Facebook site from as little as one half hour a day to as much as 5 hours per day.

These Facebook users did not seem to fit the stereotype of being naïve and reckless. With a few exceptions, they were aware of the many advantages and disadvantages of this service. Most praised the ease by which they could stay in touch with family, friends and acquaintances and keep updated with what their Facebook friends were doing, thinking, etc. Of all the Facebook features, the favourite is the —Wall" because it is —good for communication" and —is a good way to keep up w/friends." Those who liked —Status Update" emphasised the same benefits: —these let me know what people are up to" and —it is nice to see what people are doing sometimes." Even so, the students pointed out the downsides, for instance, that nasty comments are posted on the Wall and that with Status Updates —people do this too much"; it —is kind of annoying- telling everyone what you are doing all the time." One person confided that

> it can cause harm with all the gossiping. A group of friends get together and look at pictures and gossip about the pictures. It sparks mean gossip and you make judgments before you even know them.

The group participants discussed privacy issues and control over personal information. One person confided that she kept her Wall private to retain some degree of control over access and content. Many acknowledged the potential risk that photos, and other artefacts that they intended for a private audience, might reach the eyes of prospective employers; nevertheless, they claimed to have

strategised ways to avoid this. Some try to maintain a "clean" site while others planned to alter or cancel their account when the time seemed right: "The reason I would cancel my account would be to get rid of my content, so I would not want my pictures or info still available to whomever wants it." It is noteworthy that two students who declined participation in the focus group said that they did not use Facebook out of concern over employers seeking information and finding damaging pictures or other information that could be held against them.

One of the researchers asked the students to respond to the controversy over whether Facebook administrators may exercise property rights over the users' content. Most responded with incredulity and fear:

> Makes me feel unsafe. Never know where photos will end up. Are the photos my property or Facebook's?
>
> I do not like that at all- I would only delete my facebook if I really needed to (getting a job). If my pictures + information are forever theirs to do what they please I am in jeopardy to be exploited later.
>
> I don't appreciate it. I don't think they should be able to use our stuff without our knowledge or approval.
>
> I feel like I could be in jeopardy of being exploited or black mailed in the future…. I would not like to see my face on some advertisement w/out any knowledge."

A few of the students perceived this as a violation of privacy:

> Why? Stupid and they need to recognise people's privacy everything belongs to us and they have NO right to own anything of ANY person placed on facebook!"
>
> There is an invasion of privacy issue. It enables people's life information to be sold in the public domain.
>
> It's a privacy concern. I don't need the whole world knowing my business since on facebook I am extremely private.

These young men and women do care about privacy, controlling their personal information, and exposure. Nevertheless, by their reactions to the controversy over the use of content it was evident that they were not familiar with Facebook's terms of agreement and did not consider the vulnerable position that they are in vis-à-vis Facebook administrators. They may know and want consumer protections, however they, themselves, are not proactive. Their sense of being in control is wishful thinking.

4. Discussion

What conclusions can we draw from the survey and the focus group follow-up? Most importantly, we found little evidence of a rift between light and heavy users of social networking and between older and younger students on privacy concerns and control over personal information. Light to heavy users of social networking were very similar in their support for protections. Young men and women, as compared to older students, expressed slightly more indifference to particular ethical stands and did not show as much regard for access and property rights, however, they scored higher on privacy protection. Either way, the differences between the age groups were not substantial.

It is possible that our sample of college students missed segments of the population more likely to differ dramatically in attitudes and behaviours. Admittedly, our sample did not include many middle-aged (or older) men and women. In regard to Facebook, some say the 'network effect' has won over the older generation who can watch their kids, store pictures from trips, find jobs and connect professionally not just for personal fun and games. According to the site insidefacebook.com the median age of a user is 26 but the fastest growing user group (up 175% in 6 months) is women 55 or older with men 55 and older increasing use by 138% in 6 months (Gates, 2009). Our study did not

target this population. We did not sample high school students. A future study would do well to sample these age categories and test whether the rift is most apparent across the wider expanse of maturity and experience.

Facebook continues to expand both in terms of users and applications. It now has over 200 million users and is growing at the rate of 5 million new users a week. It has doubled in sise since August, 2008 and has been called the Web's dominant social ecosystem and an essential personal and business networking tool in much of the wired world. In 2006 Facebook introduced communities for commercial organizations and is widely used by companies as well as universities. One of the Facebook founders, Chris Hughes, brought social networking to the campaign for the presidency. Facebook was used by the Obama campaign as a political tool and Obama stated, "There's no more powerful tool for grass roots organizing than the Internet" (Associated Press, NYT, 7/7/08). Facebook also enables broad based activism such as the mobilization of 12 million people to protest around the world against the FARC rebels in Columbia (Stone, 2009).

It appears that a certain percentage of social networking users discover or are led to use sites in ways that go beyond simple socializing. We found in our survey that approximately half of the heavy users (11+ hours per week) indicated that they would use social networking sites for career advice. Only one-sixth of very light users (<1) expected to do this. Forty five percent of heavy users and 25% of very light users anticipated using social networking sites to look for a job.

If dedicated users utilise social networking sites for professional development, we must question the assumption that social networking is a passing fad or lifestyle soon left behind when the young grow up and enter the real world. Future studies should explore whether, with serious purpose in mind, users will replace a somewhat lazy consumer mentality with a more sensible and activist stand on consumer rights. We found in our investigation that the appropriate values and attitudes regarding privacy and information control are in place, but compromise comes through passivity and wishful thinking. Perhaps this will change as students graduate and the stakes become higher.

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ALIENATION AND ICT: HOW USEFUL IS THE CLASSICAL CONCEPT OF ALIENATION IN ANALYZING PROBLEMS OF ICT?

Mike Healy and N. Ben Fairweather

Abstract

This paper examines the value of using the concept of alienation in studying the ethical and societal implications of information communications technology (ICT). In recent research in this field alienation is not fully described and seems to serve as shorthand for some vague form of undefined dissatisfaction. This paper seeks to address this weakness and opens by outlining significant theories of alienation. After considering the theoretical underpinnings of alienation, the paper develops the argument by examining how the concept can be applied to the use of ICT in a range of scenarios. Alienation and work also forms part of the discussion since it appears as a prominent theme in the literature. This section of the paper concludes by looking at the relationship between ICT, ethics and alienation. Here the paper notes that research embracing ICT, ethics and alienation is underdeveloped. The paper concludes by arguing that the concept of alienation, rather than being merely a shorthand term for general dissatisfaction, offers a robust tool for the examination of how a range of non-technical factors adversely impact on the use of ICT.

1. Introduction

This paper presents an overview of the concept of alienation and argues for its inclusion among the concepts used in the study of information communications technology (ICT). The first part of the paper draws primarily on the works of Marx, Seeman and Mann to provide an introduction to alienation. The paper then looks at how the concept can be of value in ICT research and concludes by indicating how the discussion on ICT and alienation can be progressed.

The literature concerned with the relationship between alienation and ICT includes reference to work alienation among women IT workers (Adya 2008), business investment decisions (Abdulla and Kozar,2007), urban alienation (Foth, 2005), international ecommerce (Sinkovics *et al* 2007), the impact of technology job structure and redundancy (Vickers and Parris, 2007), education (Akudolu, 2006, Moule 2003, Rovai and Wighting, 2005), the alleviation of poverty (Slater and Tacchi 2004) and business ethics (Smith *et al* 2004). Yet in the literature concerned with ICT and alienation, the latter term often appears as a catch-all category covering a number of vaguely registered feelings of unease. The relations between the various pressures that lead to alienation and how it can be used to explain people‘s interaction with the technology are not fully explored. However, while researchers concerned with society and ICT may have an underdeveloped view of alienation, the issues they seek to investigate often relate to concerns associated with alienation and would therefore benefit from the use of a more comprehensive appreciation of the concept.

2. Classic Research using the Concept of Alienation

Martin *et al* (1974) noted that in 1969 the US National Institute of Mental Health had compiled a bibliography of 225 articles concerned with alienation. Nisbet (1953, quoted in Seeman, 1959) talks of the central role played by the hypothesis of alienation in social science research. Seeman (1959) also remarks on the concept of alienation as being a —pervasive theme in the classics of sociology” with the concept having a —prominent place in contemporary work.” Seeman‘s paper in 1959 was a seminal work in that it attempted to —present an organised view of the uses that have been made of the concept; and to provide an approach that ties the historical interest in alienation to modern empirical effort” (Seeman 1959, p783).

3. Marx and alienation: the development of the modern concept

It was the discovery and subsequent publication in 1932 of an early text by Marx, the *Economic and Philosophical Manuscripts of 1844*, that provided the impetus for much of the discussion on alienation. While Costas and Fleming (2009) note that Marx's formulations of alienation have not always been popular (and particularly so towards the end of the 20th century), they also argue, that this tradition "yields important insights" in the exploration of alienation (Costas and Fleming 2009: 360). Langman and Ryan (2009) also draw upon the alienation theory as described by Marx to explore contemporary global culture. Archibald supports the value of Marx's view of alienation by making two important points: firstly that "globalization and competition … increased objective powerlessness and subjective alienation" (Archibald 2009b: 337) and secondly that those seeking to study alienation from a Marxist perspective should be prepared to read widely and deeply on the subject. Following Archibald's advice, it is appropriate to review key aspects of Marx's concept of alienation.

The essence of Marx's theory of alienation is connected to loss of control over one's labour (Cox, 1998). For Marx, the worker's labour is bought and sold in the market place like any other commodity and as workers have no control over the way the market place operates, they have no real control over their labour. Thus the "object that labour produces, its product, stands opposed to it as *something alien*, as a power independent of the producer" (Marx 1970: 108). Erickson *et al.* (2009) refer to this as the distance human beings experience from the things they make and the processes they use to make them. This is an important building block in Marx's theory of alienation since it is through labour that the essential humanity of the people is expressed.

Marx argues the dynamism of labour "shapes and moulds" the world of the workers and motivates them to "create and innovate" and in doing so transform themselves (Cox 1998: 2). In addition this creative, innovative drive occurs within a social context as people enter into a range of relationships with others to achieve the outcomes of their labours. The emphasis here is on collective endeavour needed to obtain those things required to live and survive. For Marx, society "does not consist of individuals, but expresses the sum of interrelations, the relations within which these individuals stand." (Marx 1857 in Ollman 1996: 104) There are then, three key aspects of Marx's view of humanity: it is in our nature to work on and transform the world within which live; in doing so we change ourselves and, finally, we undertake these tasks within a collective environment.

Marx argues that capitalism, in which labour becomes a commodity, undermines creativity and results in alienation which takes four forms. As mentioned above, people become alienated from the products of their work in that they have, ultimately, and to varying degrees, no control over what gets made. Decisions and priorities linked to the production of commodities are determined by employer, not employee. This can equally apply to both service and industrial sectors. Recent researchers looking at ICT and white collar work, such as Downing (2008), have referred to these workers as being so alienated from their work involving the use of computers that they could be described as "cyber slaves"39 (Downing 2008: 16). Thus for Marx and more recent researchers "the worker is related to the product of labour as to an alien object", which means the more they work the less control they have over the results of their work. As a result, the objects they create exist independently of them. (Marx 1970: 108)

The alienation that workers have from the products of their labours impacts on relationships they have with the world, including themselves. For Marx, this leads to the second aspect of alienation, self-alienation. Alienation "is not only in the result, but also in the *act of production*, within the *activity of production* itself" (Marx 1970: 109). Alienated work prevents social, mental and physical development. When this occurs work ceases to be a confirmation of self and becomes something to avoid. (Marx 1970: 109)

The third form of alienation outlined by Marx focuses on what he calls our species being. On this view, labour is the life activity of the human species, and he argues that "productive life is species-life. It is life-engendering life". (Marx 1970: 113) Human beings, unlike other animals[40], can reflect upon their own labour and are able to see their species-character in the concrete objects they produce, in the

39 Downing is not directly comparing this to the type of slavery experienced in pre-capitalist economic formations but is trying emphasise the lack of control ICT workers have over their work.

40 Possibly with very limited exceptions.

processes they create and in the world they have changed. Therefore, argues Marx, when people are denied control and use over the product of their labour, when it becomes alienated from them, and appears as having power over them, they are in effect alienated from their own species-being; alienated from their own humanity. Drawing upon Lukas, Costas and Fleming (2009: 361) describe a condition where self-alienation arises because "self becomes an object to be exchanged since skill, expertise and experience are commodified as a productive resource." These attributes: skills, expertise and experience, can only be embodied within a person.

As a result, the purpose of work ceases to be the purpose of life and becomes instead merely a means of physical existence and although alienation arises from the work experience, which under capitalism is carried out in shops, offices, factories, and so forth, it is experienced beyond the confines of the work place and touches upon the very essence of humanity in all spheres of human activity (Marx 1970: 114). Weeks (2007), in reviewing the work of Mills (1951) and Hochschild (1983), argues they make a powerful argument that

> "the critique of estranged labour is even more applicable to the conditions of immaterial labour than it ever was to industrial production. The alienation of immaterial laborers from the product and process of labour may be comparable to the experience of industrial work, but work that requires the application and adjustment of 'personality'"

This intensifies the experience of alienation (Weeks 2007: 242).

The final expression of alienation for Marx arises from the previous three and is related to the collective endeavour Marx identified as being critical to labour. Because labour is a commodity, people are in competition with each other to sell their labour thereby creating alienation between people (Marx 1970: 114). 'The other' is seen as a threat. Morris (2009) maintains that a further consequence of this aspect of alienation is that workers "encounter one another as competitive individuals and not as essentially cooperative beings" (Morris 2009: 144). Worrell argues that forced labour leads to an abstraction of the person, to "depersonalization, (an) irretrievable loss of time, (and a) permanent depletion of vitality." (Worrell 2009:432) In short Marx argues that alienated labour strips us of our humanity and forces us into competing, conflictual relations with others. For Marx every aspect of society is adversely affected by alienation. As Worrell notes, few, if any, are able to avoid the logic of alienation and "the consequential impoverishment and degradation of self." (Worrell 2009: 432)

Thus, Marx identified four distinct expressions of alienation: estrangement from the products of our labour; alienation from ourselves; alienation from our species being; and alienation from others. His approach attempts to define and reveal a person's relationship to the wider social order. The strength of Marx's presentation of alienation is its overarching theoretical framework comprised of interlocking elements where each of its component parts is intimately dependent upon the others. As such it encourages an adoption of a total view of human activity. That there are a significant number of current researchers who draw upon "Marx's pioneering insights" to explore alienation across a range of areas is indicative of the explanatory power of his analysis (Archibald 2009: 152). The work of Wendling (2005), looking at Marx, alienation and technology is a recent addition to this body of knowledge.

Seeman's concept of alienation

However, if there is a weakness in Marx's scheme it arises because his approach does not sit comfortably with attempts to investigate and reveal (using primarily a positivist perspective) how alienation is expressed in concrete forms. Seeman sought to resolve this problem and to fuse the Marxist approach with other views of alienation in order to make "alienation more amenable to sharp empirical statement." (Seeman 1959: 783). Doing so led him to construct a typology of five categories of alienation.

The first aspect of alienation, as conceived by Seeman, is powerlessness described as the belief held by a person that her "own behaviour cannot determine the occurrence of the outcomes or reinforcements" she wants (Seeman 1959: 784), and arises from lack of control over socio-political

events. In this respect he sails close to the views of Marx. However, Seeman cautions against simply applying notions of powerlessness to "more intimate need areas" such as love and affection (Seeman 1959: 785). However, space exists for the idea of powerlessness to be of value in looking at activity that lies between the larger social and intimate environments. Work, community, citizen-state discourse, and learning are examples of spheres of activity in which people have both an immediate contact with others and interface with distant entities such as government departments or commercial and non-commercial organisations. These are also examples of activity which are increasingly mediated through the use of ICT. This notion of powerlessness has influenced a significant amount of research: recent examples of which are agency verses structure (Hitlin and Long 2009); and education and healthcare (Mirowsky and Ross 2005).

Meaninglessness is the second aspect of alienation in Seeman's topology and refers to the "individuals sense of understanding the events in which he is engaged" or the lack of clarity as to what she is expected to believe (Seeman 1959: 786). As a consequence, a person cannot determine with confidence "the consequences of acting on given belief" (Seeman 1959: 786). An obvious instance of where this could apply is online privacy, where research has shown that online users are increasingly concerned about the efficiency of online systems designed to secure private data and increasingly think that it amounts to meaninglessness to believe the claims of organisations when say they will protect sensitive data.

Seeman's third category of alienation draws upon Durkheim's notion of anomie which describes a situation where "social norms regulating individual conduct have broken down or are no longer effective as rules for behaviour" (Seeman 1959: 787). The driving force for the development of anomie is inability of society to meet aspirations or desires of individuals.

Isolation is the fourth aspect in Seeman's typology of alienation and arises when individuals "assign low reward value to goals or beliefs that are typically highly valued on the given society." (Seeman 1959: 789). Thus they develop a sense of separateness from society as a whole and may seek to bring about changes that reflect their own priorities and imperatives. Seeman concludes on different types of alienation by looking at self-estrangement. This he characterised as "loss of intrinsic meaning or pride in work and the failure to be fulfilled by the activities in which one is engaged". He also argues that "one way to state such a meaning is to see alienation as *the degree of dependence of the given behaviour upon anticipated future rewards,* that is, upon rewards that lie outside of the activity itself." (Seeman 1959: 790)

While Seeman acknowledges that there may be inner connections between the versions of alienation, he considers three aspects, powerlessness, meaninglessness, and normlessness to be operating independently of each other. He also confirms that alternative versions could "be profitably applied in conjunction with one another in the analysis of a given state of affairs." (Seeman 1959: 789) It could be argued that analysis using a conjunction of the versions would help strengthen any attempt to reveal the extent of alienation in a given situation. Research, such as that undertaken by Brooks *et al* (2008), provides supporting evidence for this criticism.

In moulding his typology, Seeman sought to make alienation more accessible both as a concept and as a tool for investigation. This can help focus attention on specific types of behaviour, facilitating research in these areas. His approach continues to be influential across a range of investigations concerned with alienation such as that by Adnanes (2007) and Glatzer & Bös (1998). However, as Seeman acknowledges, his scheme does have problems and he refers to difficulties associated with notions of meaninglessness and self-estrangement. There are, however, two more fundamental criticisms. In effect, Seeman has produced a list of categories describing the various versions of alienation. The problem is that there is a real need to consider the relationship between the component parts of the list, the impact they may have on each other, and to identify which elements provide the impulse for analysis. As Signe *et al* note (2008: 81) in Seeman's scheme "there is no theoretical structure between the…..dimensions and presence of all….dimensions is not required." The second criticism lies in his attempt to research from a positivist tradition that essentially seeks to describe a condition or set of conditions that are at variance to the norm, hence the desire to quantify and to measure the problem. Seeman, and others following his lead, recognise that alienation exists but that it is at variance with what should be our normal experience. For Marx, alienation is the norm. So for Seeman to undertake his project requires the dismantling of Marx's total view of alienation and disconnecting the relationship between its various elements. The desire to measure alienation from the

positivist perspective eventually undermines its explanatory power because it ceases to recognise the internal relationship between the various expressions of alienation and strives to identify behaviour that deviates from a supposed norm. This is in stark contrast to Marx‘s approach in which the theory of alienation grows from critical analysis of capitalism.

4. Education and alienation

Mann (2001) uses alienation theory to provide an explanation for and a possible solution to the lack of active engagement by learners in higher education. Educators and trainers concerned with ICT often refer to the failure of end-users to fully engage with ICT learning, so it is worth exploring in some depth the argument advanced by Mann. Drawing upon the work of others in the field such as Marton and Saljo (1976) and Prosser and Trigwell (1999), Mann highlights difficulties associated with surface or strategic learning. The former is —characterised by a focus on rote learning, memorisation and reproduction, a lack of reflection and a pre-occupation with completing the task.” (Mann2001: 7) Strategic learning is determined by —assessment requirement and lecturer expectations and a careful management of time and effort, with the aim of achieving high grades.” (Mann 2001:7)

Mann identifies six possible conditions within which learners‘ alienation may arise. The first is the tendency within higher education to focus on external needs, primarily the labour market. Here notions such as utility, transferable skills, and fit for purpose, drive the teaching agenda. These imperatives dominate subject choice, subject coverage, delivery and assessment. In short, study is determined by external need rather than student choice. This, argues Mann, results in the student being estranged from the possibility of a meaningful personal purpose in engaging in higher education[41].

The second and third contexts Mann identifies as alienating are related first to the student entering a —pre-existing discourse” determined and controlled by entrenched, established roles and —more powerful others.” (Mann, 2001:10) Secondly, when the student encounters language, customs, and systems alien to her; she is an outsider. These two pressures create a tension within the student between the required creative urge to explore the world and the repression of this creativity arising from the need to conform with the demands of education. (Mann 2001: 12) These pressures lead to Mann‘s fourth condition of alienation: the denial/repression of student creativity by the knowledgeable other. Compliance and acquiescence to the institution, lecturers, and course demands dominate the student‘s existence. As a consequence the student is estranged from her —own creativity and autonomous self as a learner.” (Mann 2001:13)

Mann‘s fifth description of alienation draws heavily on Marx in that she likens the student‘s loss of ownership of the learning process to that of labour. In the context of higher education, the product, i.e. the essay, report, exam paper, becomes part of the system of exchange. Hence the relationship between the student and the institution is mediated through the assessment outcomes thereby re-enforcing the power relationships. Rather than liberating the student and propelling her into greater discoveries about herself and the world in which she lives, the product of her work simply re-enforces the powerlessness she feels and replaces the idea of study with achievement determined and judged by pre-set norms. Here Mann refers (2001: 14) to Marx‘s notion of species being to argue that the student‘s drive to engage in creative study is undermined by the very learning process itself.

The student ceases to be a person and becomes a summation of her grades. This leads to Mann‘s final expression of alienation where the process of assessment, apart from re-enforcing hierarchical and unequal relationships as well as normalised judgements, determines what a student feels about what he has or has not achieved. His worth is measured by his mark and his worth, as determined by the grade, is judged against marks of other students. Thus a "good" grade re-affirms the student‘s worth to institution, to teachers, to other students and to himself as well as to those, such as parents, who have invested time, money and emotional energy in the student's outcome. The grade, the result of an academic judgment which cannot be challenged, cements the power relationship within academia further strengthening alienation. As Mann (2001: 15) notes

41 This may be the case even when the student ‗chooses‘ the course, if they feel that they need to choose a course to prepare themselves for the job market (perhaps so they can repay student loans), rather than choosing the course they would find most interesting.

> "Such an experience, especially when it is linked to failure, can be argued to contribute significantly to a feeling of alienation, in the Marxist sense, from the product and process of one's work, from one's self and from others,"

5. Alienation and ICT

Having looked at alienation, the paper now considers its relevance for ICT. As Tondeur *et al* (2007: 963) note in research by the Australian Department of Education, most national ICT policies focus on the educational sector. It would therefore seem appropriate in a study of this nature to consider a number of issues concerning ICT and education. Mann's description of the alienating experience of students resonates with concerns familiar to those connected with teaching ICT across a range of ages and genders[42].

Phelps *et al* (2005: 70) also note that other research (e.g. Chandler, 2000) indicates that where learners have control over their learning environment they "feel comfortable about learning any software, are willing to 'have a go' and are generally not intimidated by computers." The relevance to alienation of the approach Phelps *et al* have, is that they foreground the notion that control must given over to learners as they learn. End-users feel they have the power to determine the pace, direction, purpose and product of their learning activity. Here, it is possible to talk about the amelioration of the sense of powerlessness that end-users often exhibit. Phelps *et al* argue (2005:81) that without the development learning based on complexity theory, computer training will fail to provide the "self-directed learners needed for an ICT based society".

The self-activity of the learner is at the heart of this discussion on the value and importance of learning based on complexity theory. However there is more than this in their scheme since complexity theory requires a co-operative effort in co-constructing knowledge through interaction with others and their environment if it is to work effectively. Although alienation does not form part of the discussion of Phelps *et al* (2005), it is possible to discern themes that fit with the insights presented by Marx, Seeman and Mann. Phelps *et al* see the application of complexity theory as enabling a degree of power to be given over to the end-user. Implicit is recognition that powerlessness is often a problem for end-users in an ICT learning situation. Similarly, the call for ICT learners to be co-operatively involved with others also recognises that isolation or alienation from others needs to be overcome for learning to be more effective and transferable to new situations.

Dickey (2004: 280) examines the impact of blogs on student feelings of isolation, alienation and frustration and notes that the research often "identifies the lack of prompt unambiguous feedback and technical problems as a source of student distress." She also remarks that as well as providing an enabling structure for study, the technology can cultivate feelings of marginalisation and disenfranchisement in students learning in this particular environment. The introduction of blogs for small group learning communities was in response to the dissatisfaction articulated by students taking a distance learning programme. The small group communities played a critical role in the success of the blogs since they helped develop the notion of a connected community. In addition, students used the blogs to discuss the issues and themes reaching beyond those expected in a more formal academic discourse and postings contained elements "of socialisation, reports of activities and events, signs of support and reports of feelings and emotions." (Dickey 2004: 283). Through this process, Dickey reports that students developed a support "system within the community" and could "empathise" with each other's problems. (Dickey 2004: 284)

Dickey noted (2004: 228) that most of the "students were very familiar with blogs and many had friends and family members who maintained their own blogs. They were familiar with the personal and self-revealing of blogs." In concluding her paper, she also remarks that "learner perceptions of community and alienation impact on learning" and that the use of technologies such as blogs can enhance the community and thereby helps alleviate feelings of alienation." (Dickey 2004: 290) Here Dickey is hinting that ICT can alleviate or diminish those feelings of alienation described in general by Marx and Seeman, and by Mann in the specific context.

Dickey's paper is a further example of how teachers/trainers of ICT increasingly see the need to consider and explore the concepts as alienation and isolation and how they consider technology to be

42 See, for example, Abdul-Rehman and Davis (2009), who looked at software learning for engineering classes.

both the creator and the solution to these adverse experiences. It is further recognition that non-technical areas need to be considered if ICT is to be utilised effectively. However, the paper is illuminating from another perspective, in that the concepts of alienation and isolation are not fully described or explored, being used to name some vague form of dissatisfaction. The separation of the terms alienation and isolation are a clue, since isolation is identified as a key component of alienation itself. One consequence of this lack of clarity is that it inhibits the formulation of appropriate measures to investigate the impact of student blogs on the student experience and its relation to wider issues associated with alienation education as a whole.

In this context it is also worth recalling the papers published in a special issue of *Education Information Technology* (EdIT) in 2006 on ―haging the Future for ICT and Education". A key theme identified by Watson (2006) in her introduction was that the pivotal point of discussions had shifted from technology to focus on the learner and learning.

A study by Tondeur *et al* (2007) found that in schools ICT is hardly used as a tool to support the learning process. Their findings echo those of other studies undertaken in different policy and organizational contexts. Tondeur *et al* (2007: 974) conclude by arguing that teachers within Flemish schools ―have hardly been involved yet with regard to the integration of ICT competency frameworks", and they call for further research into this area including contextual factors influencing the use of ICT in learning environments. However, in citing policies and school plans as examples of contextual factors that need to be explored, they move away from a core finding: the value of intimate involvement of teachers in developing ICT integration. Once again, research zeros-in on the problem, but lacks the analytical tools to take the discussion in an appropriate and fruitful direction.

Robertson (2003) moves beyond technical and typically rational analyses based on resources, curriculum policy and training, to look at why ICT is under-utilised in education, seeking inspiration from other perspectives. Although Robertson makes specific reference to alienation, his discussion is peppered with comments that show a more rigorous application of alienation theory would aid research in this area. He cites, for example, Papert, who has argued that a ―top down approach driven by administrators and academic researchers has denied teachers involvement" in incorporating ICT in teaching and learning. (as quoted in Robertson, 2003: at p 329) He also refers to work of Morrison that shows where teachers and students had a high level of autonomy over learning, the take up of ICT was significantly higher than more rigid, top down approaches (Robertson 2003: 337).

A recurring theme in much literature concerned with the non-take up of ICT in other areas relates to the need for involvement of end-users in initial planning and implementation of systems. A study on the introduction of an Internet television service (Youtie et al: 2005) found that despite being offered free, many potential users did not adopt the facility. While technical problems presented some barriers, research also revealed a significant drop-off of those who had initially used the system and concluded that ―it was necessary for policy makers to move fully consider and factor demand" by including targeted households in the development of the system. (Youtie *et al*, 2005: 356) This echoes findings of Gurstein (2003) that system design, development and implementation should involve end-users preferably by defining systems' functions.

Four key features emerge from this review of research concerned with learning and end-user use of technology. The first is recognition that initial expectations of the positive role of ICT across levels and subjects have not been realised. Secondly, initial responses were to focus on technical solutions, which failed to resolve the contradiction between what the technologies can do and what actually happens. The third, more recent impulse, to move beyond technical solutions, embraces approaches inspired by theoretical frameworks from social sciences. The fourth aspect is the increased frequency with which terms such as isolation, marginalisation, and alienation appear in the literature and inform directions of research. These features indicate that a more rigorous application of the concept of alienation to this context would be of value in helping to develop an overarching analysis of ICT and learning in its myriad forms.

6. ICT, Work and alienation

ICT has become fully integrated into workplaces and work activity. Alienation and work also appears as a prominent theme in the literature. Kohn (1976) examined the relationship between

occupational structure and alienation; a theme that has been echoed by DeHart-Davis and Pandey (2005) in their research into rules, regulations, procedures and public employees. Ferguson and Lavalette (2004) have used theories of alienation to argue for what they term ‗emancipatory social work'. Banai and Reisel (2007) have employed concepts of alienation to look at supportive leadership and job characteristics and DiPietro and Pizam (2008) examined causes of alienation amongst American fast food workers. Healy and Iles (2002) examined the inability of codes of conduct to effectively govern the use of ICT at work and called for a more general ethical approach to the problem. More recently, research on the relationship between ICT and the economic crisis indicates technology operating at times beyond the immediate control of computer professionals (Healy and Fairweather 2009). Work of this nature provides a rich source of information and perspectives when considering the relationship between alienation and ICT.

7. ICT, ethics and alienation

The final section of this paper covers ICT and ethics as they relate to alienation. In this area, Tavani had done us all a mighty service by his annual review of books published covering ethical, legal and social issues in ICT. This covered thirty books in 2004 and twenty in 2005 (Tavani 2004, 2005). Unfortunately, his annual review stopped in 2005. It is beyond the scope of this discussion to cover the area in every aspect. From the research undertaken for this paper it has been difficult to find texts that are concerned to link the issue of ICT with ethics *and* alienation. Floridi (1999) argues that personal data transformed by information systems and subsequently re-presented to an external audience is a process that creates alienation. This approach has been used by others to examine the connection between privacy, alienation and ethics in the context of Internet research and arrives at the conclusion that the notion of non-alienation may be more fruitful than the concept of privacy in researching into the ethical use of the Internet (Berry 2004, Bakardjieva and Feenberg, 2001).

In other fields of study such as medicine, management theory, education and consumer research, there is a body of knowledge that seeks to combine ethical concepts and theories of alienation. Kanungo (1992), in an interesting study, argues that managerial practices that create employee alienation are themselves unethical. Attempts are being made to employ theories of alienation to examine a range of issues in other fields. Yuill (2005) and Crinsom and Yuill (2008) for example seek to explore the value of Marx's theory of alienation in theorising health and health inequalities thus raising ethical questions about the way health services are organised.

8. Conclusion

This paper has discussed the relevance of alienation to three specific areas as they relate to ICT: work, education/training, and ethics and has shown that there is a significant body of knowledge within social and management sciences which draws upon concepts of alienation. The paper has also shown that while researchers focused on issues related, directly or indirectly, to ICT are aware of the need to encompass non-technical influences, comparatively limited use has been made of notions of alienation in this work. This is considered a weakness in ICT-linked research and the evidence indicates that research seeking to make much greater use of theories of alienation would make a significant contribution to the body of knowledge in this area. Of particular concern is the need to recast investigations of ethical issues associated with ICT within a framework that draws upon the classical theories of alienation.

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THE FINNISH EVOTING EXPERIMENT: WHAT WENT WRONG?

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Abstract

eVoting experiments have recently taken place in various countries. We introduce the Finnish eVoting experiment, analyzing the eVoting itself and discussion in Finland around the issue before, during and after polling. Problems with the Finnish system, resembling problems found elsewhere, were ignored and justifications for eVoting were problematic at best. Also, the election results of the experiment were later overturned in court and voting had to be repeated in the trialling municipalities. eVoting machines seem now to be abandoned, but there is a move to Internet voting which has most of the same problems and others in addition.

Keywords: eVoting, electronic voting, Finland, errors, information security, information systems, social impact, trial implementation, open source, certainty trough

1. Introduction

In this paper we analyze the validity of claims made in Finland of benefits from an electronic voting (eVoting) system used in the election held 26th October 2008. We also examine potential harms from eVoting and then compare benefits with risks.

Justifications given in Finland for eVoting have been: ‗cost savings', ‗activating passive voters', ‗speed and efficiency of the system', ‗staying in the front line of ICT-using-nations', and ‗reliability of counting votes'. The argument that ‗if the banking system can be made secure, why not the voting system?' was also made (HS, 31.1.2008), although government officials denied elections might be extended to the Internet (e.g. HS, 30.1.2008). All these claims are *prima facie* plausible. However, most do not stand up to scrutiny, nor are these the only problems with the eVoting system as it was implemented in Finland.

EVoting is much more complex to understand than a paper ballot which can be explained to anyone in 15 minutes. The software, cryptography, etc. involved in an eVoting system cannot[43].

2. The Finnish Voting System

There are four major Finnish elections: representative municipal, Parliamentary and European Parliament elections; and direct presidential elections. All four are simple for voters. The voter enters the polling place, presents their ID, goes to a voting booth with a paper slip, chooses a candidate to vote for, writes the number[44] of the candidate on the slip, folds it, and returns the slip to the voting official who stamps it and the voter inserts it in the ballot box. Although counting for representative elections is more complicated, using a modified d'Hondt method[45], the basics are fairly simple, and the system is reasonably easy to explain to voters, should they want to understand counting. After the close of poll, the paper slips are counted, and combined municipally or nationally, as appropriate. This process can be observed by representatives from any and all parties with candidates. The process secures unidentifiable votes, yet transparency of the system, while ensuring fraud in the process is very difficult, since all parties and lists are able to nominate poll watchers.

43 See e.g. Mercuri, 2001 on difficulty to explain systems to laypersons.

44 With traditional Finnish paper ballots, votes for candidates are registered by writing the number allocated to the candidate onto the voting slip. Only those votes are accepted that have an unambiguous number written on them. Ambiguous markings are one of the most common reasons to discard the vote.

45 The candidate from a party or a list comprising of several parties and/or private candidates who receives the most votes receives the total amount of votes for the party or the list, the candidate who received the second most votes, receives half of the votes, the third one third and so on. These are then listed for all parties/lists and put in order. As many positions as are available, e.g. for parliamentary elections, 200 are then chosen.

Approximately a quarter of voters choose a recent possibility to vote in advance in places like post offices[46]. This has not solved the steady, but slow, decline in turnout (which probably arises more due to lack of interest in the democratic process than lack of ability to vote).

Preliminary results – typically accurate – are available within four hours. The system is stable, easily understood, secure, relatively cheap and fast. It satisfies the necessary requirements for a voting system for Finland.

The Justice Ministry commissioned the eVoting software from Tieto, a local software house, which in turn commissioned Scytl, a Catalonian producer of proprietary voting systems, to modify their software for Finnish elections. The system was to replace the paper ballot used in Finland, and replicates the paper ballot. The eVoting system offers the same basic functionality – lists of candidates are available, with voters entering the number of their chosen candidate and confirming their choice. The system offers a possibility to return an ‚empty vote'. Although empty votes do not affect results, they are noted (both in paper voting and in eVoting)[47].

The system is a ‚black box' (seeking ‚security through obscurity'). Functioning is a mystery except to the designers and system auditors. Many declined opportunities to audit the software because the non-disclosure agreement was too restrictive. Tarvainen claimed ―The agreement is not designed to protect trade secrets, but to silence all criticism." (Effi / Tarvainen, 2008)[48].

Many serious or critical faults were found in the software audit (Karhumäki et al., 2008), but according to the Justice Ministry (Oikeusministeriö, 2008) these were fixed ―if necessary" in the software used. The Effi report (Effi, 2009a) was critical about whether these problems were corrected sufficiently well. A user interface error was found in the usability tests, but was not documented and thus not corrected (Oikeusministeriö, 2009). Finally, the user interface of the system malfunctioned due to inadequate testing. This led to invalidation of the vote in the three municipalities which used eVoting.

3. Arguments for eVoting – and their problems

Cost savings: Traditional paper ballot elections in Finland cost 6-14 M€ per election. The official cost for the eVoting experiment was 0.8 M€ (HS, 9.2.2008). However we calculate as much as 12-15M€ was used simultaneously to "sustain election capabilities". These are possibly side costs for the eVoting project[49] (Valtiovarainministeriö, 2000-2009). The amounts only represent design of one system and its implementation in three small municipalities. Computerised systems do not, however, tend to be cheap to upkeep or to update.

As elections are held on average every 18 months, the cost for elections aggregates as less than 10M€/year – if the development of eVoting system is excluded. Ireland, with less population than Finland, spent 52 M€ on their eVoting experiment (2004-2006) (The Times Online, 2006). Even with no other election costs, developing and maintain the eVoting system would cost Finland more. Even if we are wrong, and some savings do accrue, the annual budget of Finland is 45 Billion € (Valtiovarainministeriö, 2000-2009). The percentage of the national budget taken by elections is negligible, thus minimal savings from a system as inherently risky as this one can hardly justify taking the system into use if it is problematic.

Activating passive voters: In other countries, eVoting experiments may have resulted in slightly increased turnout, but as this appears to be due to novelty is unlikely to last. In Finland, voters still needed to go to the voting location, so even though eVoting was widely advertised in the following three municipalities, it did not activate people to vote in notably greater numbers than usual – even with the novelty value. Voting activity rose 0.5% in Vihti, 0.8% in Kauniainen and 0.7% in Karkkila, while it rose 2.4% in the Uusimaa province as a whole[50] and 2.6% in whole country. (Yle Election Result Service).

46 Also other places e.g. shops, libraries, schools, embassies.

47 By contrast, when eVoting trials took place in the UK, despite calls for them to do so (Fairweather and Rogerson, 2002, p22), they prevented voters from actually recording ‚spoilt' votes.

48 See e.g. Fairweather & Rogerson, 2002, p. 15 on the need for transparency.

49 Based on the available information from the Ministry of Finance, at least 12M€ have been earmarked for ―sustaining election capability".

50 Uusimaa is the province that contains Vihti, Kauniainen and Karkkila

Internet and/or Mobile voting might encourage people to vote who would otherwise be non-voters, however, results from other elections in which these have been used show a jump in activity (due to novelty value) which then soon fades to almost same figures as before. One may ask whether democracy is really enhanced by including votes of voters who cannot be bothered, on a bank holiday, to go vote. It is not clear-cut that it is a benefit to make voting so easy that such electors cast a vote without expending that effort.

The true underlying value is interest and participation in democracy. In the discussion, willingness to vote seems to be confused with interest in participation.(Valtioneuvosto, 13/2010, HS 9.3.2007, 11.3.2007). Although casting a vote is a consequence of interest in democracy, the two do not in any way equate. The real problem is a polity that discourages participation: but it is not in the interests of those elected under that system to admit this.

Speed and efficiency: It has been argued that eVoting systems allow quicker results. In Finland, results of an election are clear approximately 4 hours after polling closes. However, reducing the time to 30 minutes[51] is hardly a major advantage if elections are held once every 18 months[52]. In most OECD countries it is hard to imagine counting taking more than a couple of days at worst; even using more complicated election systems than the Finnish one. Also, this would result in a system which could not give us the main claimed benefit, decreased cost of voting.

Staying in the front line of ICT-using-nations: In Finnish political rhetoric the term ―information society" is common. It is seen as a value in itself. ―Information Society" reflects efficiency, fully electronic government practices and generally a modern society in positive ways. What it really means, though, is the whole 3rd industrial revolution for good and bad (see e.g. A Green Knowledge Society, 2009).

While rhetorically being at the technological forefront may appeal, nothing about technology means being an early adopter is a good thing. Justification for *why* it would be valuable is needed. A high proportion of technologies, from supersonic airliners, to Betamax video, to pagers and using gopher to retrieve information from the internet offered opportunities to be at the technological forefront until the technology became seen as a dead-end. Globally it is not clear that there is a trend to develop eVoting. Countries including Ireland, Netherlands and UK have moved away from eVoting.

Reliability of counting votes: eVoting offers improved ease of use and reduced mistakes compared to traditional paper ballots. When electronic voting systems record the vote digitally ―This renders recounts difficult, impossible, or all too easy, depending on one's point of view. Indeed, in most cases, recounts carried out using such computer-based systems result in exactly the same result each time a recount is carried out." (Johnson, 2004, p1) If there have been errors, re-counting cannot correct them[53]. Electronic systems are, however, typically more complicated than analogue ones. Thus there are places in the system where errors can occur that cannot be detected or corrected by re-counting. Unless an entirely separate system[54] is used to recount, these include errors (or intentional manipulations) of how votes are tallied that could produce biased results.

There are problems even without inaccuracy in how votes are tallied. The discarded votes in the Finnish experiment strongly suggest that interface problems were causing errors in how the system recorded the intended vote of a proportion of voters: voters were having difficulty inputting their votes how they desired. It is possible for bias to be introduced (either accidentally or intentionally[55]) into eventual results by such difficulties. No amount of re-analysis (i.e. re-counting) of single input data (i.e. votes) can ever on its own detect or correct input error. In such cases reliability of counting is at the cost of reduced reliability that counted votes represent the votes intended by those who went through the voting process.

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51 If (nearly) all voters use the system

52 An interesting coincidence is, that according to Moore's ―law" is also 18 months – which may be relevant in its own right, as hacking the system will become doubly easier in each elections.

53 Except in the very particular circumstances of incorrect tallying of the votes, if an entirely separate system is used to recount the data.

54 With no software (including operating system and compliers) or hardware elements in common.

55 We have no reason to suspect that bias was introduced into the result. Accidental bias could occur either because poor design makes it more difficult to select certain candidates, or because certain demographic sectors of the electorate (with a non-typical distribution of voting intention) find operating the interface more difficult.

Internet and/or mobile voting: If a system is extended to Internet voting, it is vulnerable to a vast range of security threats. It is hard to defend servers against Distributed Denial of Service attacks which can stop use of the system and disrupt the voting process (Mercuri, 2001, p98). Even more dangerous are especially tailored zero-day malware, which could be used to attack even a closed eVoting system, as was pointed out in the audit report (Karhumäki et al., 2008). The most likely attack, however, would be an inside job (Fairweather & Rogerson 2002, pp6-7); a system provider altering the results either through a specific back door or using testing features left in the system.

It is good to keep in mind, that in every election not organised in specific booths, there is a possibility of having votes sold and blackmailed (Pratchett, 2002, pp14-15). For electoral secrecy, voting must take place in safe locations, where there is no possibility to spy on voting. Generally this is an argument against eVoting, and even more so for mobile voting.

Inevitability of eVoting - In Finnish media, citizens and politicians alike have seen eVoting as an inevitable force which comes to replace paper ballots. Finland is at a crossroads at the moment – whether eVoting is inevitable or not will be decided within the next few elections unless some major upgrade to the current system appears.

Technology development has been best in areas where moving to new technology is steady, safe and useful. Hence computerization is always delayed in fields where users resist, where new technology compromises safe continuance of the activity (e.g. eHealth), and/or where new technology brings no clear advantages compared to previous practices (c.f. mobile phones). With eVoting – in Finland‘s case at least – only the user resistance has not been an issue.

Some countries who have studied and practiced eVoting are abandoning it (e.g. Norway, Ireland, Netherlands, and UK). This is understandable because of the costs (e.g. at least 52 M€ in Ireland (The Times Online, 2006)) and the civil resistance after the experiments (Oikeusministeriö, 2009). In the UK unaddressed issues of security and transparency were given as key reasons (Electoral Commission, 2007, p4). More inevitable than the adoption of eVoting is the ―inevitability to *try* eVoting”. It seems every nation has enough nationalism left to not learn from others‘ mistakes.

Secure banking system – secure voting system: While parallels between secure banking and secure voting are widely drawn and appealing, applications are actually very different. Banks determine appropriate security levels by calculating the level of loss they are prepared to insure against (Fairweather and Rogerson, 2002, p30). To maintain confidence, banks then conceal the cause and nature of losses due to breaches of security. By contrast the financial value of affecting an election result that determines the government could be so vast as to be uninsurable.

As for concealment, the revelation—or widespread suspicion—that such an election had suffered a significant breach of security, and an attempted cover up, could cause protests more widespread than those witnessed in Iran in 2009, if the protestors came from a population with a tradition of free speech and where protest is an accepted right: in an extreme case revolution could result.

Another key disanalogy is that if banking transactions are delayed by a few days, parties will still normally complete the same transaction as soon as they are able (Fairweather and Rogerson, 2002, p30). By contrast, if eVoting suffers widespread delay of a few days, the mere fact of delay could influence voting intentions, and a different election result is so likely as to render the risk unacceptable.

Open Source: Electoral systems traditionally had higher standards of transparency than other kinds of decision process. Systems exist to allow representatives of parties and/or candidates to observe what happens to each ballot paper, and how votes are aggregated. ―If they see that the process is not being carried out properly, or if because of their observation, they believe a mistake has been made, they are able to make a challenge. Because of this transparency, there is general confidence in the process and in the result.” (ICAVM, 2002, p93) Transparency of counting processes has been an integral part of democracy in Finland, the United Kingdom and very many other countries[56].

Transparency with paper ballots is such that amateurs with a few hours training can understand systems well enough to be effective observers. With eVoting, no equivalent transparency is available. Even if everything is revealed to observers with maximum transparency, only an expert can interpret it:

56 In the United States ―In the polling place, representatives of each party oversee the voting activities, such as inspecting the machines to see that they begin with zero vote counts, and insuring [sic] that the totals are recorded properly on the returns at the end of the day” (Mercuri, 2001, p51)

but perhaps, despite this reduction, if each party were able to appoint their own team of experts, and they were allowed enough access to thoroughly inspect, sufficient transparency could be obtained[57]. However, in the Finnish experiment, it is not the case that everything was revealed to observers with maximum transparency.

The Finnish eVoting auditing report (Karhumäki et al., 2009) reveals: "(s)ource code (for the eVoting system) is not open source, and only critical parts of the code have been inspected." Clearly that is insufficient, since elements of a computer program can crucially impact on others that by themselves appear to correctly complete an operation. The problems, however, went yet deeper: "Even if the code had been thoroughly inspected, we need somehow to verify that the executable matches the inspected code" (Karhumäki et al., 2009), Without such verification, inspections are worthless, since inspected software that correctly records and tallies votes could have been intentionally mis-compiled or supplanted with similar software that introduces enough bias to affect the overall result without arousing suspicion.

Even if it was verified that thoroughly inspected, good, code was running, it would be important to ensure "that there are no external programs running on the computer" (Karhumäki et al., 2009), since even if the program successfully defends itself from having its internal processes manipulated by other programs on the computer, those other programs could interfere with how the program interacts with input or output devices. Without such checks, hidden back doors in software are possible. A hostile takeover of the system (whether by national or external parties) is, thus, much more likely than with traditional paper ballot.

In sum

> "even if one has verified that the source being compiled is the properly certified version, one must also examine the compiler used to create the running object code, the compiler that compiled the compiler, and the entire system upon which the code is being installed. If all of this was also provided in an open format, can we … trust the system? No because there need to be assurances that all of the various components previously examined were indeed the ones used within the system during the election (which could be done using cryptographic checksums). We further need to secure all parts of the system before, during, and after the election so as to maintain integrity throughout the entire process. And we need to do this for all components, at all election locations, throughout all of the aforementioned times." (Mercuri, 2001, p58).

Open source code may be a pre-requisite to meet appropriate standards of transparency: it does not, however, solve the fundamental tension in eVoting between extensive security, universal access, and strict privacy. Indeed that tension has caused one previous advocate of open-source eVoting to 'recant' (Kitcat, 2004). There also needs to be a guarantee (e.g. checksum) that the software used is actually the open source generated software.

Secrecy: Secrecy of how individuals have voted is a key requirement for 'free and fair' elections. Yet Finnish eVoting machines keep votes with the voter's name *after* the vote is cast, thus effectively eradicating anonymous voting; *if* officials holding the keys to the ballot, at any later date, want to know how individuals voted. In a changed political climate, the implications could be catastrophic. Further, Finnish eVoting machines, like many eVoting machines, have fairly large, slightly tilted, screens. Screens are noticeably larger than ballot papers. Most voting places are in public school gymnastics halls, where many people—not only students, janitors, teachers, etc., but also evenings rentals—exercise and play. It is not hard to install and conceal a small wireless webcam so that voting screens can be observed. However, in some special situations (unfortunately not mentioned in the Finnish eVoting discussion) eVoting machines could (presuming the eVoting system is itself secure) improve privacy of disabled users, removing the need for aid in the polling booth. This would improve the privacy and self determination of these voters.

57 Sufficient access to thoroughly inspect effectively implies that the source code is openly available to examination by all. A more restricted access to the source code would either limit the capacity of parties to bring in their own experts to examine it, or limit who is allowed to stand for election to those who were willing to abide by restrictions on distribution of the source code.

Human-computer interfaces transfer electronic pulses between interface and computer. This communication can be eavesdropped and electoral secrecy thus broken. While we don't know of attempts to eavesdrop in this eVoting experiment, similar methods were used to eavesdrop on Dutch eVoting machines (Jacobs & Pieters, 2009).

The American Experience: We must also notice that the U.S., where eVoting takes many forms, has had its share of problems. Electronic Frontier Finland (Effi, 2009) addresses a few:

- Year 2003 in Virginia a candidate lost 100 votes due a programming error
- In California, 2001, because of programming error, votes had to be recounted. (They had paper trail)
- Al Gore was initially attributed *minus* 16 022 votes in a voting district in Florida at the 2000 presidential election
- Year 2003 in Boone county, Indiana, 20 000 voters gave 140 000 votes
- 3 400 votes were lost in the 2008 elections in Florida

The idea they could happen in Finland was called "Science Fiction" by Minister of Justice Tuija Brax (Uusi Suomi, 3.9.2008)

4. What Went Wrong

The eVoting system was tested in three municipalities: Kauniainen, Vihti and Karkkila. The percentage of lost votes was over three times as high as on average on the paper ballot. 232 votes, approximately 1.9% of all votes, were lost in these three municipalities (T&T, 29.12009). By contrast 0.17% of votes were lost nationally due to unintentional problems, and all votes lost nationally were 0.63% of turnout. (T&T, 29.1.2009, HS 30.10.2008). The media, and statements by government officials, described this as user error, and – with very few exceptions – claimed the problem was 'minor'. "It seems that the (eVoting) system was not the problem. The human was." commented the Minister of Justice, Tuija Brax (HS 28.10.2008). Users were blamed, not the system, its creators, nor its original testing by Tieto[58].

In reality it was a *user interface error* which was found in testing, but ignored (Oikeusministeriö, 2009). The user interface did not clearly verify that the vote had actually been recorded. The user interface problem is none-the-less a problem which can be corrected easily enough if eVoting is continued. This would, unfortunately, leave the real underlying problems of inadequate testing, and inadequate changes when testing revealed problems, wholly unhandled. If even the user interface was this faulty, what about the invisible parts of the system?

Some of the public woke up to the problems with the system. Legal action was taken in the Helsinki administrative court. The decision was not to re-run the elections in the three municipalities (Effi/Administrative court decision). However, an appeal was brought to the supreme administrative court (KHO, 2009), and the elections were ordered to be re-run in the three municipalities.

The Finnish eVoting system was criticised for not having a paper trail, which could be used by the voter to verify the vote cast, and placed in a standard ballot box. With the paper trail results could be audited after the election. For this same reason, the German Federal Constitutional Court ruled that eVoting, without a possibility to verify results independently, is unconstitutional (Bundesverfassungsgericht, 09). Since the work of Mercuri (2001, p54), most critics of the trustworthiness of eVoting (like EFFI) emphasise that if eVoting is used at all, this should be the starting point. (Effi, 2009)

If the system is a 'black box', why will people not criticise it? It may have something in common with "the certainty trough" idea (Mackenzie, 1990). The idea states that people who do not know enough and people who are very familiar with a technology, are most suspicious about that technology (Mackenzie, 1990). This idea has been generalised (e.g. Woolgar, 1994; Pantzar, 2002).

Those who do not understand computer technology are understandably quiet about eVoting systems; while there are too few, who understand enough, to be heard. Therefore people, who falsely think they understand enough, make most of the calls in this matter. *This* of course is an alert.

58 Then called TietoEnator

5. Wakeup Call

A common problem with complex systems is that users are forced to trust the system. Because of this, IT-systems are built to mimic real life, with e-mail analogous to traditional mail. Electronic voting, however, is different from many other systems mimicking physical counterparts: the verification of outcome differs. For both letters and emails, people can verify the outcome by asking whether the mail reached its destination. In eVoting users must trust the system. Most people cannot verify the code in the first place, let alone be assured that the same code is used in the actual voting machine (this is especially true when the software is proprietary). While society is under constant digitalization, trust towards the system can only be evaluated through results. With elections, this is usually impossible, since there is no way of finding out what the result would have been without trusting the electronic voting system.

Estonia is using even mobile voting, but nonetheless faces criticism of the system for having ―almost no oversight of the internet voting process by political parties or civil society" (OSCE, 2007:2; Oikeusministeriö, 2009:51). Prior to January 2010, Finnish government officials gave the impression that Finland would not follow the Estonian model of mobile and internet voting because of the security issues involved (e.g. HS, 30.1.2008).

The Netherlands is getting rid of eVoting because of public concern and the vulnerabilities of the system in use (The Register, 2007; Digitoday, 2008). The Dutch case should have been a warning to Finnish politicians and government officials. A Dutch civil activist group Wijvertrouwenstemcomputersniet (We do not trust voting computers) proved that an eVoting system used in Netherlands, France and Germany can be easily cracked (Wijvertrouwenstemcomputersniet, 2007). These results were no big issue while discussing eVoting in Finland.

A few things are still unclear, like the lifespan of an eVoting system. Is it similar to a normal personal computer, which is usually updated every 2-5 years, or are these systems built to survive longer, like 5 to 10 years? Or more? The security of a five-year-old system is not what it was when it was designed, while the possibility of a zero-day vulnerability increases as systems are in use without hardware and software updates. If we assume the system would be updated every 6th year, Finland would have new eVoting machines every 4-5 elections. How much would new voting machines cost?

If we build eVoting systems, what will happen to them when they are outdated? Will they be destroyed or reused as components for newer versions? One theory is that we will ship our broken and insecure eVoting systems to developing countries as ―development aid", just as we ship other technology.

As industrial nations we must also remember, that the technology we use, we must also accept as suitable for developing countries to use. If we accept ‗black box' unverified eVoting systems as a suitable way to hold elections, we also should accept their use in less industrialised countries. We may, however be reluctant to do so when used by regimes who we already suspect of electoral manipulation.

6. Conclusions

In this paper, we have covered the arguments for and against the eVoting system which have been most prevalent in public discussions in Finland. We conclude that, as MacKenzie (1990) points out, those most critical seem to be those who either understand the system most clearly or do not understand the system at all. Politicians and the young, computer ‗literate' and Internet using populace at large who have a general understanding of computers (but do not understand the specifics of eVoting), are most trusting of the system. Specialists in cryptography and information security specialists are especially sceptical towards the system.

The system cannot be justified based on the discussions of politicians, representatives of various ministries, companies promoting eVoting or the media in general. Even though there may be some viable arguments for an eVoting system (e.g. some disabled people being able to vote without assistance), the arguments in public discussion in Finland justify transfer to an eVoting system poorly at best and are actually contrary to transferring to an eVoting system after even the most cursory closer examination.

As this paper was almost ready to be published, on 13.1.2010, the Finnish Government announced that Finland's eVoting experiment has been suspended. They also decided that Finland should endeavour towards internet voting in 2016 municipal elections (Valtioneuvosto, 13/2010). Internet

voting opens up a whole range of extra concerns: we can now only hope that the new project considers them adequately.

A worry with the 2008 Finnish eVoting experiment is that it was unclear whether attempts would have been made to answer even those faults which could be addressed, let alone to mitigate problems that could not be solved. A positive sign is that the Ministry of Justice is now looking into open source, for future implementations of eVoting, to solve some of the issues raised in the discussion (Oikeusministeriö, 2009). This still leaves unanswered the underlying problems of ordinary voters not being able to understand the code, and systems being approved with known significant flaws.

For future work, we think it would be good to look at the technical aspects of the tested eVoting application in more detail. There will also be a need to study how closely (or otherwise) the proposals for internet voting match appropriate requirements for such a system.

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A DEONTOLOGICAL TWO-PRONGED MORAL JUSTIFICATION FOR LEGAL PROTECTION OF INTELLECTUAL PROPERTY

K.E. Himma

Long Abstract

Whether or not intellectual property rights ought, as a matter of political morality, to be protected by the law, I argue, depends on what kinds of interests the various parties have in intellectual content. Although theorists disagree on the limits of morally legitimate lawmaking authority, this much seems obvious: the coercive power of the law should be employed only to protect interests that rise to a certain level of moral importance. We have such a significant interest in not being lied to, for example, that ordinary unilateral lies are morally wrong, but the wrongness of lying does not rise to the level of something the state should protect against by coercive criminal prohibition.

I begin this essay by distinguishing two ethical issues regarding IP not usually distinguished in the literature. The first is whether authors have a morally significant interest (i.e., one that receives some protection from morality) in controlling the disposition of the contents of their creations, which would include some (possibly limited) authority to exclude others from appropriating those contents subject to payment of an agreed-upon fee; this interest might, or might not, rise to the level of a moral right. The second is whether it is morally permissible, as a matter of political morality, for the state to use its coercive power to protect any such interests authors might have in the contents of their creations. Such protection might, or might not, constitute a legal right, as there are other legal mechanisms for protecting peoples‘ interests.

These are logically distinct issues. The first concerns moral standards that apply to the acts of individuals, while the second concerns moral standards that apply to the acts of the state. Not every morally protected interest an individual has is legitimately protected by the state. For example, I have a morally protected interest in not being told lies, but it would not be legitimate for the state to create a criminal or civil cause of action that makes a person liable for every lie she tells. Conversely, not every morally legitimate law protects some interest antecedently protected by morality. Apart from the existence of a law requiring people to drive, say, on the left-hand side of the road, no one has a morally protected expectation that people drive on the left-hand side of the road. Such an interest arises only after the enactment of a law requiring as much – and it arises because that law has been enacted. What individuals morally ought to do and what the law morally ought to do are issues that fall into two different areas of normative ethical theorizing because the law regulates behaviour by coercively restricting freedom and hence impinges our moral right to autonomy.

Of course, the two issues are sometimes connected. Surely, part of what justifies the state in coercively criminalizing murder is the moral quality of murder: it is one of the worst moral wrongs, if not the worst (I am not sure, for example, whether torture is worse), one can commit because it violates one of the most important moral rights – the moral right to life. It would be morally problematic to criminalise a behaviour and punish it with incarceration or death unless it involves a pretty grievous moral transgression.

I argue that it is also reasonable to think that whether legal protection of intellectual property is justified as a matter of political morality turns, at least in part, on the moral importance of the interests of the various concerned persons in intellectual content. If content-creators have no morally significant interest in the content they create and other persons have an urgent need for unrestricted access to content, then it seems reasonable to think that it would be wrong for the state to enact restrictions on access to content of a sort that constitutes protection of intellectual property.

In this essay, I next address the substantive issue of whether the state may legitimately recognise and protect IP rights (which, again, need not mirror the content of existing IP law in the western world) because this is, as far as I can tell, the issue about which theorists and laypersons are most concerned. In doing so, I assess the weight of the interests that content-creators have in their creations against the interests of third parties, and attempt to assess the relative importance of each. In the process, I defend this methodology on both intuitive and theoretical grounds, giving famous examples of influential

philosophical theories that more or less explicitly justify substantive moral claims on the strength of the interest-balancing methodology I articulate here. Additionally, I explicitly address both the issue of individual morality and the issue of political morality and take care to ensure that the reader is aware at all times which issue is being addressed.

On the basis of this methodology, I give a detailed assessment of all the relevant interests, specifying whether they fall under the category of needed for survival, needed for human flourishing, or merely wanted for amusement. I argue that the interests content-creators have in the content they create (or discover) (1) outweigh the interests of other persons in all cases not involving content necessary for human beings to survive, thrive or flourish in morally significant ways, and (2) are sufficiently important that they deserve some legal protection. I also argue that (3) ordinary considerations of justice support the idea that content-creators have a morally protected interest in the value they introduce into the world through their intellectual creations. While (1), (2), and (3) do not obviously imply the existence of moral rights to intellectual property, they surely present a prima-facie justification for using the coercive power of the law to protect the interests of content-creators in the contents of their creations. And one eminently sensible way of protecting their interests is for the law to allow them limited control over the disposition of their creations. How much control they should be allowed is a further issue I do not address here.

METAPHORS IN ORBIT: REVOLUTION, LOGICAL MALLEABILITY, GENERATIVITY AND THE FUTURE OF THE INTERNET

David Sanford Horner

Abstract

This paper proposes that the concept of ‗the Computer Revolution' is neither descriptively nor analytically useful in understanding the complex history of the emergence of computing technology and the Internet. The idea of ‗revolution' invokes a misleading sense of the significance of novelty, upheaval and inevitability. Equally, proposed structural models of the Computer Revolution have little or no predictive value in constructing ‗better ethics'.

1. Introduction

The idea of ‗the Computer Revolution' has figured prominently in the literature of Computer Ethics as a guiding principle or framework which appears to make sense of the significance of the field. For example, Krystyna Gorniak-Kocikowska writes: ―The revolutionary nature and the global character of digital technology questioned only a few years ago, are undeniable today. It has also become obvious that this technology generates a new lifestyle, new standards of human behaviour, new values; in short, a new culture/civilisation is emerging due to the use of digital technology. A very important characteristic of the culture that will emerge as a result of the computer revolution will be its global character." (Gorniak-Kocikowska, 2001, p.208) In a similar vein Terry Bynum writes: ―…An ‗Information Revolution' has been changing the world more rapidly – and more radically – than the Copernican Revolution and the Industrial Revolution. Of special interest is the fact that the Information Revolution is altering our understanding of human nature, the nature of society, and even the nature of the universe." (Bynum, 2009, p.1) However, it seems to this writer that such claims are neither ‗obvious', nor ‗undeniable' nor analytically helpful.

Revolutionary talk about computing appears under a number of labels: ‗the cybernetic revolution', ‗the digital revolution', ‗the information revolution', ‗the virtual revolution', ‗the computer revolution' and so on. In fact the concept of this putative revolution is central to what has been become something of a ‗standard account' of the development of information and communication technologies. The revolution is the moving force in the transition to a new form of society precisely characterised by its technology: the computer society, the cybernetic society, the information society, the virtual society, the digital society etc. (Winner, 1986; Graham; 1999). Like an external force, the Computer Revolution brings in its train a total transformation of society. One of the dangers of this revolutionary language is that it suggests a kind of irresistibility, a quasi-Marxist view, in which the very technical force of computing in itself transforms society.

The argument of this paper is that we in the Computer Ethics community have been perhaps held captive for too long by this picture of ‗the Computer Revolution'. Is this picture really helpful? Is it helpful to assimilate an essentially social phenomenon, a political revolution, with a scientific and technological one? I am increasingly puzzled by what is meant by ‗the Computer Revolution'. Are we meant to take ‗the Computer Revolution' to mean something literally? And if so what? When did it begin? If the meaning is metaphorical just what is being likened to what? Does it really help to sort out our moral responses to predicaments by being told that it's a revolutionary situation? Is it intended to be descriptive or explanatory? Or is it more of a rhetorical flourish, a form of short-hand, for indicating something important is happening? In this paper I tackle these questions at the theoretical level by looking at the standard account and then by examining a recent study of the history of the Internet.

In the next section, ‗Technological revolution and the standard account', I give a brief, critical overview of Jim Moor's general model of technological revolution and its application in particular to computing. In section 3, ‗The metaphor in orbit', I discuss the lineage of the idea of revolution and its

application in a variety of contexts from the political to the scientific. The discussion reveals the instability and variety of its meanings. In section 4, History and the Internet, I explore Jonathon Zittrain's recent account of the history and potential future of the Internet. This history shows the importance of social ethos in the shaping of technological pathways. Outcomes are by no means inevitable. The history does not resemble the deterministic model of a computer revolution.

2. Technological Revolutions and the Standard Account.

In Jim Moor's now widely accepted standard account of Computer Ethics, as an independent field of theoretical and practical endeavours, the stress is precisely on the need to address the policy vacuums and conceptual muddles thrown up by the radical novelty of revolutionary advances in computing. But 'the Computer Revolution' is not the only technological revolution in town. Other candidates for the title also include genetic technology, nanotechnology, and neurotechnology: "All these technologies are conducted under paradigms suggesting that they hold great power over and control of the natural world. Each could bring about worlds unlike those ever experienced" (Moor, 2009, p.36). Immediately this way of putting things seems to suggest that technologies are some form of force external to society that will, willy nilly, radically transform our life world. Even more strikingly Moor argues that the technologies are convergent: "The malleability and convergence of these developing technologies make revolutionary outcomes likely. Revolutionary outcomes make ethical considerations ever more important" (Moor, 2009, p.37).

Moor summarises the argument in this way: "The revolutionary feature of computers is their logical malleability. Logical malleability assures the enormous application of computer technology. This will (sic) bring about the computer revolution. During the Computer Revolution many of our human activities and social institutions will be transformed. These transformations will leave us with policy and conceptual vacuums about how to use computer technology. Such policy and conceptual vacuums are the marks of basic problems within computer ethics. Therefore computer ethics is a field of substantial practical importance." (Moor, 1985, p.272) A further part of this standard account is that we must not only fill the policy vacuums retrospectively but attempt to anticipate the future direction of technological travel in order to produce a prospective ethical assessment of likely policy vacuums. But it is not clear why logical malleability automatically confers on computing the status of a 'universal tool' that necessarily translates into large scale social impacts. "Syntactically, computers are logically malleable in terms of the number and a variety of logical states and operations. Semantically, computers are logically malleable in that the states and operations of a computer can be taken to represent anything we wish."(Moor, 2009, p35). But the key is surely in fulfilling the 'wish' not in the technology *per se*. Wouldn't we want to say that malleability only matters when it is translated or instantiated in a range of differing devices, processes and media and when it is put to use. Then the technology disappears and becomes something other. Is my mobile 'phone a computer? Well yes, but only in a very loose sense.

The analysis of these technologies in revolutionary terms has also intended predictive value particularly for the anticipation of new ethical issues. In other words, the use of 'technological revolution' is not meant to be merely descriptive but is intended to be explanatory. Ethical issues can be tied into different stages in the unfolding of a revolutionary technology. Unfortunately, this way of putting things also seems highly teleological as if history has a purpose which unfolds in some Hegelian kind of way. This is evident in Moor's ever more elaborated model which begins in 1985 with two stages and in 2009 has three stages and four revolutionary technologies (Moor, 1985; Moor 2009). Moor describes a three stage model for such technologically driven revolutions in general and the computer in particular. In the first stage, 'Introduction', there occurs a wave of innovative products and processes. This, he argues is essentially a learning period in which the technology is subject to continuous testing and improvement and, in addition, the introduction of innovations is limited to specific applications in specific sectors. At this stage the impact on society and the implications may be marginal but not without ethical significance: "One of the important ethical issues during the introduction stage of the computer revolution was whether a central government database for all U.S. citizens should be created. It would have made government more efficient in distributing services, but it would have made individual privacy more vulnerable."(Moor, 2009, p.37)

In the second stage, ‗Permeation', the costs of applications drop and the diffusion of the technology becomes more widespread. Absorption into everyday social practices may still be relatively moderate but becomes ‗more noticeable' and more ethical issues will inevitably arise as social impact increases. Here again the model implies that technologies operate as some external force on society, like a force of nature, rather than simply the ‗instrumentation' of human values, choices and actions. (Johnson, 2001). As, in the case of computing, more people come to own and use personal computers and file sharing begins to take place then ethical questions around intellectual property and privacy come to the fore.

In Moor's final and most critical stage, ‗Power', the technology is widely diffused and embedded in society such that it has major social impacts. The technology is central to the running of many sectors of the economy and social life such that if it was removed or collapsed the consequences would be devastating. For example, the concerns about ‗the millennium bug' reflected the centrality of IT to societies across the globe. At this stage the ethical questions raised are new, profound and wide ranging. Moor, for example cites identity theft, and paedophilia. I suppose the logic must be that if you identify the stage which a ‗revolutionary' technology has reached you may have some insight into the scale of ethical problems. And hence the eponymous Moor's Law: ―…As technological revolutions increase their social impact, ethical problems increase." (Moor, 2009, p.37)

To some extent Moor recognises the social shaping of technologies or rather the political shaping of technologies. He makes a crucial distinction between technologies developed in open societies and those developed in closed societies. His model assumes a liberal democratic state in which market forces steer technological innovation and diffusion even if within some regulatory framework. In contrast, in closed societies: ―…the access to the technology remains severely restricted by social, political and economic forces. For example, a ruling elite or a military may maintain control by limiting access to and use of particular technologies." (Moor, 2009, p.29) We can see this process at work in the Chinese Government's attempt to censor the Internet and stifle political opposition. The exercise of control affects the diffusion and use of a technology, the permeation stage, thus limiting the broader social and political impacts.

Even in the ‗revolutionary' camp it is sometimes not clear what is revolutionary; the technology or the changes it brings about or both. But if everything is revolutionary then nothing is! For example, Krystyna Gorniak-Kocikowska writes: ―The changes computer technology is bringing about to people's lives are revolutionary, which means that they are not always beneficial. One of the features of every revolution is that it is at the same time both a process of creation and destruction." (Gorniak-Kocikowska, 2001, p.208). But what is clear is the claim that the arrow of causality runs from the technology to its impacts: ‗technology x' has ‗y social impacts'. This looks very much like technological determinism.

3. The metaphor in orbit.

We have been here before with this revolutionary talk. Far from being a literal account the revolutionary view is, of course, metaphorical and metaphors are notorious for their properties of bewitchment. Langdon Winner (1986) has deconstructed the ‗romantic politics of the computer revolution' and shows how the belief in the transformative effects of ‗the Computer Revolution' is largely naïve and utopian. What we are being offered with this revolutionary talk is a powerful metaphor. He argues that the metaphor in trying to compare the disruptive and transformative affects of political revolutions with changes around computer information systems simply does not hold. Technology is not a substitute for politics and an understanding of the role and exercise of power in human affairs As Moor points out also, technology doesn't operate outside of a political context (2009, p.29).

Hannah Arendt reminds us that the original meaning of the metaphor of revolution was ‗return', a backward revolving motion, suggesting the lawfulness of rotating, cyclic movement of astronomical bodies. Revolution, for example, for the English Puritans meant restoration. The new metaphor denoting novelty, beginning and violence can be dated to the time of the French Revolution (Arendt, 1963, p.41). Similarly, Ravetz points out: ―In modern Europe, ‗revolutions' began with the radical and thoroughly implausible theories of Copernicus. His great astronomical book was about the cyclic movements of the heavenly bodies (now including the earth), but later the philosopher Kant referred to

a ‗Copernican Revolution' in the new sense. Then historians and commentators found revolutions all around in the present and the past; the ‗Industrial Revolution' transformed the means of material production and gave rise to urban society; and the ‗Scientific Revolution' of two centuries earlier was associated with positive knowledge and the world-view that distinguished modern Europe so definitively from other cultures." (Ravetz, 1996, p.44) But then subsequently revolution becomes fundamentally associated with the political overthrow of existing structures: the iconic moments, the Declaration of Independence, storming the Bastille, seizing the Winter Palace etc. But even here the meaning of the American Revolution is very different from the meaning of the French Revolution, as Arendt (1963) argues, the former is concerned with founding a new constitutional order, whilst the latter was driven by ‗the social question'.

It is not too long ago that the idea of an almost continuous unfolding of a Scientific and Technological Revolution (STR) was a mainstay of orthodox Marxism and Soviet ideology (Volkov, 1975). Scientific and technological progress was an integral element in the historical shift from capitalism to socialism. ―At each stage of the development of the productive forces there is a certain correlation between the production functions fulfilled by human beings alone and those fulfilled with the aid of technical means. The Industrial Revolution was associated with the transfer of the technological production function to the machine; with the STR the fulfilment of logical and control-regulation functions is similarly transferred, the ‗kernel' of this development being the automation and cyberneticization of production." (Cooper, 1977, p.160) I guess no one now would suggest that the STR proved to be a guarantor of the triumph of socialism!

The pattern inherent in Moor's model mirrors that of Thomas Kuhn's famous account of ‗scientific revolutions' in *The Structure of Scientific Revolutions* (1962) where similar stages are invoked as almost the ‗natural' course of development of scientific paradigms: stage 1: pre-paradigmatic; stage 2: emergence of a paradigm; stage 3: normal science (puzzle solving); and stage 4: exhaustion. But Kuhn's account hardly survives the detailed analysis and enumeration of limitations to be found in Stephen Toulmin's brilliant but neglected critique in *Human Understanding* (1972). The problems with Kuhn's account are legion including the very definition of ‗paradigm' (one critic noted 23 different senses), the shifting use of ‗revolution' between description and explanation; the problem of whether a paradigm is a cognitive event; a sociological event or a reference to a set of tools; the problems of explaining change if paradigms are truly incommensurable; and lack of clarity about the level at which a paradigm operates. However, beyond this Toulmin demonstrates how on closer and more detailed historical inspection the distinction between incremental and revolutionary change began to fall apart. ―For, on closer examination, it turned out that even the Copernican and Einsteinian revolutions were something less than ‗revolutionary', in Kuhn's technical sense of the word. His theoretical account of full-scale scientific revolution thus failed to reflect the actual experience of the sciences involved, even in the phases of scientific change whose effects were most ‗revolutionary' in the familiar descriptive sense." (Toulmin, 1972, p.113)

Revolution has all the qualities of a metaphor out of control. And one of the things it does is to focus undue attention on novelty generating an ‗innovation-centric' picture of social and technological change. David Edgerton in *The Shock of the Old: Technology and Global History since 1900,* (2006) develops a broader and more cogent picture, a ‗technology-in-use' view. He argues that this innovation-centric picture generally tends to ignore those technologies which are mature and currently in use; their histories and continuing significance. Why should we assume these no longer present ethical problems? Social values change; what once seemed uncontentious may now be contentious and vice versa: ―Time was always jumbled up, in the pre-modern era, the post-modern era and the modern era. We worked with old and new things, with hammers and electric drills. In use-centred history technologies do not only appear, they also reappear, and mix and match across the centuries. Since the late 1960s many more bicycles were produced globally each year than cars. The guillotine made a gruesome return in the 1940s. Cable TV declined in the 1950s to reappear in the 1980s' (Edgerton, 2006, xii). In its picture of revolutionary irresistibility, an innovation-centric view tends to ignore the innovations that failed; it tends to ignore the technology that developed only slowly and not exponentially; it ignores the counterfactuals that is how, for example, the different ways in which information and communication technologies might have developed given different policies, regulatory regimes and social values. Old technologies re-emerge whilst we find emergent limits to

new technologies. The recent history of the Internet has begun to display these tendencies as, if not old technologies, then older forms of regulation and control, and business models bid for dominance.

4. History and the Internet.

What I argue using the example of the history of the PC and the growth of the Internet is that the use of the language of revolution is of little help in understanding these phenomena. I believe that the distinction between ‗revolutionary technological change' and ‗normal (incremental) technological' collapses in the face of actual complexities of history. What it is more important to understand is the values that animated choices made at various stages in this particular piece of technological history. To some extent all design is value sensitive. I hesitate even to talk of stages for this seems to me to impose a kind of teleology on the process whereas the actuality was much more chaotic and the outcomes uncertain. This is the source of what Taleb (2007) has called' the narrative fallacy'. In retrospect we construct a story, often a triumphal march of development, as though it always had to be so. For example, Moor's model of stages open technological revolutions in the Computer Revolution as though there actually was some rising curve of history. But what Jonathan Zittrain's recent account of the growth and possible future of the Internet, *The Future of the Internet: And How to Stop It* (2009) shows is the many possible pathways in the history of the PC and the Internet.

On the surface Zittrain's approach has much in common with that of Jim Moor. He refers, for example, to ‗the modern information revolution' and considers both the PC and the Internet as revolutionary. If, for Jim Moor, the revolutionary attribute of computing is ‗logical malleability' then for Jonathan Zittrain the concept of ‗generativity' is the radical attribute of PCs and the Internet. However, I think that Zittrain's use of revolution here is descriptive rather than explanatory. The explanation for the emergence of the PC in the form we have it is in a rich picture of competing models, values and visions. Generativity describes an outcome of social processes but is not an explanation of them.

Following Moor's terminology if there is something called the Computer Revolution then the invention, innovation and diffusion of the PC and the subsequent development of the Internet may be called *sub-revolutions*. In each case the history shows different and often unexpected pathways of development emerged. These pathways were under-determined by the technology itself but very much a consequence, on the one hand, of struggles between different conceptions of the technology and on the other of quiet incremental development. Zittrain, in the case of the PC sketches the struggle between different conceptions of computing and the personal computer. In the ‗battle of the boxes' three possible models emerge; firstly ‗the Hollreith model' is one of powerful, general-purpose machines maintained continuously and exclusively by a vendor'; secondly ‗…the appliance model is one of predictable and easy-to-use specialised machines that require little or no maintenance. What is characteristic of these two models is that in each case neither the machine nor the appliance ‗…can be easily reprogrammed by their users or third parties'. The third and triumphant model is precisely the all purpose, powerful PC with qualities of generativity: ‗…adaptable to many different tasks and accessible to anyone who wanted to recode them' i.e. open to reprogramming and repurposing (Zittrain, 2008, p.17) . Zittrain argues that this outcome was not some inevitable product of Moore's law but an unpredictable consequence of ‗the battle of the boxes' with their attendant different models and values.

Moor's (1985) account to some extent parallel's that of Zittrain's. He writes that stage one, i.e. technological introduction, stretches from around the time of the Second World War to the mid-1980s. This period was characterised by the application of computers to existing types of activity from payroll applications to scientific and military applications. The computer was treated as just another tool. In the second stage, however, the phase of permeation, the applications of computer technology begin to change the very nature of the tasks to which it is applied and the social, economic and institutional structures which form the context of application. Of course what is missing from this account is that sense that things could have been very different.

For Moor the major contrast to be drawn between the introduction and the permeation stage can be summarised in the kinds of questions which are being asked at each stage. But questions by whom? In the first stage the ‗appropriate' questions are: ‗How well does a computer do such and such an activity?' and ‗How well does a computer help us to work? However, in the transition to the stage of

permeation characterised by widespread adoption, activities and institutions are transformed, and the pertinent questions become ‗What is the nature and value of such and such an activity?' and ‗What is the nature of this work?' For Moor the changes in the appropriate questions mean that values associated with old concepts or ways of doing things are brought into question. But what Zittrain's analysis shows is that what is at the heart of the changes is how the technology embodies certain values and business models. And what was crucial here was the specific lineage of the PC in the culture of hobbyist personal computing of the 1970s and the enthusiasts in academia and research establishments. ‗The PCs ability to support a variety of programs from a variety of makers meant that it soon outpaced the functionality of applianised machines like dedicated word processors' (Zittrain, 2008, p.15).

Zittrain depicts a parallel battle in the emergence of the Internet between the model of a centralised proprietary network and that of the relatively open and decentralised Internet. There were a variety of ways to build a network. The fact that we ended up with one which was open and flexible (or ‗generative' in Zittrain's terminology) was on the face of it an unexpected success given the background against which it emerged the dominance of large corporations such as IBM. Zittrain argues that there were possible alternative histories to the Internet along two dimensions. On one dimension there were alternative pathways to development on the one hand and on the other there were competitors to the Internet in the form of dedicated online information services not open to linking to a network more generally.

The early history of the development of the Internet, parallels to some extent the early struggles over the development of the PC. And it is worth emphasising that what is crucial in this regard is not necessarily the technology – but the differences represented different mixes of generativity, regulation, and social control. Zittrain (2008, p.21) relates the importance of the battle around opening up the telecommunications network controlled by AT & T. The corporation fiercely protected its monopoly taking legal action, for example, to keep alternatives services from hooking up to the network. Even when telecommunications networks began to be opened up the emergent on line services were based on a ‗proprietary network model'. Such on line information services were founded on a business model built around mainframe services e.g. CompuServe, The Source, America Online and so on. Such dedicated network services offered subscription services including news, weather, bulletin boards, email, provided by an individual vendor. Zittrain refers to these kinds of technical and business models as ‗appliancised'. In appliancised networks innovation takes place at the centre whereas in a network characterised by generativity innovation is diffused across the network.

However, in the longer term ‗the proprietary network model' lost out to forms of grassroots network based on the linkage of the PC to the Internet. ―The Internet's design reflects the situation and outlook of the Internet's framers: they were primarily academic researchers and moonlighting corporate engineers who commanded no vast resources to implement a global network. The early Internet was implemented at university computer science departments, U.S. government research units, and select telecommunications companies with an interest in cutting-edge network research." (Zittrain, 2009, p.27) The network pioneered by these groups was different in audience and character from those of the corporate proprietary networks.

Trust in dealings over the network was a fundamental assumption rather than the need for protection. However, Zittrain also shows that there was a price to be paid for the generativity, the relative incompleteness of the network, its openness to tinkering, and the belief that most problems could be solved later (‗the procrastination principle'). Thus the network from the start was vulnerable to hacking, viruses, spamming etc. but when the first internet worm, the Morris worm, was launched in 1988 there was no business model for viruses. These initially were irritations or demonstrations of prowess depending on your point of view. The situation is, of course, very different now. The prevalence of ‗bad code' and ‗malware' is ubiquitous across the network. This is not primarily for technical reasons but because we do have business models for spam advertising, identity theft and the like. The vulnerability of the all purpose, connected PC is now creating the conditions in which generativity is retreating before the advance of appliancization. The challenge for the future is how to retain the openness and innovativeness of the Net without a lock-down in the name of security.

Increasingly we are seeing the adoption of independent information appliances such as iPhones. These characteristically may have access to the Internet but are channelled through browsers provided and controlled by the vendors. For Zittrain this trend represents a ‗counterrevolution' which builds on

features of the Internet but is more limited, more easily controlled and regulated. It potentially threatens the end of the all purpose PC as the centre of the ‗IT ecosystem'. ―Today the same qualities that led to their successes are causing the Internet and the PC to falter. As ubiquitous as Internet technologies are today, the pieces are in place for a wholesale shift away from the original chaotic design that has given rise to the modern information revolution. This counterrevolution would push mainstream users away from a *generative* Internet to an *applanicised* network that incorporates some of the most powerful features of today's Internet while greatly limiting its innovative capacity – and for better or worse, heightening its regulability." (Zittrain, 2009, p 8)

Zittrain's account demonstrates that the innovation-centric approach with its emphasis on irresistibility and novelty misplaces the dynamic from the social to the technological. There was nothing pre-destined about the way the Internet emerged and continues to develop. It was the way in which certain developers and designers chose to instantiate logical malleability to produce generativity which is the key to its current characteristics. The analysis of the history of both the PC and the Internet with the emergence of generativity stems ultimately from the nature of social groups primarily involved in their development (academic researchers, hobbyists, etc.), the values they held and the choices that they made. I claim that Zittrain's history shows that trust and openness were as important, if not more important, than any particular technical attributes. There is a clear link between design choices and the ethos of the Internet and this puts ideas of ‗the good' at the centre of the discussion. At the same time the possibility of an applanicised network represents the re-emergence, if not of old technology, then of new technologies embedded in old business models and old methods of control.

5. Conclusion

It's not ‗logical malleability' that creates moral problems – it's people. It seems to me that the focus on the concept of ‗the Computer Revolution' as a central tenet of Computer Ethics is misleading and distorting our picture of the realities of technological change. It overstates characteristics of (technical) novelty, upheaval and inevitability at the expense of a more subtle appreciation of the role of social, economic, cultural and ethical values in shaping the trajectories of information and communication technologies. The history of the Internet, I believe, shows the ways in which the directions of design and implementation were, are, and will be, fundamentally matters of the ethos, choices, and values of designers, developers and users. The real history of technological change shows how the use of ‗revolutionary' as somehow explanatory rather than descriptive fails. Supporters of the standard account will deny that the account does entail technological determinism, the neglect of social shaping and a belief in the neutrality of technology. Nevertheless the presentation of the argument, as indicated above, nearly always prioritises the technology at the expense of the decisions and values inscribed in the technology. ‗Logical malleability' in itself settles nothing, what are key is the values and choices which embed that logical malleability in real processes and artefacts. If we want a picture or metaphor then it seems to me that rather than revolution an appropriate one may be drawn from the title of a luminous short story by Jorge Luis Borges: ‗the garden of forking paths'.

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THE PROBLEM OF TEACHING ETHICAL THEORY TO COMPUTING UNDERGRADUATES

Suzy Jagger

Abstract

Practitioners have identified that the teaching of ethical theory presents problems for students learning ethics as part of a computing degree programme and there is often a balancing act in judging how much theoretical content to put into a module and differing views on whether ethical theory should be taught at all. This study examines the extent to which students on a first year undergraduate computing course were able to understand and apply ethical theory to help them identify ethical issues. The study measures their performance through applying an *ethical theory score.* This score is then correlated against two other scores; an *ethical sensitivity score* adapted from research on moral sensitivity and a *moral judgment score* obtained through the Defining Issues Test, a validated psychometric test for measuring moral judgment. The study highlights the inherent problems students encounter in understanding ethical theory but also shows a correlation between a high understanding of theoretical ethical concepts and ethical sensitivity and judgment.

1. Introduction

Over the last decade there have been a number of writings surrounding the use of ethical theory as part of the curriculum on computer ethics courses. Theories such as; utilitarianism, deontology, social contract theory and virtue ethics are the most commonly taught on computing courses and are briefly explained in most computing ethics text books. Ethical theory is often used by practitioners to aid students in evaluating dilemmas. Advocating ‗least harm' and ‗greatest amount of good' as key phrases in determining possible solutions to provide an ethical benchmark from which to work. Presenting students with options from a philosophical perspective allows a level of guidance without being prescriptive. These theories represent the ground rules for moral decision making and many educators consider instruction in these principles as providing useful guidelines in the analysis of particular dilemmas. However, the use of these theories within computing courses is controversial with opinion being divided on their effectiveness or purpose. Gotterbarn (2002) believes ethical theories provide little benefit to future computing professionals:

> A mistake made by the philosopher is to portray ethics as ―Pick your theory and then reason to an answer". They believe that different theories will lead to different sets of answers. Advocating this model of reasoning reinforces the view that all ethics discussion is fruitless because there are as many answers as there are theories.

On the other hand, Johnson (2003:28) is of the view that the theories provide a useful framework for students to build their arguments:

> Familiarity with traditional ethical theories will help in articulating the reasons for many of (your) moral beliefs. Ethical theories provide frameworks in which arguments can be cast. Moreover ethical theories provide some common ground for discussion' and ‗frameworks within which, or against which, ideas can be articulated.

Research has shown that the teaching of ethical theories within a non-philosophical discipline is problematic and my own personal experience as a teacher on a computing ethics module supports this view. Students on computing courses battle with the complexity of these concepts and in the limited time available, often fail to utilise the theories correctly (Liffick, 2004). In 1989, a survey of leading business ethics text books concluded, ‗There is a serious lack of clarity about how to apply the theories to cases and a persistent unwillingness to grapple with tensions between theories and ethical reasoning' (Derry and Green, 1989). This research is designed to examine the relationship between the application of ethical theory and moral reasoning by analysing and correlating student ability in the application of theory with their levels of moral reasoning as defined by two components within Rest's

four component model of cognitive developmental theory – moral sensitivity and moral judgment (Rest, 1984).

The research was carried out on a group of first year undergraduates taking part in a computing ethics module at a typical London university. The study utilised three scores, the *ethical theory score,* the *ethical sensitivity score* and the *moral judgment score.*

1. An analysis of coursework was used to create an *ethical theory score* to evaluate students' understanding and ability to apply ethical theory to a real-life dilemma.
2. An adaptation of research by Clarkeburn (2002) and Bebeau (Bebeau et al., 1985) was used to devise an *ethical sensitivity score* to determine students' ability to identify ethical issues to a typical professional dilemma.
3. A *moral judgment score* was calculated using The Defining Issues Test, a well-validated psychometric test designed to measure moral judgment (Rest et al., 1999).

The paper discusses the methods used in this study for the creation and development of these three scores, results of correlations between them and how these results relate to the teaching of ethical theory. The precise method for obtaining the *moral judgment score* is discussed in a separate paper (Jagger, 2010).

2. Assessment Method

As part of a twelve week course on Computing Ethics, students were introduced to ethical theory over two one-hour lectures given in weeks two and three. By design, lectures included interactive discussion and real-life examples to help explain the relevance of the theories to everyday life. A step-by-step exercise preceded the two lectures with the hand-in date during the fifth week to allow three weeks for self-study. The exercise was used as a method for applying the theories to which they had been introduced in the lectures within a practical computing related scenario (Table 1).

Two weeks ago you started a new job as system administrator for a computer lab at a small college. Wanting to make a good impression, you immediately set out to learn more about the various applications provided to the users of the lab. One of the packages, an engineering design tool, seemed way out of date. You looked through the lab's file of licensing agreements to see how much it would cost to get an upgrade. To your horror, you discovered that the college never purchased a license for the software – it is running a pirate copy. When you bring this to the attention of your boss, the college's Director of Information Technology, he says, "The license for this software would cost us £8,000, which we don't have in our budget right now. This software is absolutely needed for our engineering students, though. Maybe we can get the license next year. For the time being, just keep the current version running."

Table 1: Scenario for Step by Step Exercise

The exercise incorporated elements from a variety of step-by-step methods for ethical decision making notably; Wolcott and Lenk (2003) and Forester-Miller and Davis (1996); with the inclusion and exclusion of some of the steps (Table 2).

Step	Instructions
1	Read the scenario and explore the issues, alternatives, risks and information associated with the scenario
2	Explore the problem from the perspective of different stakeholders
3	Evaluate courses of action from three different ethical viewpoints, (deontology, utilitarianism, virtue ethics)
4	List five key ethical issues in order of importance
5	Write a short script of how you would respond to the Director

Table 2: Instructions for step by step assignment

To engage students in the exercise a dilemma was devised, shown in Table 1, which resembled a situation students could find themselves in on leaving university – working as an IT technician in a college. The dilemma concerned what the student should do having been asked by the boss to continue to run software not paid for by the college on the lab computers. The issue is one that it was felt would challenge attitudes to digital intellectual property rights. Lectures had discussed the issue from the point of view of the law and the legal penalties and culpability of employees involved in upgrading and maintenance. This was to ensure students would be able to evaluate the dilemma within the context of the law.

Of the 54 students on the course, 49 submitted papers for this assignment. Three papers were removed for the purpose of this research - one because the student failed to complete the last two steps and the other two because the students failed to provide the work using the step by step approach making data extraction difficult. This left a total of 46 papers for analysis.

2.1 The Ethical Theory Score

The criteria for Step 3 required students to analyse the dilemma from the viewpoint of three ethical theories after which they identified which theory they felt was most suited, in this instance, to making a decision. Table 3 is an extract from the assignment documentation.

Evaluate courses of action from different ethical viewpoints. a) What would a Kantist do? b) What would a utilitarian do? c) What would a virtue ethicist do? d) Which theory do you think the most relevant to finding a solution?

Table 3: Extract from assignment documentation for Step 3

Two sets of data were extracted from Step 3 to determine:

1. The level of understanding of the three ethical theories;
2. The ability to apply an ethical theory to the scenario.

Scoring Procedure

After analysis of responses to the questions in Step 3, it was determined that they tended to fall into three specific categories:

1. Those who understood the theories well and were able to apply them to help answer the dilemma;
2. Those who had some understanding of the theories but had also made some incorrect assumptions;
3. Those who had not managed to grasp even the basic tenets of the theories.

In the case of point d), that is, the application of the theory, it was also possible to categorise this answer in a similar fashion:

1. Those who applied their chosen theory to the problem well;
2. Those who used the theory but showed lack of clarity;
3. Those who failed to apply the theory logically.

These answers were coded by a rating system shown in Table 4.

Rating	Label	Description
2	Good	Shows an accurate understanding of the basics of the theory and good application
1	Some	Has grasped some understanding of the basics but has also shown some omissions, inaccuracies and lack of understanding
0	None	Has completely missed the point of the theory, with a description that is incorrect showing a lack of understanding and application

Table 4: Scoring of student understanding of ethical theory

Table A1 and A2, located in the Appendix; provide examples of how student answers were coded in Step 3 for definition and application of the theories using a rating of 2-0 for each type of answer. Please note these are real extracts from the students and are thus not ‗perfect' definitions but examples of what qualified for a particular rating.

Ethical Theory Score Results

By adding up the points from the rating system, a colleague and I established a numerical level of understanding of ethical theory and labelled this the *ethical theory score.* The greatest number of points a student could receive was 8 by obtaining a rating of 2 for all four sections. The mean *ethical theory score* of 2.9 out of a possible 8 demonstrates that at the time of this submission students had a low understanding of ethical theory. Figure 1 shows the distribution of student *ethical theory scores* showing predominance in the lower areas with 8 out of 46 students having zero understanding of ethical theory and application by the fifth week and 16 out of the 46 having achieved a score of 4 or more out of a possible 8 marks.

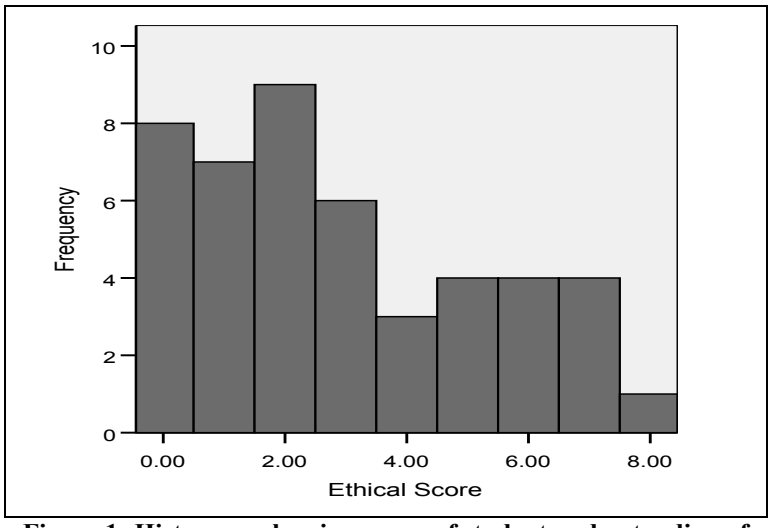

Figure 1: Histogram showing range of student understanding of ethical theories (ethical theory scores)

2.2 The Ethical Sensitivity Score

The idea of moral or ethical sensitivity is explored in the writings of Rest and other researchers in moral development (Clarkeburn, 2002;Bebeau et al., 1985;Rest, 1984). Ethical sensitivity involves recognising ethical issues in professional situations where they are not obvious (Rest, 1986). It also involves the ability to see the implications of actions outside one's environment to view the issue within the context of the broader social picture. Bebeau made the differentiation between ‗moral' and ‗ethical' sensitivity by suggesting that ‗ethical' sensitivity should relate to assessment within a professional context .The term ‗ethical sensitivity' (as opposed to ‗moral sensitivity) is used here for that reason. However it is possible to identify ethical issues and the impact of actions on others without having a principled approach to solving the problem (or moral judgment) and vice versa and for this reason although research has indicated some correlation between ethical sensitivity and moral judgment, it is a modest one (in the 0.2-0.5 range) (Bebeau and Brabeck, 1987). Therefore if we wish to gain insight into student levels of moral reasoning, a separate test is needed for both components as skill in one component does not necessarily mean skill in the other.

Step 4 of the step-by-step exercise was designed to inform and assess student skills in identifying ethical issues. Following on from Step 3 – having evaluated the ethical scenario in the light of ethical theory, students were required to list by order of importance, five ethical issues they considered important before making a decision on whether to or not to keep the pirate software on the school computers. Table 6 is an extract from the assignment documentation:

Step 4: From your analysis list 5 key ethical issues, in order of importance, that need to be addressed when making your decision – (a typical ethical issue would be one such as ―is my job more important than this principle?", ―is it justifiable that others should suffer as a result of my actions?" – think of the ethical issues in the defining issues test which tend to be written as questions). Write a paragraph on each issue explaining why it is important.

Table 6: Extract from assignment documentation explaining step 4.

Tiered analysis

The tiered approach to determine students' level of ethical sensitivity was an adaptation from the *Test for Ethical Sensitivity in Science* (TESS) (Clarkeburn, 2002). Students were required to write down five ethical issues they considered important with regard to the scenario described in Table 1. Similar to TESS, the scenario was context-specific as it related to the IT profession for IT students. However there were a number of variations. Unlike the Clarkeburn study, the measure was incorporated into the step-by-step approach in order to guide students through the process. Also Clarkeburn's study required a written identification of each of the five issues on one line as one part of a three part, thirty minute questionnaire whereas this study was part of an assignment which students had three weeks to complete and involved the use of a structured approach, further study and the writing of a small paragraph for each issue. It was felt that analysis of a paragraph would provide a stronger representation of students' thinking processes ensuring more accurate categorisation. Due to these differences, comparison between mean scores between the studies was not possible other than as a general guideline.

Scoring Procedure

Similar to the approach used in the TESS study (Clarkeburn, 2002:126), a scoring structure of four 'tiers' was devised. The four tiers represent four levels of effectiveness in identification of an ethical issue. A fifth tier (Tier '0') was added to cover those who provided no issue. The five tiers are defined in Table 7.

Tier	Label	Description
0	No Issue	No issue supplied
1	Non-ethical	Responses do not identify the ethical issues at all but focus on other issues or factors.
2	Minimal recognition	Responses identify ethical issues weakly – they show a level of scrutiny and questioning but do not verbalise the ethical issues clearly
3	Some recognition	Responses articulate the moral elements of the dilemma to some degree but not fully
4	In-depth recognition	Responses not only articulate the dilemma but show a good level of moral clarity

Table 7: Criteria for the four tiers used to categorise student responses for Step 4

Ethical Sensitivity Score Results

Of the 46 submissions received, 217 issues were extracted from Step 4 and coded in NVivo by tier.

Table 8 and Figure 2 illustrate the distribution of responses across the five tiers. A high percentage of issues identified were not ethical ones (91 or 39%). However, 55% of issues identified were ethical issues although with varying levels of recognition.

Rather than focusing on the tier categorisations themselves which represent the spread of issues, it is more helpful to analyse categorisation per individual. Similar to the Clarkeburn study, a score was devised for each student which represented their overall level of ethical sensitivity. This was

calculated by giving 0 for either no issue or where a Tier 1 issue was identified, 1 point was given for each Tier 2 response, 2 points for each Tier 3 response and 3 points for each Tier 4 response. Out of 15 possible points (3 points for all five issues identified) the results produced a mean score of 4.8.

Tier	No of issues	%
0: No issue	13	6
1: Non-ethical issue	91	39
2: Minimal recognition of ethical issue	43	19
3: Some recognition of ethical issue	70	30
4: In-depth and detailed recognition	13	6

Table 8: % Distribution of issues across tier categories.

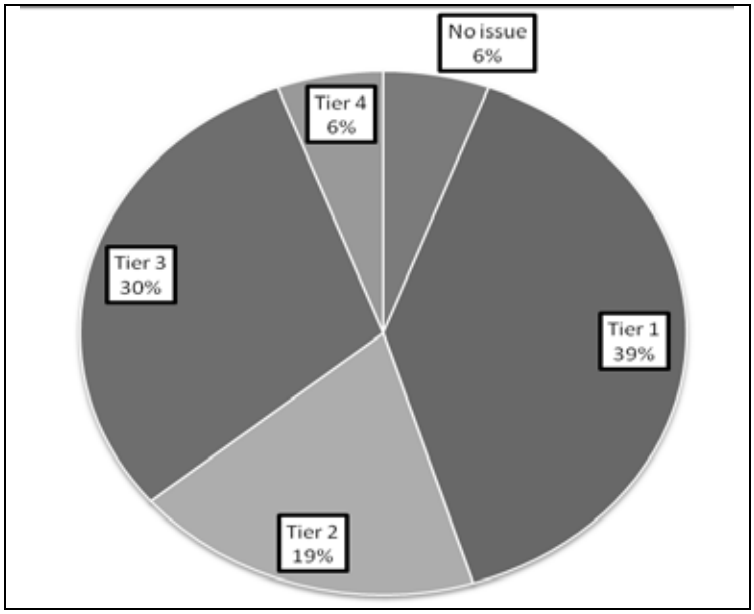

Figure 2: Student Responses by Tier

Figure 3 shows the spread of results for ethical sensitivity with the majority of students residing between levels 2-5. No one managed to gain the full 15 points. The highest score was 10.

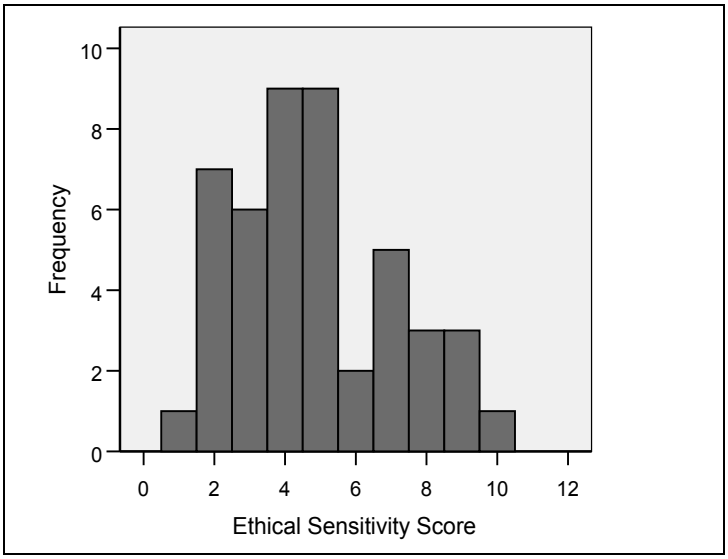

Figure 3: Histogram showing spread of ethical sensitivity scores

Comparison between scores

The relationship between scores was investigated using the Pearson product-moment correlation coefficient. In the case of the *ethical sensitivity* and *ethical theory scores* a medium positive correlation was found (r=0.315). Table 9 shows the results and shared variance and Figure 4 illustrates the results in a Scattergram.

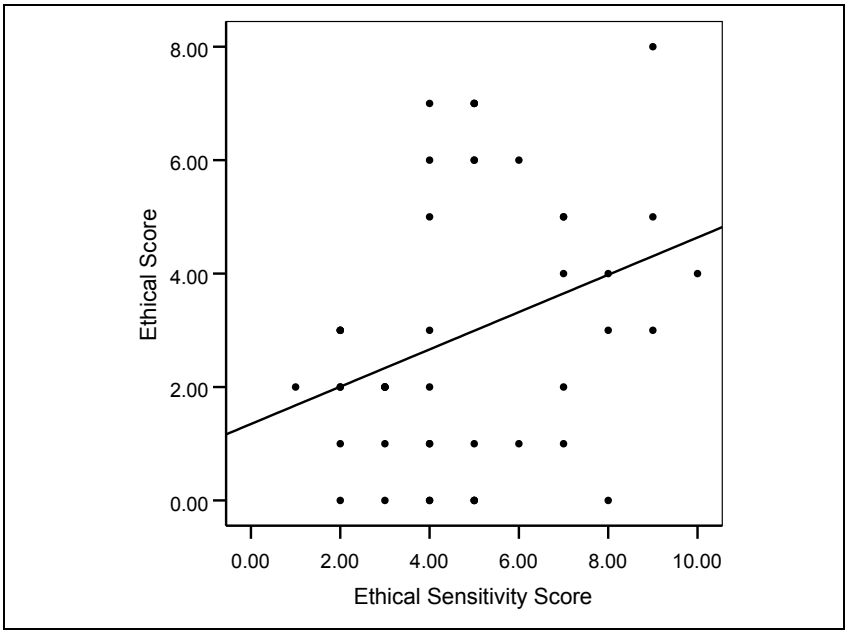

Figure 4: Scattergram showing positive correlation of ethical sensitivity and ethical theory scores

Correlation variables between ethical theory and ethical sensitivity scores	N	r	Shared variance
Ethical sensitivity score and ethical theory score	46	.315	9.92%

Table 9: Showing medium correlation between ethical theory and ethical sensitivity

2.3 The Moral Judgment Score

The moral judgment scores used for this study were taken from a separate study conducted on the same cohort which utilised the Defining Issues Test, a well-established and validated psychometric test designed to measure moral judgment (Rest et al., 1997). The test is based on the cognitive developmental stage theory of Lawrence Kohlberg and attempts to measure a person‘s ability to use principled or justice-based reasoning to solve moral dilemmas. The method is discussed in a separate paper (Jagger, 2010) but the results are correlated against the other two scores mentioned in this paper.

The relationship between the *moral judgment score* and the *ethical theory score* was investigated using Pearson product-moment correlation and showed a strong, positive correlation (p<.0005); r=.679 with 44% shared variance (a strong range being r= .50-1). Table 10 and the Scattergram shown in Figure 5 illustrate this result.

However this high correlation may be explained by other factors such as a person‘s academic ability or intellect. Partial correlation was used to explore the relationship between the two scores whilst controlling for overall academic achievement by the introduction of a new variable – the *academic achievement score*. This score was the average of an individual‘s end of year achievement across all first year modules. Results in Table 10 demonstrate there was a strong, positive, partial correlation between the *moral judgment* s*core* and *ethical theory score* with an inspection of zero order correlation (r =.63, 40% shared variance) suggesting that overall academic ability had little to no effect on the strength of the relationship between these two variables.

Correlation variables for Step 3 and DIT scores	N	r	Shared variance
Moral judgment score and ethical theory score	27	.679	44%
Both variables with academic achievement control	24	.632	40%

Table 10: Correlation between P-Scores and ethical theory scores and partial correlation between the two variables with the controlling academic achievement score.

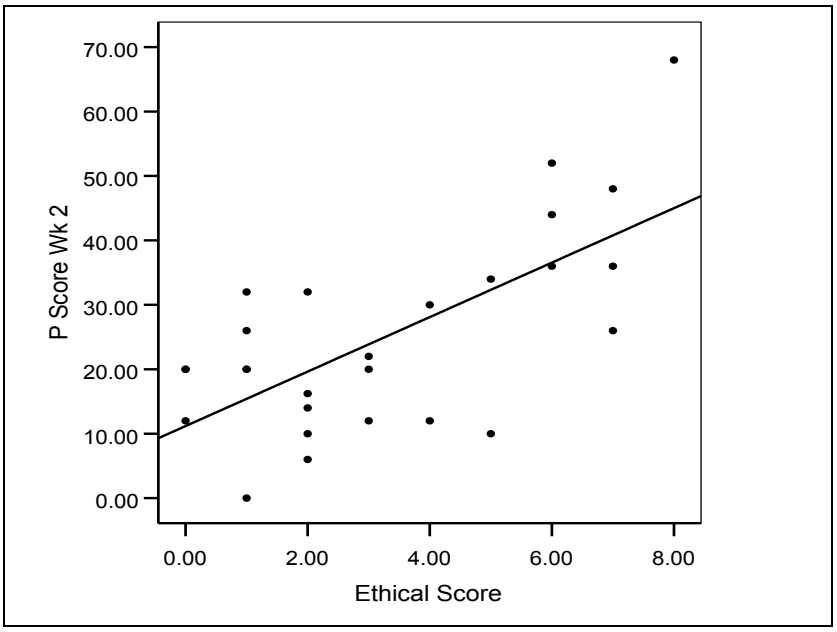

Figure 5: Scattergram showing positive correlation between moral judgment score and ethical theory scores

3. Discussion

3.1 Ethical Theory Scores

The histogram in Figure 1 indicates that there was limited understanding of ethical theory with a spread across the scores but a greater weight in the lower third (0-3). With the highest possible score being 8, the overall mean was a low 2.93. A third of students were able to apply the theories to a practical scenario. More detailed analysis revealed marked differences between student levels of understanding amongst the different theories with an average score of 49% for deontology as opposed to an average score of 27% for virtue ethics. There was a large disparity between student understanding as shown in the extracts below:

On deontology:

> **Student 1:** Looking at the scenario from a Kantist point of view, I would have to first think of their beliefs. Kantist believes what‘s right is right. They rely on goodwill. They also act to please themselves regardless of others happiness. No other consequences will be considered, once they‘re happy that‘s all that matters.
>
> **Student 2**: A –Kantist" doesn‘t condone or participate in any criminal activity, and to prevent breaking the law they would notify the legal authorities immediately, even if it resulted in the termination of their contract of employment as it is the right thing to do because it is illegal to operate or use the software without a valid license. I think they would do so because they believe stealing is ‗wrong‘ rather than the illegal aspect. If there was REAL injustice, the Kantist would go against the law.

When applying a theory:

> **Student 3**: I agree with the virtue ethicist, as you can‘t make a decision that would benefit just yourself and not others like a Kantist, which is selfish and mean.

Student 4: Fulfilling duties, in itself, is not the best way of treating things in life. If we follow only them this will give us benefits and we will progress but only in a narrow and controlled way. Applying the utilitarian method of thinking is the best way viewing this situation. If one action brings the greatest amount of happiness to the greatest number of people, then therefore it is the right thing to do. Every law should benefit society as a whole, not stop its progress.

Students 1 and 3 clearly had trouble understanding the basic concepts which resulted in a trivialisation and misrepresentation of the theory. Such a result suggests that teaching the theories is worse than providing no theoretical instruction at all as the less discerning hand-pick from the theories to support their own viewpoints - giving weight to whatever belief they wish to espouse. The results raise the question of how to teach the theories as some grasp the concepts fairly quickly whilst others (and the majority for this type of cohort) remain unenlightened.

3.2 Ethical Sensitivity Scores

A mean ethical sensitivity score of 4.8 is very low when placed against a maximum of 15 (3 points for each of the 5 issues). On average students identified 32% of the possible ethics associated with the issue – even after using a step-by-step method for analysis. The result demonstrates that despite utilising the moral decision-making exercise and taking part in the various discussion, workshops and lectures, by Week 5, the majority were not clear as to what constituted an ethical issue.

The medium positive correlation between the *ethical theory* and *ethical sensitivity* scores suggest that either ethical theory helps in the identification of ethical issues and/or those who can identify ethical issues are better able to understand the theoretical concepts. Either way, it demonstrates that innovative methods of introducing the theories may help in the development of ethical sensitivity.

The strong positive correlation between *moral judgment* and the *ethical theory scores* indicates that students who understand ethical theory will have a higher level of moral judgment and/or .that students who have higher levels of moral judgment are more able to understand ethical theory. Conversely, this correlation demonstrates that students with low *moral judgment* scores may have difficulty understanding and applying ethical theory and that attempts to introduce them to these concepts through a fair number of classroom discussions, and two dilemma exercises within the twelve weeks, are not particularly effective.

4. Conclusion

Some purport that the teaching of ethical theory is pointless as ‗students appear to have little affinity for such theories and have great difficulty internalising them' (Liffick, 2004) and some have chosen to replace this with other methods (such as analysis of professional codes of conduct and/or dilemma analysis without incorporating the theories). However the correlation between understanding theory and ethical sensitivity and moral judgment suggests that there is a link that should be utilised.

Unlike codes of conduct, the student is required to use the theories to evaluate the problems and find their own ethical solutions. Theoretical aims and principles are often in dispute and dependent on a variety of elements, worldviews and interpretations of the problem. Ethical theory provides a basis from which to argue under the umbrella of wisdom and logic.

However these results suggest that if ethical theory is to be taught, innovative methods need to be found to help the uninitiated. The question is how to incorporate these theories for non-philosophers to grasp and utilise without trivialising them through over simplification as a result of time constraints and initial reticence from students.

There has been a trend in recent years to approach the teaching of computing ethics using virtue approaches as a way of utilising ethical theory. Proponents of virtue ethics believe that students will not necessarily naturally choose moral solutions and that instruction in the virtues rather than a prescriptive adherence to principles, moral codes, (or the alternative avoidance of any moral instruction at all), is a more appropriate approach to ethics teaching (MacIntyre, 2007;Sandel, 1982). Thus since the turn of the century, there has been a trend from the liberal approach (historically grounded in Kantian philosophy) to a virtue ethics model although there are still worthy proponents of these different approaches on all sides.

Grodzinsky (2000) advocates a focus on the virtues specifically in teaching computing ethics and gets to the heart of the concept of professional ethics and morality:

> Prior to attempting to solve ethical dilemmas, a person must address the question of the kind of person he/she needs to become to be able to live well. From a virtue ethics perspective, what an individual ought to do in a situation cannot be abstracted from the kind of person he/she is and wishes to be (p.4).

Volkman (2004) takes a similar view:

> It follows that virtue ethics is not susceptible to rationalisations based on extrinsic rewards made uncertain by a prevailing relativism about values or by a volatile economic environment.

He believes an approach to teaching computer ethics is to appeal to the student from the perspective of the integrity of the profession:

> The culture of computing does support virtuous conduct leading to a coherent and defensible conception of the good life. In short, advocates of the values that define the technological enthusiast will be better able to succeed in the pursuit of these values if they manifest the virtues of integrity, honesty, courage, and good judgment (ibid).

In practice, ethical theory can be valuable in promoting discussion or to help guide when an impasse is reached. They allow the teacher to journey into the area of morality, the discussion of the rightness or wrongness of things without endangering individual cultural or religious sensibilities. They alter the tone of a discussion by presenting to students examples of intellectual thought steeped in history and depth. However this research has highlighted the problems in teaching the theories - that students with low levels of ethical sensitivity and moral judgment become lost and do not benefit from instruction. And yet, it is clear from the positive correlations between applying the theory, identifying ethical issues and finding moral solutions that the theories should be considered an important part of the curriculum – it is the teaching of them that requires further exploration and future research should attempt to address this issue.

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Appendix A

Rating	Theory	Sample extracts for theory choices (taken from student responses)
2 – Good understanding of theory	Deontology	A –Kantist" doesn't condone or participate in any criminal activity, and to prevent breaking the law they would notify the legal authorities immediately, even if it resulted in the termination of their contract of employment as it is the right thing to do because it is illegal to operate or use the software without a valid license. I think they would do so because they believe stealing is _wrong' rather than the illegal aspect. If there was REAL injustice, the Kantist would go against the law
	Utilitarianism	Utilitarianism would argue that the greater good would be to the students' education and so to use the software is justifiable. On the grounds that the students' education is worth more than the software developers' bank account. In the long run however they may also consider the effects of this action, as it may lead to the software developers company going bust thus being unable to develop better educational software in the future.
	Virtue Ethics	A virtue ethicist is concerned less with what makes good actions but concerned more with makes a good person. Moral character is the most important aspect of this philosophy. With this in mind I am inclined to think that a virtue ethicist will report the authority keeping in line with high moral and ethical goals.
1 – Some understanding but with some omissions	Deontology	If I took a Kantist approach, I would make my decision purely on what is lawfully right. Whether people would suffer or not would not matter. As long as I did what the law told me it was right. So in my opinion I think that a Kantist would either quit the job immediately, or let the company that own the copyright know that the college is running their software illegally
	Utilitarianism	A utilitarian would definitely consider the consequences of the action. In other words they would think about the punishment if they decide to go along with the IT director. But on the other hand they have a rule not to lie but their action would be lie if brings good to more people. Therefore I think that they would go along with the IT director because in the end it is bringing good to a lot of students
	Virtue Ethics	The virtue ethicist also will not report the matter for they are driven by ethical virtues that serves a greater good. The immediate effects of not reporting the violations are far more honourable than the delayed outcome of reporting it.
0 – No understanding of theories	Deontology	Looking at the scenario form a Kantist point of view, I would have to first think of their beliefs. Kantist believes what's right is right. They rely on goodwill. They also act to please themselves regardless of others happiness. No other consequences will be considered, once they're happy that all that matters. So in the case of the scenario the employee would not allow for the software to be run, as it is not right to lie or not respect other people's property
	Utilitarianism	A utilitarian would do exact the same as a Kantist but mostly because it saves lot of time for the students which means it makes life easier for the student
	Virtue Ethics	A virtue ethicist would look into the situation and would make a decision that would not harm anyone yet give all the right answers, and would ensure that everyone is happy yet agree to the decisions that is being brought into everyone's consideration.

Table A1: Examples of coding of responses for Step 3 definitions of ethical theory.

Rating	Sample Extracts for theoretical application (taken from student responses)
2 – Good application of theory	Fulfilling duties, in itself, is not the best way of treating things in life. If we follow only them this will give us benefits and we will progress but only in a narrow and controlled way. Applying the utilitarian method of thinking is the best way viewing this situation. If one action brings the greatest amount of happiness to the greatest number of people, then therefore it is the right thing to do. Every law should benefit society as a whole, not stop its progress.
1 – Some application with some omissions	I feel that the theory best suited for this case is the Utilitarian theory. I say this because even though what the college is doing is against the law they don‘t see it as a bad thing, they look at it as the amount of happiness it brings a large number of people in this case the students are the people who will be happy as the piece of software is essential for their course.
0 – Incorrect application of theory	I agree with the virtue ethicist, as you can‘t make a decision that would benefit just yourself and not others like a Kantist, which is selfish and mean

Table A2: Examples of coding of responses to Step 3 – application of the theory to the dilemma

MEASURING MORAL JUDGMENT IN COMPUTING UNDERGRADUATES USING THE DEFINING ISSUES TEST

Suzy Jagger

Abstract

This paper evaluates two small quantitative studies designed to evaluate moral judgment utilising a well-established psychometric testing measurement - the Defining Issues Test. The test was administered to groups of first year undergraduates taking a computing ethics module as part of a BSc in Computing. The first study was a quasi-experimental study and results suggested an increased ability in making moral judgments as defined by Kohlberg's theoretical stage model. However, the second study, undertaken a year later to a new cohort, using the same teaching interventions, involved a larger sample and an experimental model, and failed to deliver a significant result. The paper explores possible reasons for the differing results between the two cohorts and questions the premise of post-conventional thinking as a basis for measurement particularly for cross-cultural application.

1. Introduction

Quick and easy information access via the internet and networked databases has had a positive social and economic impact by providing new possibilities and limitless flexibility in the way we live and work. This technological capability has brought with it a host of innovative ways for exploitation of systems and networks making the development of courses in computer ethics for would-be professionals an essential part of the curriculum on undergraduate computing courses. This paper examines the impact of a computing ethics module on the moral judgment (as defined by a psychometric testing method) of two small cohorts of first year computing undergraduates. Using empirical research, the study attempts to determine the extent in which teaching computing ethics helped students develop their moral frameworks to enable them to ethically navigate within the prevailing technological environment.

Empirical research in the area of teaching (or assessing) ethics is problematic due to the difficulties associated with the methodology of investigation. Moral appraisal is typically done on the basis of three main areas; what participants say, do and feel (Nicholson, 1994) and in this regard there is generally an absence of accepted criteria for assessing the meaning and truth of moral propositions (Hill, 1995).

There are a number of studies which utilise empirical measurement to evaluate moral competency (Daniel et al., 1997;Loe et al., 2000;Robinson et al., 2000) and most require some form of value judgment in their analysis. The Defining Issues Test is one such measurement which analyses moral judgment capabilities using a 'post-conventional' approach to moral-decision making. Staehr and Byrne (2003:233) administered the test to a group of final year computer science undergraduates and concluded,

> There is plenty of scope for study in a wide variety of aspects of moral development in the computing and engineering professions.

Smolarski and Whitehead (2000:260) described approaches to introducing students to the study of computer ethical issues and felt the question of personal ethics was an important consideration, 'it is not an unreasonable question to ask how much a student's attitudes have changed as a result of including such ethical material in a technical course'.

This small study is an examination of students' level of moral judgment before and after taking part in a computing ethics module, using the Defining Issues Test (DIT) as a method for analysis. It examines two cohorts – one in 2006-7 and one in 2007-8 in order to evaluate any impact on moral judgment that could be attributable to the course. The study also evaluates the DIT itself as a method of measurement.

1.1 The Defining Issues Test

Piaget engaged in morality research in the 1930s but it was Kohlberg's work from the 1960s that shaped the theory of cognitive-developmental moral philosophy. He is best known for his moral judgment interviews and his six stage theory. This theory is the most popular and tested theory of moral reasoning and remains the most cited work in contemporary behavioural science (Trevino, 1992;Endler et al., 1978). Kohlberg believed that there are three levels to moral development: pre-conventional, conventional and post-conventional. Each of these levels can be split into two categories, giving six stages in total.

James Rest (1984), a contemporary of Kohlberg's, developed the Defining Issues Test on the basis of Kohlberg's six stages to measure a particular aspect of moral development – moral judgment. Rest contends that depending on a person's level of moral judgment they will ‗interpret moral dilemmas differently, define the critical issues of the dilemma differently, and have different intuitions about what is right and fair in a situation' (1986b:196). The DIT is a paper and pen test which uses generic hypothetical ethical dilemmas in which the participant is asked to rate twelve issues for each story and rank by order of importance. The test takes about half an hour to complete.

The test uses three scores or *schemas* which are analogous to Kohlberg's stages. The *Personal Interest* score (PI) denotes stage 2 and 3, the *Maintaining Norms* score (MN) represents stage 4, and the *Post-conventional* (*P-Score*), stages 5 and 6. These stages are linked to levels of mental maturity. Children have a moral level of stage 1-3 being more personally orientated with a limited social conscience – hence the *Personal Interest* label. Stage 4 relates to those who have reached a level of social awareness and integration – they are anxious to keep the law and maintain the status quo - the *Maintaining Norms* schema. Most adults, to varying degrees, reside at this level. The ultimate goal from educational interventions at higher education level is for students to progress to stage 5 or 6 – that of the principled or *post-conventional* thinker. Thinking post-conventionally involves a level of moral reasoning skills whereby a person can identify an ethical issue and make moral judgments which provide long term benefit to society. Such persons will often question the law but rarely break it unless it directly contravenes a moral principle. They will have high level skills in critical analysis and be able to view issues akin to a moral philosopher in which all aspects and perspectives of that issue are considered and weighed against levels of harm. The test evaluates the level of post-conventional thinking by calculating a *P-Score* from the ranked data.

The DIT-2 is a new version of the test which includes a number of amendments. As well as the three scores, the DIT-2 includes the *N2 score.* The *N2* compares changes that take place in the *P-Score* against reductions in the *Personal Interest* score and research has found it to outperform the *P-Score* in pre and post test experiments. The higher effect sises achieved suggests the *N2* is more sensitive to educational interventions (Rest et al., 1997:501). Research using the Defining Issues Test has suggested that educational interventions, particularly at university level, can have an impact on student moral judgment (Rest, 1986a:81) and (Rest et al., 1997:501).

2. Research Method

The computing ethics classes ran every spring term as a compulsory module for computing undergraduates. Students received a total of thirty-six hours of ethics instruction in the form of lectures, student-led debates, dilemma-based exercises, assignments and workshops over a twelve week period. During the two years of this study, course content remained the same.

All students who attended the class in week 2 were given the test to complete. Ten minutes was spent explaining how the test was structured with students being advised to select ‗not important' for any issue they did not understand (this instruction was advised by the Centre). It took approximately thirty-five minutes for students to complete the test. The process was repeated in week 12 with the same test administered to the students under the same conditions. After completion of the test, the papers were sent to the Centre for analysis and scores were returned in the form of a floppy disk containing an SPSS spreadsheet with a breakdown of scores as three schemas: *post-conventional* (*P-Score*); *Personal Interest* (PI); and *Maintaining Norms* (MN) as well as an *N2* score. The *N2* and *P-Score* are the scores most focused on in this paper as they are the most validated. However the *Personal Interest* and *Maintaining Norms* scores are briefly mentioned due to their impact on the *N2* and *P-Score*. The paper presents results for each study and compares results.

2.1 DIT Study 1 (2006 cohort)

Participants

Participants represented an opportunistic sample of first year Computing undergraduates who were present in weeks 2 and 12 of the ethics class. From the tests collected, only those who had completed both tests by being present at both sessions were used. These students were of average academic ability having gained at least two Cs at A level and a B in maths GCSE for entry to the course, as well as a number of mature students who gained entry through non-traditional methods. There was a mixed cultural balance with 22% of Middle Eastern or Asian decent, 13% from European backgrounds and the remainder being a mixture of English ethnic mixes. The average age of the class was 23.8 years and for 66%, English was their primary language. The sample reflects the gender imbalance that exists in the field of IT with more men than women.

Of the tests collected in weeks 2 and 12, 17 students were matched as having completed both tests. A t-test confirmed no significant difference between mean scores for the entire sample and the selected 17 paired tests suggesting the 17 pairs were a suitable representation of the whole sample. The average age of the sample was 22.8, all with English as their first language. Table 1 shows the breakdown of the number of tests received and the final paired sample.

Students enrolled	Male	Female	Unspecified	Total
Week 2 respondents	20	12	6	38
Week 12 respondents	20	9	0	29
Matched pre and post tests	13	4	0	17

Table 3: Tests received and final sample selection based on pairing of pre and post tests

After checking for blanks and illegibility, a total of sixty-seven questionnaires were sent for data extraction by scanner to the Centre. Results were returned indicating the relevant schema scores from which further analyses and correlations were carried out using SPSS.

Reliability Testing

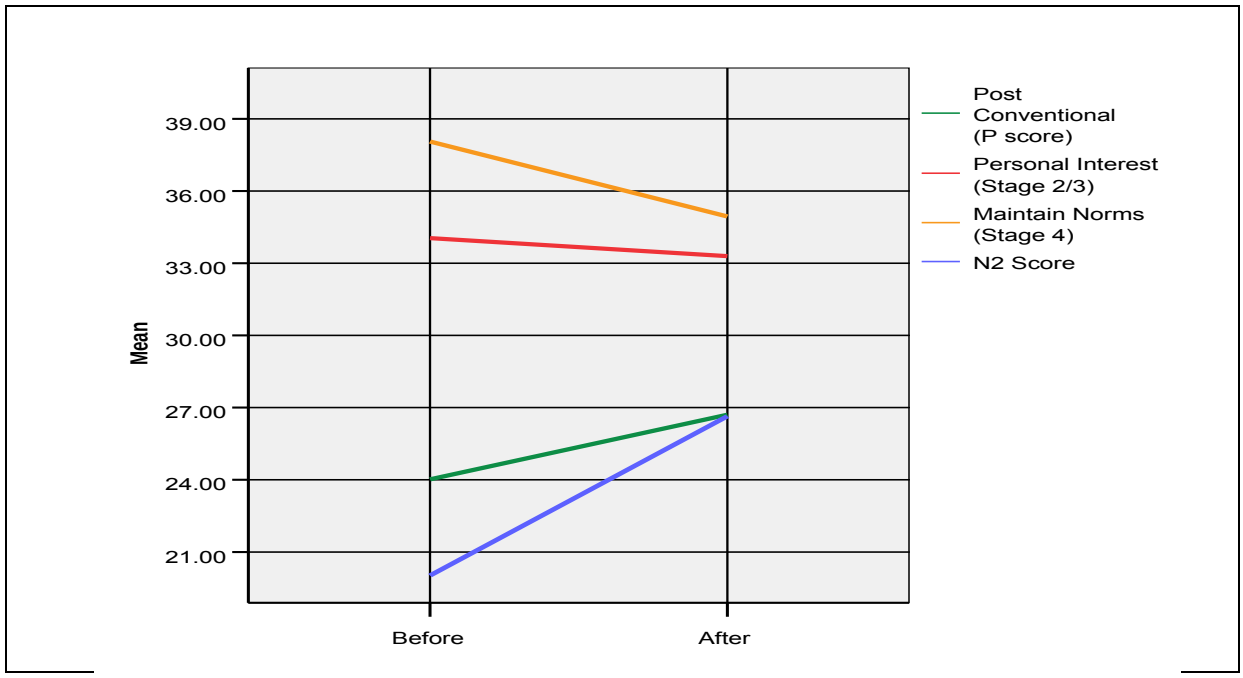
The sample was tested for internal consistency (story rather than item consistency) using Cronbach's coefficient alpha and produced an alpha score of .70. Although a borderline result, this is partly explained by the small sample sise and narrow range of subjects and is thus considered acceptable (Nunnally, 1978) .

Results

Table 2 shows the before and after mean scores showing a small increase in *P-Score* and an increase in the *N2* score. Figure 1 provides a graphical representation of the four scores. It can be seen from this graph that pre and post scores suggested favourable results - post-conventional increasing, *Personal Interest* decreasing and *N2* showing a small effect sise (.25). Although the table shows all score results, this paper focuses primarily on the *P-Score* and *N2* results as these are the most externally validated. However all schema scores are shown as they impact on overall findings and are discussed in the final section.

Schema	Mean Before	S.D.	Mean After	S.D.
Post-conventional	24.02	14.97	26.71	14.16
Personal Interest	34.04	11.19	33.29	12.96
Maintaining Norms	38.06	17.54	34.94	12.37
N2	20.02	14.90	26.64	14.70

Table 4: Schema before and after scores for Study 1



Figu **nd showing a significant increase.**

Post-conventional Scores

The International average for first year university students *P-Score* is 32.62± 14.77 (Bebeau and Thoma, 2003). The mean for this study was far lower at 24.02± 14.97.

Pearson's product-moment correlation coefficient confirmed there was a medium, positive correlation between the two variables of age and *P-Score* (r =.502, n =17, p =.04) with a shared variance of 25.20 demonstrating that 25% of the variance of respondents' *P-Score*s can be attributed to their age (Post test *P-Score*s were used for this analysis). Past research confirms that there is a relationship between age and *P-Score* and that, within educational interventions, the most powerful treatment effects take place in the adult group (.61) and least for the secondary school group (.22) (Rest, 1986a:82). There was an increase of 2.69 between the before and after results although a t-test confirmed this result was not statistically significant.

N2 Score

There was an increase of 6.62 in the *N2* before and after results and a paired samples t-test was conducted to evaluate the impact of the intervention on these scores which revealed a statistically significant increase between the before (M=20.02, SD=14.90) and the after (M=26.64, SD= 14.70, t(17)= -2.235, p<.0005). The effect sise was calculated using eta squared (Pallant, 2005:212) which produced a small effect sise (.25) (Cohen, 1988).

2.2 DIT Study 2 (2007 Cohort)

The conditions for this study were the same as for study one but in the case of this study an experimental model was used and a control was added. The sample sise was also larger with an increase from 17 to 27 for the experimental group. The control group consisted of students who experienced no ethics instruction at all during that time.

Participants

Participants for this study consisted of first year undergraduates on the computing programme as the experimental group and first year undergraduates on the business programme as the control. An ideal control for this study would require the use of computing rather than business students. However this was not possible because a) the entire computing programme consisted of the experimental group and

b) the ethics module is compulsory for all computing students. It was felt the control of the business group represented an acceptable compromise. The academic entry requirement for both computing and business courses was identical and the percentage of students for which English was their first language was 63% for the experimental group and 69% for the control.

Due to the nature of computing which historically has a low level of females applying, there was a gender imbalance between the experimental and control group with more women in the control group studying business subjects (see Table 3). There has been some discussion about the significance of gender in moral development but research has found no clear evidence of this (Snarey et al., 1985;Gibbs and Widaman, 1982;Nisan and Kohlberg, 1982). T-tests on means data showed no significant difference between male and female scores. Also no significant difference was found between those for whom English was not their first language, and no significant difference existed between scores for the entire pool of students who took the first test and the final selected groups. The average age for the two initial samples was 20.3 for the experimental and 20.7 for the control.

The test was administered in week 2 of the spring semester to 32 students in the ethics class (experimental group) and 82 in the business (control group) and again in week 12 to 39 in the experimental group and 49 in the control group.

Table 4 shows the gender split between the groups, the number of tests collected for each week and those matched together, and the number of tests purged on the basis of the Centre‘s reliability checks. After checking for blanks and illegibility, a total of 202 questionnaires were sent for data extraction by scanner to the Centre. Results were returned indicating the relevant schema scores.

Only respondents who had completed both a pre and post test were used for this study. This consisted of 27 students in the case of the test group and 36 in the case of the control. T-tests done on unused tests within both the experimental and control groups showed no significant difference in the mean between the used and unused tests ensuring that removing these tests did not create bias.

DIT Groupings	**Week 2**			**Week 12**		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Experimental	22	10	32	26	13	39
Control	39	43	82	22	27	49
Matched Pre/Post Experimental completions	18	11	29	18	11	29
Matched Pre/Post Control completions	20	22	42	20	22	42
Purged Experimental			2			1
Purged Control			5			3
Pre and post Experimental after removal of purged subjects.	18	9	27	18	9	27
Pre and post Control after removal of purged subjects	17	20	36	17	20	36

Table 5: Tests collected for Study 2

Reliability Testing

All groups were tested for internal consistency (story rather than item consistency) using Cronbach‘s coefficient alpha. Although Nunnally (1978) recommends a minimum level of 0.7, Rest and Narvaez (1997) maintain that where a sample focuses on a narrow range of results (in this case a group of peers at the same educational level) the alpha is likely to be affected. In this study for all groups combined the alpha was 0.653, just under the desired result. Table 5 shows the Cronbach alpha scores for each group.

Group	**Cronbach‘s Alpha**
E1	0.71
E2	0.70
C1	0.66
C2	0.72

Table 5: Cronbach‘s alpha for Study 2

Results

This section details the pre and post mean schema scores and compares the *N2* and *P-Score* against international averages, correlates age to *P-Score*, and graphs upward and download trends of the *P* and *N2 scores* between the two groups. A two-way ANOVA was performed on all scores but did not show any significance within or between groups (*p > .05)*.

Post-conventional Scores

Group	**N**	**Pre *P-Score* (mean ± SD)**	**Post *P-Score* (mean ± SD)**
Experimental	27	26.01± 14.88	24.83± 13.99
Control	36	24.89± 13.95	24.01± 15.53

Table 6: Pre and Post post-conventional means for experimental and control groups

A comparison of the mean for this study and the International average for first year university students (32.62± 14.77 (Bebeau and Thoma, 2003)) reveals the average for this group to be lower than the international average by a difference of 7.73. Table 6 displays the means and standard deviations of *P-Scores* for both groups.

Unlike Study 1, the means for both the experimental and control reduced. Using a two-way ANOVA, it was established that those who received ethics instruction did not increase their *P-Score* any more than did those who received no instruction ($F(1,61)$ for interaction = .011, p = .92). In fact, *P-Scores* for the combined sample decreased slightly from pre to post measurement though not enough to reach significance ($F(1,61)$ for pre-post main effect = .497, p = .48). Figure 2 illustrates the *P-Score* downward trend.

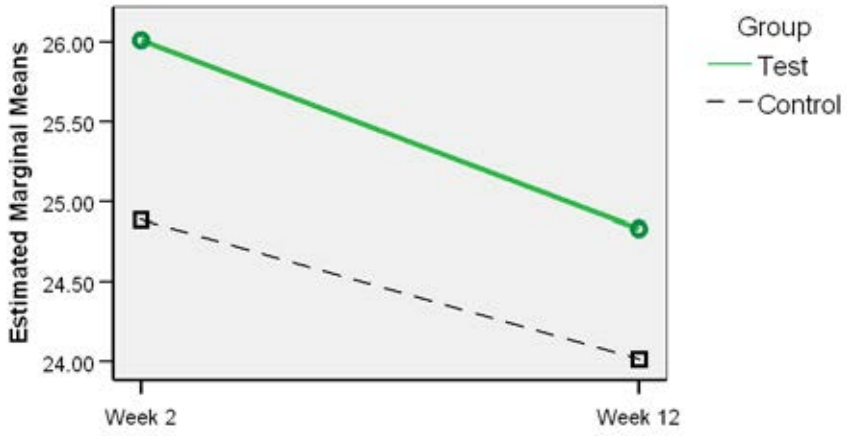


Figure 5: Pre and post score plot showing small decrease in *P-Score* by both experimental and control group over the semester although this decrease was not significant.

The relationship between high *P-Score*s and age was investigated in both groups. Pearson's product-moment correlation coefficient confirmed there was a medium, positive correlation between the two variables (*r*=.353, *n*=63, *p*=.005*)* with a shared variance of 12.46 demonstrating that 12% of the variance of respondents' *P-Score*s can be attributed to their age.

The N2 Score

The international average for the *N2* score for this year group is 31.24 which is much higher than for this sample. This score revealed an upward trend in the experimental group (change of 1.42), but this was not significant (Table 7 and Figure 3). There was a slight downward trend in the control (change

of.41) although, a two-way ANOVA revealed this was not significant (*F(1,61)* for interaction = 1.25, p=.27). The upward and downward trend between the pre and post combined samples were not significant (*F*(1,61) for pre-post main effect = .80, p= .38*)*.

Group	**Number**	**Pre *N2*-score (mean ± SD)**	**Post *N2*-score (mean ± SD)**
Experimental	27	21.93± 14.87	23.35± 15.20
Control	37	21.63± 13.65	21.22± 16.29

Table 7: Pre and Post *N2* means for experimental and control groups

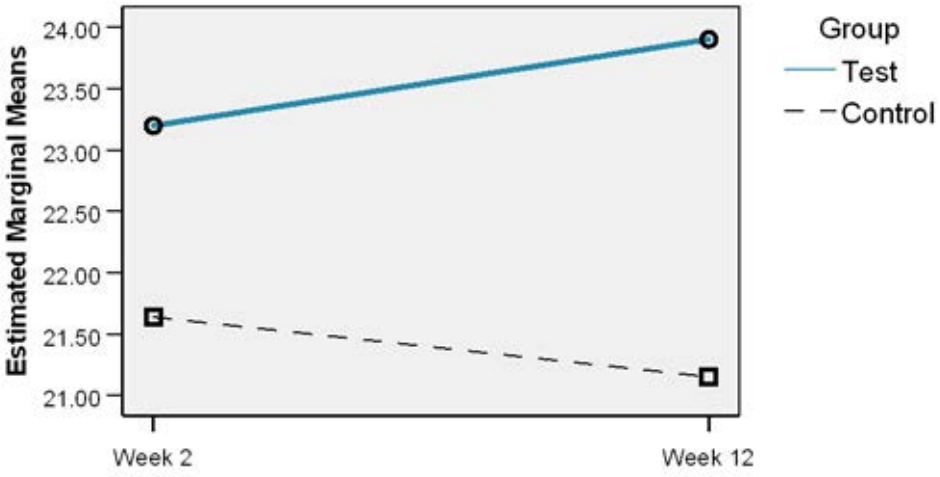


Figure 3: Pre and post score plot showing increase in *N2* score for experimental group and decrease for control group over the semester.

3. Discussion

3.1 Study 1 - Pre and post test comparison

Study 1 resulted in a small increase in the post-conventional scores with a correspondingly small decrease in the *Personal Interest* score which resulted in a statistically significant increase in the *N2* score overall. The *N2* score was developed specifically to identify more sensitive effects as a result of educational interventions and in the case of this study, indicated that although post-conventional scores do not show a significant rise, there was significant movement in a positive direction.

3.2 Study 2 - Pre and post test comparison

Contrary to Study 1, Study 2 actually showed the opposite trend - a decrease in post-conventional scores and an increase in *Personal Interest* scores. Although the changes in both experimental and control scores were not statistically significant, there was a large increase in *Personal Interest* (PI) scores at the expense of *Maintaining Norms* (MN) scores (quite extreme in the case of the control group).There is very little research on MN and PI scores in the DIT with most studies focusing on the well-known *P-Score* - the theory being that by the time students reach tertiary education, the results will primarily range between *Maintaining Norms* and post-conventional choices rather than *Personal Interest*. In the case of this cohort, that assumption is incorrect. The low mean scores suggest that more credence and discussion should be given to the PI and MN scores in themselves and the interplay between them.

3.3 Comparison of Study 1 and 2

Cohort characteristics and educational content were very similar between the Study 1 and Study 2 experimental groups, and results were all within the same boundaries with no significant differences

between scores between the groups. However Study 1 suggested an improvement in moral judgment had taken place even if small, whereas for Study 2, there is no statistical significance or even suggestions from trends.

Being a quasi-experimental design, Study 1 did not have the benefit of a control group to determine whether the *N2* increase was significant within the context of another group and the sample sise was far smaller. However the mean scores for the larger group, although not used, were not statistically different. Also existence of Study 2 does provide some validation for Study 1 by showing means scores to be comparative. For this reason it is unlikely the differences between the upward and downward trends of the two studies can be put down to study design, it is more likely to be a result of other factors which may explain the differences between the two study results.

3.5 Age and ethical development

Findings in 55 studies undertaken by Rest (1986a) cite the impact of age as a significant factor on *P-Score* effect sise verifying that adults of 24 years and older respond better than younger groups to educational interventions. In the case of Study 1 the average age of respondents was 22.9, and in the case of Study 2, 20.3. Coefficient results from both studies show that the factor of age does have a bearing on *P-Score* even within these small samples. Thus it is possible that age may explain the significant increase in *N2* scores for Study 1.

3.6 English as a first language

The sample for cohort 1 all had English as their first language whereas for cohort 2, 63% had English as their first language. However separate t-tests performed on both groups did not detect a significant difference in the *P-Scores* between those groups. Research suggests that the lack of English as a first language can have an impact on the validity of the test (Bebeau and Thoma, 2003).

3.7 Mean scores against international averages

Both studies had low mean *P-Score*s compared with international averages (Study 1 a difference of 8.60, Study 2 a difference of 6.61 in pre-test results). There are a number of non-American studies which show very low mean *P-Score*s and three are discussed here: Clarkeburn‘s (2000) work amongst 195 Bioscience Students at the University of Glasgow; Wimalasiri‘s (2001) study involving 106 Australian university students and Ahmed and Geilen‘s review of studies undertaken across the Arab world (2002).

Clarkeburn reasoned that the low mean could have been a result of the changing nature of university cohorts due to greater demands and pressures imposed on students and lack of ethical instruction. She concludes in her thesis that the university environment is no longer conducive for moral development to take place (Clarkeburn, 2000).

In an Australian study, Wimalasiri (2001) encountered low *P-Score* means using the DIT and commented that all but one dilemma in the DIT related exclusively to issues of rights and legal justice – a ‗narrow domain‘ which did not incorporate a larger moral field. It was felt that this affected the assessment‘s capability to measure higher levels of reasoning that may fit a broader definition. The study concluded that this factor in the DIT assessment method may explain the low scores rather than that the Australian subjects were morally inferior.

Ahmed and Gielen (2002) identified a number of methodological problems preventing conclusions being drawn about the usefulness of the DIT in Arab cultural settings. The studies produced high failures in the DIT consistency tests – particularly among Kuwaiti and Sudanese students with many students finding the DIT‘s moral arguments ‗strange‘ and difficult to understand.

These studies suggest that the DIT has possible cultural limitations. Although Kohlberg and Rest believed ethical theory should be robust enough to have universal application, it seems reasonable to conclude that to measure to any accuracy may require a more local and more discipline-specific approach.

Bebeau and Thoma (2003:35) acknowledge that even within the national spread in the USA in which thousands of studies have been used to create the averages; ‗Caution should be used in interpreting these scores as data were not selected to counterbalance the variability that appears to exist among college and professional school programmes‘.

3.8 Past studies and effect sise

A review of 55 DIT studies by Rest (1986a:85) provides evidence that educational interventions which use dilemma discussions enhance moral judgment skills in students with the effect being ‗modest but definite'. These studies were a combination of dissertations (30), Journal publications (18) and unpublished manuscripts (9). However, only 9 of the studies employed a full experimental design with only 19 using ANCOVA or two-way ANOVA (as used in Study 2) with the others adopting an approach similar to Study 1 (t-test without control). Thus the claim of a modest but definite increase needs to be understood within this context. The effect sises for these 55 studies were calculated from the *P-Score* (for which neither Study 1 nor Study 2 showed a significant increase).

One specific factor identified as contributing to an increased effect sise for the above studies was the teaching of Kohlberg's theory as part of the intervention. Table 8 compiled by Rest (1986a:82) shows changes in effect sises as a result of exposure to Kohlberg's theory and demonstrates that the teaching of Kohlberg's theory has a profound effect on *P-Score* results.

Exposure	No. of Samples	Effect Sise	95% C.I.
Exposed to Theory			
E^1	12	.56	(.32<*d*<.81)
C	8	.02	(-.29<*d*<.33)
Not exposed			
E^1	56	.25	(.16<*d*<.34)
C	36	.10	(-.03<d<.23)

Table 8: Effect of exposure to Kohlberg's theory (Rest, 1986a:82)

Although some consider the teaching of Kohlberg's theory as a useful tool by giving students an indication of what defines post-conventional thinking, there is also the distinct possibility that teaching the theory would create research bias by not necessarily reflecting true attitudes and for this reason (and also because it was felt irrelevant to the discipline), in these studies Kohlberg's theory was not taught as part of instruction.

4. Conclusion

A lower age mean and lower percentage of English as a first language for the second study have been identified as possible contributory factors to explain the difference in change scores between the two studies. The lack of effect sise for study 2 compared to past research may be due to the fact that, unlike a number of past studies, Kohlberg's theory was not taught. However, independent research also points to an issue with the DIT and international application.

The DIT and the notion of a ‗common morality'

As experienced by Wimilarisi (2001) and Ahmed and Gielen (2002) (see section 3.7) thinking post-conventionally is not necessarily an indication of moral judgment. Cultural differences may make the Universalist choices required for a high *P-Score* on the DIT not appropriate for some audiences and in some situations.

Kavathatzopoulos contends that tests which evaluate using any kind of moral philosophical framework can mislead an assessment and considers a more valid approach is to remove any moral philosophical principles from the analytical process. In his measurement model, he focuses primarily on the cognitive process involved in moral decision-making as a method for analysis. However he acknowledges that ‗cognitively higher ethical reasoning does not necessarily lead to ―better" morality because there is no moral principle in the model to define what is good and what is bad' (1994:58).

Moral Judgment – one component of Moral Development

Another consideration when evaluating the DIT test is the fact that the component of moral judgment is only one aspect of moral development as recognised by Rest in his four component model (the others being moral sensitivity, moral motivation and moral character (Rest, 1984)). It follows that

developing the skill to think critically and choosing post-conventional solutions will not necessarily transmit into a change of ethical attitude or action and in this way the DIT is an indication of a particular skill in post-conventional cognitive thinking rather than evidence of attitudinal or behavioural change.

Huff et al comment on the DIT;

> …this sophisticated measurement focuses on one aspect (giving reasons) of one category (reasonableness) of the skills and knowledge relevant to successful moral action. Better, though, would be skill and knowledge measurement that was specifically targeted to the issues and needs of professional action. (Huff et al., 2008:306)

The idea of developing skills through expertise is an area explored by Huff and Rogerson in their work with moral exemplars (Huff and Rogerson, 2005). They identified specific skill sets required for computing professionals which overlaps elements of Rest's four component model but relates specifically to that discipline. The component of ‗reasonableness' is similar in nature to Rest's concept of moral judgment but, used within the profession of computing requires, ‗engaging in reasoned dialogue with openness'. With skills in ‗constructing data-based and reasoned arguments; engaging in reasoned dialogue, gathering relevant evidence, listening to others, giving reasons, changing plans/positions based on reason'. And requiring knowledge about the specific domain and ‗technical knowledge of constraints and opportunities; knowledge of ethical argumentation' (Huff et al., 2008:301). This component echoes less Universalist sentiments than Kohlberg's stages, being more aligned to specific values recognised within the profession.

The development of these skill sets through practice is one promoted by Narvaez and Lapsley (Narvaez and Lapsley, 2005). Huff et al cite this approach;

> The more often this skill is exercised, the more proficient one will be at recognizing the opportunity for its expression and the more efficient one will be at discerning options. (Huff et al., 2008:306)

Future research should support the development of an assessment measure specific to computing which can be used as a measuring and teaching aid, designed by utilising the recognised skill sets identified in the Huff and Rogerson model. Furthermore the tool should be culturally sensitive, reflecting the values and requirements of the profession within the culture in which is it operating. Such an approach would provide a more accurate and appropriate measurement than the DIT can provide to aid in the teaching and assessment of professional ethics. Research should involve an analysis of older cohorts, such as final year undergraduates, participants on masters' programmes and employees within private and public organisations.

This study is part of a larger study which includes qualitative evaluation of the same cohort. These evaluations are the subject of two separate papers, one which provides an in-depth analysis of the student experience by case study in the light of the changes experienced in moral judgment scores (Jagger, 2010a), and the other which evaluates the role of ethical theory in teaching ethics by correlating against moral judgment and ethical sensitivity scores (Jagger, 2010b).

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COMPUTER AIDED ETHICAL IT SYSTEMS DESIGN

Iordanis Kavathatzopoulos and Mikael Laaksoharju

1. Introduction

Usability of IT systems, defined in terms of Human-Computer Interaction (HCI), is based on research conducted in many scientific disciplines as well as inside the frame of HCI. It is understood as knowledge on how to construct and use an IT system with respect to what is significant regarding human cognition, perception, ergonomics, group processes, organizational structures, etc.

HCI is the discipline that investigates how all this can be integrated into IT systems construction and use processes. It is also a discipline that focuses on the development of methods and tools that can be used by designers to produce knowledge on how to build usable IT systems. Guidelines, standards and recommendations cannot cover all problems or produce detailed answers to concrete design and use problems. They are general and they have to be interpreted and adapted. Ethical aspects are important and we have to be able to consider them, too. All above remarks are also valid regarding the problem of ethical usability: Computer Ethics as a scientific discipline

- produces knowledge that can help us in our effort to achieve ethical usability of IT systems. It can point to the significant issues and it can provide the main principles and ethical guidelines.
- helps gathering relevant information, interpreting it and applying it in concrete design projects.
- focuses also on development of methods and tools that produce detailed knowledge on how to design ethical IT systems, for example VSD, Paramedic, etc.

There is however a significant difference between normal usability issues and ethical usability. In ethics, ethical choice, ethical problem solving and decision making there is another dimension which is very important. Philosophy and psychology have clearly pointed to the ability of thinking in the right way, and how this can be developed, sustained and applied on moral problems (Kant, 2006; Piaget, 1932; Kohlberg, 1985). Given now that in ethics no one can provide detailed and functioning answers, this dimension, i.e. ethical ability, is necessary to consider and to incorporate explicitly in an ethical usability process. And this is something that does not have the same value regarding other forms of IT systems usability. Simply it is not enough to have access to a body of usability knowledge or to methods producing such knowledge. In ethical usability we need also to provide support for the acquisition and use of ethical skills.

Various ethical support systems have targeted the concern of identifying relevant information in different ways. In Paramedic Ethics (Collins & Miller, 1992) focus is put on the obligations and responsibilities of the decision maker. Based on these, the user is establishing relationships between stakeholders and then identifying considerations for the different opportunities and vulnerabilities that come from alternative solutions. Finally a negotiated social contract alternative is evaluated as a possible compromise solution. In SoDIS (Gotterbarn, 2002; Szejko, 2002) the user is first gathering extensive background information about the problem and its stakeholders and is then prompted to answer questions aimed at identifying known causes for moral problems. In ETHOS (Mancherjee & Sodan, 2004) the user is advocated to identify the open moral questions at hand through taking the role of a moral agent after which the utility of alternative solutions are quantified according to ethical theories.

It should be noted that the first two of these systems are intended for computer professionals working in technical development projects while ETHOS, like EthXpert, is not targeting a specific audience and does not assume any specific content in the problem to be analyzed. This wide application scope makes it impossible to guide the user by asking questions about previously known sources for moral problems and other means to raise awareness of ethical issues need to be deployed. We in fact consider this absence of framework for issue identification as strength when it comes to widening the agenda for the problem situation.

Further, EthXpert‘s omission of imposed comparison to ethical theory, as is the case in ETHOS, forces the user to make an independent decision about the correctness of the outcome. The user is thus never lured into the false comfort in believing that a premature analysis is finished. Following the

definition of autonomy, the user has to independently decide when an analysis is finished. Such a setup enforces that the responsibility for a satisfactory analysis rests with the user. Our approach has many similarities to other ethical computerised tools suggested previously, or to other ethical usability tools such as Value Sensitive Design proposed by Friedman, Kahn and Borning (2008). However, those approaches do not focus exclusively on what psychological theory and research describe as the basis of competent ethical problem solving and decision making, namely the tension between heteronymous and autonomous moral reasoning (Kohlberg, 1985; Piaget, 1932). Following that what we need are tools that promote autonomy and hinder heteronomy. All above tools are excellent to systematise, organise and take control of designer‘s thinking on concrete ethical usability issues. Nevertheless, since these tools, in different degrees, urge and lead the extension of thinking to moral philosophical considerations and other details there is a risk of being too complex and of missing the main goal, namely blocking heteronymous thinking. Focus should be on how to handle practical problems. Of course that may be also an effect of Paramedic, SoDIS, ETHOS or VSD but they include analysis of or comparison between different normative moral theories, or some others are even built to propose moral solutions (for example Davidrajuh, 2008). Ethical autonomy is not at focus there nor is it considered explicitly, meaning that the control of this necessary ethical problem-solving and decision-making process is not secured.

1.1 EthXpert

Our methods and tools stimulate the cognitive and group/organizational mechanisms of ethical competence in combination with their function of producing knowledge of how to design ethical IT systems. EthXpert is a computerised tool based on these theoretical assumptions, (for more information see the web site of the tool http://www.it.uu.se/research/project/ethcomp/ or see Laaksoharju & Kavathatzopoulos, in press).

The intention with EthXpert is to help an analyst or decision maker to understand how different design solutions affect the interests of each involved stakeholder. To support this understanding, the analysis is made explicit by iterating a procedure comprising three main steps (Figure 1). The first step is to create an overview by drawing a stakeholder network, i.e. a map over the relations between all stakeholders. The step also involves assigning interests, needs, values and principles (unique as well as shared) to the stakeholders. Second, the impact of each of these interests on other stakeholders are analyzed and described. Finally, the considerations for each interest are used as foundation for making assumptions about how the stakeholders are affected by different design solutions. Not only does this process help people to scrutinise, structure and get overview of an ethical problem. The resulting document can also be used as vindication of the choices that are made.

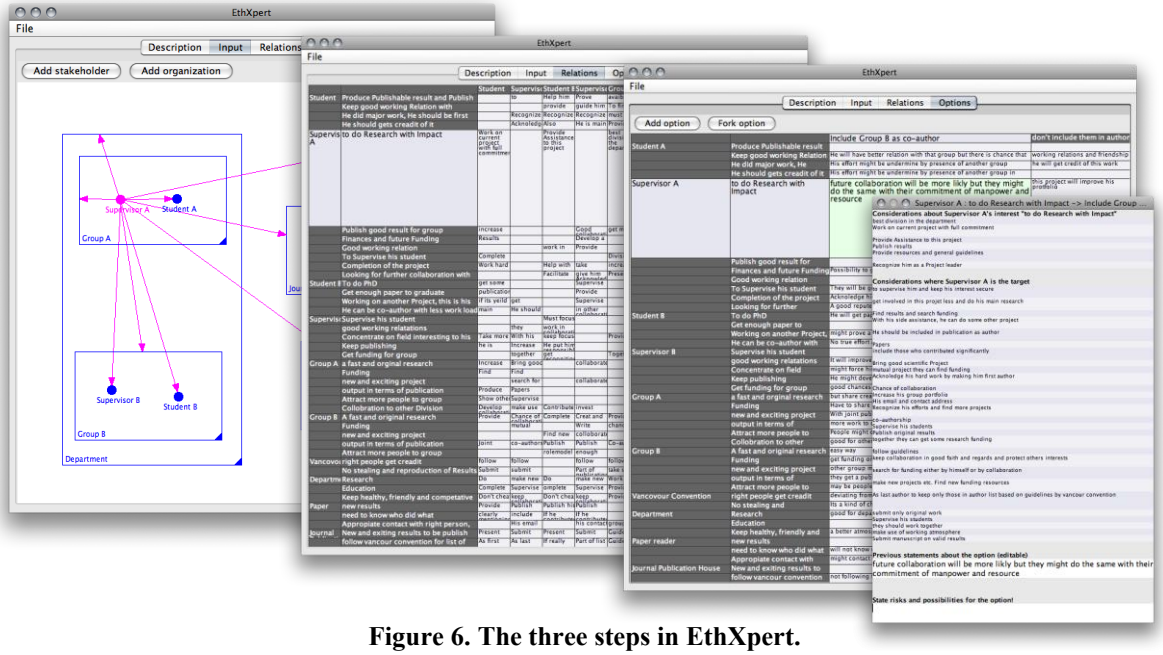

Figure 6. The three steps in EthXpert.

1.2 Pen and Paper

The Pen and Paper method (P&P) consists of two parts. The first part consists of two columns where the participant can give examples of heteronymous and autonomous thinking. This is done as a preparation for the second part in order for the participant to be conscious of the difference between the two different ways of ethical problem solving and decision making.

The Paper and Pen (P&P) method is a matrix with values in the row headers and possible options in the column headers (Erlandsson & Kavathatzopoulos, 2005; Rauschmayer et al. 2009). P&P was printed on a piece of A4 paper and it was distributed to the participants. Their task was to fill in the values relevant for the situation as well as the possible options. Then each participant started comparing each value with each option, which resulted in small descriptions for each cell of the matrix. The small text sum-ups described how each solution affected each value. While doing this, even more values and options evolved out of the considerations necessary for each cell. Some columns were later merged because of similarity, and others were added.

The process of constructing such a matrix can never be completely finished, but the more people involved in the creation the more complete the matrix will become. The resulting matrix does not state any right solution, but rather what foreseen effects each solution has to all involved values. Therefore, to use this matrix as a decision support one has to make a conscious choose between the identified decisions, without being able to ignore all the positive and negative implications that are clearly stated for each decision.

1.3 OLE

OLE is a list of questions (see Appendix 1) based on the same theory of autonomy as EthXpert and P&P. The aim of the OLE tool is to support the identification of important non-technical aspects and problems in IT use through aiming attention. The assumption is that working with these questions will straightforwardly raise the awareness of the important aspects and facilitate measures for improving usability and productivity.

Fundamentally, all of the tools are based on the same assumptions. They all advocate focusing on interests, values and needs of involved stakeholders. OLE does this through specifically directed questions, and is, as P&P convenient as the only properties needed are pen and paper. EthXpert however has benefits in visualizing the relationships between stakeholders and adding the possibility to easily reuse and restructure information. It also features the additional step of analyzing how the interests and values of stakeholders affect other stakeholders.

2. Method

2.1 Study 1

The first study was conducted mainly to investigate the usability of the software EthXpert, both in the sense of how well the application supported the process of critical scrutinizing of ethical problems, and in the more practical sense of how well the participants could utilise the functionality of the software. In the study six groups, comprising between six and seven participants each, evaluated the ethical implications from introducing new IT systems. The participants received lectures about computer ethics and about ethical usability, and they participated in seminars on ethical topics. The EthXpert software and the paper-and-pen method were introduced in a lecture. Following that the participants were urged to choose a problem that they considered to be relevant to themselves. The resulting topics were diverse, including e.g. the introduction of instant messaging in health care, the use of lie detectors in an insurance company‘s call centre and the use of AI in medical decision making.

In the study the participants were given two tasks. The first task was to make an analysis of the chosen problem using the OLE questionnaire and the P&P method. The second task was to use the first alpha release of EthXpert for the same analysis. In the study we assessed the scope of consideration about options, stakeholders and stakeholder interests and values by counting the number of items in each of the categories. We wanted to determine if there is a difference between using the autonomy enhancing method with or without the aid of a computerised tool. After the two tasks the

participants were asked to give written feedback on how well EthXpert supported the process of autonomously handling ethical problems as well as on how usable the software was generally.

2.2 Study 2

For the second study EthXpert was slightly improved based on the reporting of usability problems from this first study. These changes included bug fixing and interface improvements but the basic structure of the program remained unaltered.

In this study 5 women and 6 men, of four different nationalities, between 25 and 35 years old, all of whom were PhD students at the Faculty of Science and Technology at Uppsala University, were given the task to analyze an ethical problem that they considered to be relevant and important to themselves. Since the participants were from different fields within Science and Technology, the range of problems was more diverse than in study 1. Since they were all attendees in a mandatory course on research ethics, it was natural that most of the participants analyzed issues arising in their roles as PhD students under specific requirements and constraints.

Prior to the task they were given an hour and a half introductory training in how to use the tools. They were then divided into two groups: One with five participants and the other with six participants. Both groups started by doing an OLE analysis after which one group started using EthXpert for a second analysis, followed by P&P for a third, and the other group used the tools in reverse order. After the analyses they were asked to grade the tools in a questionnaire (Appendix 2) and write a 100-300 words evaluation of the tools.

2.3 Analysis

The study gives four types of data: 1) The numbers of identified stakeholders, interests and options from EthXpert and P&P as well as 2) the ratings from the questionnaires supplies quantitative data, 3) the ethical analyses made by the participants and 4) the written summaries supplies qualitative data.

The significances of the differences in identified stakeholders and between the groups are calculated with Student‘s t-test. In the current paper will focus mainly on the significant results from a quantitative analysis and only use the qualitative data to discuss causes for some deviating results.

3. Results

3.1 Study 1

Study 1 was an exploratory study where we wanted to get an indication whether the hypothesis, that EthXpert would help users to identify more stakeholders and interests, was reasonable. The results were slightly positive as can be seen in Table 1, but the participants reported that they had suffered from bugs and usability problems in the software.

Group	P&P			EthXpert			Difference		
	Opt	Sh	Intr	Opt	Sh	Intr	Opt	Sh	Intr
1	6	4	12	6	4	11			-8,3%
2	7	4	13	7	4	13			
3	3	3	5	3	5	13		66,7%	160,0%
4	5	3	10	3	5	14	-40,0%	66,7%	40,0%
5	4	5	5	4	6	16		20,0%	220,0%
6	4	6	18	4	6	18			
Average	4,83	4,17	10,50	4,50	5,00	14,17	-6,7%	25,6%	68,6%

Table 6. Results from study 1.

3.2 Study 2

The results from the second study will be divided into three parts: Measures from the analyses performed by the participants, ratings from the questionnaires and a qualitative analysis of the written summaries and contents of the analyses.

Measures

Four relevant significant differences could be identified in the study. First and second, the number of considered stakeholders and interests were significantly higher in the EthXpert analysis than in the P&P analysis (see Table 2).

Third and fourth, the order in which the tools were used affected the number of identified stakeholders and interests in EthXpert. The study shows that the participants who started with EthXpert included significantly higher numbers of stakeholders and interests (see Table 3).

	Assignment				Questionnaire	
	No. of identified	EthXpert	P&P		Tool	Rating***
EthXpert first, averages	stakeholders	10,80	3,40		OLE	-0,27
	interests	34,80	6,20		P&P	0,16
	options	2,00	3,20		EthXpert	0,40
P&P first, averages	stakeholders	5,67	3,00		OLE	-0,27
	interests	13,00	4,17		P&P	0,82
	options	2,67	3,17		EthXpert	0,59
Total averages	stakeholders	** 8,00	** 3,18		OLE	-0,27
	interests	* 22,91	* 5,09		P&P	0,52
	options	2,36	3,18		EthXpert	0,50

*** Mean values of responses to 16 questions. Ranges from -2 to 2. -2 means a very negative attitude and 2 a very positive attitude.

**p<0.001, *p<0.01.

Table 7. Average identified stakeholders, interests and options by the use of each tool.

Stakeholders		Interests		Options	
in EthXpert		in EthXpert		in EthXpert	
EthXpert first	P&P first	EthXpert first	P&P first	EthXpert first	P&P first
10,80	5,67	34,80	13,00	2,00	2,67
t=3.67, df=9, p<0.005		t=3.03, df=9, p<0.01		No significance	
in P&P		in P&P		In P&P	
EthXpert first	P&P first	EthXpert first	P&P first	EthXpert first	P&P first
3,40	3,00	6,20	4,17	2,00	3,17
No significance		No significance		No significance	

Table 8. Average identified stakeholders, interests and options by each tool and depending on which tool was used first.

Ratings

The overall results from the questionnaires were mildly positive for both P&P and EthXpert (average score of 0.52 and 0.50 on a scale from -2 to 2 where 0 is neutral; see Table 2). For OLE the results were a bit lower than neutral (-0.27). Both groups started with the OLE analysis and the fact that they gave the same average score suggests that the group division was unbiased with regard to attitude toward the autonomy approach. Due to the small sample space no significant differences could be calculated, but there still are some observations that should be addressed in further studies. Most interesting is the participants‘ opinions about the P&P method. The participants who started with P&P were overall more positive to the approach than the ones who started with EthXpert (see Table 4).

Respondent	P&P	OLE	EthXpert
B	**-0,81**	0,75	0,44
C	**-0,15**	0,38	0,23
E	**0,31**	-1,19	0,75
D	**0,38**	-1,38	0,93
G	**0,44**	0,69	0,00
K	**0,44**	-1,00	0,00
J	**0,53**	-1,31	0,53
H	**0,94**	-0,73	1,06
I	**1,06**	-0,56	1,09
A	**1,09**	0,08	-0,38
F	**1,50**	1,31	0,88

Table 9. Averaged opinions about the tools sorted according to total satisfaction with the P&P method. Left aligned respondents are the EthXpert first group.

Qualitative analysis

The written summaries of the participants pointed to the following strengths and weaknesses with EthXpert:

Positive

- easy to name stakeholders and helpful to detect interests; easy to add stakeholders and interests; user-friendly, easy to understand; relatively intuitive; easy to revise; very easy to define stakeholder interests and expectations from other stakeholders
- best for problems with many stakeholders, interests and outcomes; helps to cover many aspects of the analysis; identified more possibilities than in P&P; to put yourself in the position of others is inspiring and gives new insights; good approach - especially for those who prefer stimulus or focus in ethical questions; allows focus at parts of a problem, expanding the overall picture; suitable for people who like to constrain the problem and focus on parts in isolation
- less dependent on external factors
- the interest relations adds interesting depth and helps detaching from one's limited point of view
- made it very clear how outcomes would affect stakeholder interests
- good overview; more overview; everything visible; stakeholders were shown in a good way; very structured
- quite interesting to use

Negative

- grows fast and becomes impossible to handle; too much information - hard to select what is important; more time consuming
- lost the overview due to the high number of stakeholders and interests
- a bit tricky to use; same as P&P but slightly more complicated; took a while to understand how relations worked; difficult to understand how to start; requires more education; difficult to envision every relationship between stakeholder interests and stakeholders
- difficult to focus on problem (as in P&P)
- messy setup - did not fit my way of thinking; messier than P&P - no overview
- sometimes considerations are similar - would like to be able to link these
- the potential of the stakeholder network is not fully utilised
- difficult to explain, discuss and solve the problem
- not a good overview when deciding options (interest considerations are not directed towards specific stakeholders anymore)
- a bit buggy
- had high expectations

Neutral

- combinatorial explosion, fields that needed filling in expanded rapidly
- started with wrong strategy but would now prefer to use EthXpert for future problems
- would like to see the heteronomy part in EthXpert and also a concluding part and colouring of cells

4. Discussion

The results are quite surprising. Surely we had expected that the group that started with EthXpert would benefit less from the P&P method than vice versa, and surely we had expected that the mechanisms to stimulate the expansion of the ethical problem scope would result in a higher number of identified stakeholders and interests in EthXpert than in P&P, but we had not expected such a striking number of stakeholders and interests as were the results from the group that started with EthXpert. It is also interesting to note that the numbers of stakeholders and interests were not subsequently reproduced in the P&P analysis. The sparseness of the P&P analyses indicate that most of the participants did not see the point in reproducing the extensive analysis and therefore satisfied with just outlining the most relevant contents from the EthXpert analysis.

The opposite relation is also interesting. All but one of the participants who started with the P&P analysis limited the problem to something only slightly more extensive when using EthXpert, yet far from the combinatorial explosion that the ones who started with EthXpert experienced. The reason for this might be that these already had completed an analysis and therefore considered the problem to be satisfactorily solved. The mindset was already established and did not benefit from the brainstorming support supplied by the software.

As seen in Table 4, the participants who started with the P&P method are generally more satisfied with the method. The written summaries about P&P differ somewhat between the groups. While the group that started with P&P brings up the benefits of a traditional media like paper and pen, i.e. flexibility and good overview, the group that started with EthXpert focus more on shortcomings compared to the computerised approach, i.e. limited space and difficulties to sort, define and overview individual stakeholders and interests while still appreciating the simplicity in the approach.

The rating of EthXpert did not differ significantly between the two groups. The general impression was mildly positive and the written summaries reveal mixed feelings toward the approach. The most common positive remarks are that it works relatively smoothly. It is easy to interact with the software and adding information works well. However, several of the participants observe that the software is most useful when handling problems that involve many stakeholders and interests. It helps to cover many aspects of the problem and to focus on parts in a systematic way. On the downside the participants report that the procedure is a bit difficult to understand at first. The extensive matrices gave a messy impression that did not fit their thinking. Also, the analysis grows rapidly as each added interest generates a relation to each of the other stakeholders. Although these relations are *potential* they require special attention to determine whether they are relevant to the analysis or not. On the other hand, these potential relationships are deliberately established by the software, to trigger associations and provoke the user to consider them explicitly.

5. Conclusion

EthXpert has been applied on the design of different IT systems as well as on the handling of various moral problems with very positive results. With help from EthXpert the participant decision makers were able to extend previous analyses through identifying additional stakeholders and interests. The procedure also gave insight in how the interests of different stakeholders were interrelated. Some of the participants especially appreciated the collaboration feature of EthXpert. An ethical analysis often brings up many big and small issues to consider and it is therefore efficient if a group can cooperate in solving the problems. Thus the tool also works as a means to gather several perspectives on a problem.

Through the explicit process, the decision maker or the designer acquires both a better overview of the complexity of a problem and a conception of how the involved stakeholders affect and are affected by different solutions. The main opinion of the participants is that the systematic procedure of EthXpert is purposeful for acquiring higher ethical problem-solving and decision-making skills by

offering a holistic overview over ethical aspects in the design of IT systems. Although critical remarks about the usability of the interface, many also became aware of shortages in a prior analysis made without the tool. This indicates that a computerised tool that guides the investigation of stakeholders' interests, and supports structuring and overview over information, is helpful for the handling of moral problems and for designing more ethical IT systems.

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Appendix 1: OLE Questionnaire

Ethics, internal relations and relations to society at large

1. Will there be any ethical problems or conflicts in the context, in the organisation or in the group where your project or the results of it will be applied or used?

2. Will your project or the results of it cause any ethical problems or conflicts?

3. What groups, individuals, organisations, etc, will in any way be affected by or have a stake in the development, use or mere existence of your project or the results of it? (Including society at large and the environment)

4. What values, interests, duties, standpoints and attitudes are involved in the use of your project or the results of it?

5. What effects will your project or the results of it have on each of these values, etc? Will your project or the results of it fit certain values and conflict with others? What values and how?

6. What will you do to make sure that the use of your project or the results of it will be optimal with regards to ethical aspects? For instance if it is an IT system, adapt the design of the product, user training, organizational changes, inform stakeholders, etc? How exactly are you going to succeed with this?

Appendix 2: Evaluation Questionnaire

Evaluation questionnaire

OLE, Paper-and-pen and EthXpert

1. **Which tool did you use first after OLE?:**

   ☐ Paper-and-pen ☐ EthXpert

2. **How good was the tool in identifying:**
   (Rate 1 to 5, 1=Bad, 5=Good)

	OLE	Paper-and-pen	EthXpert
Stakeholders			
Values/interests			
Options/alternatives			
Possibilities			
Risks			

3. **Did it help you to:**
   (Rate 1 to 5, 1=No, 5=Yes)

	OLE	Paper-and-Pen	EthXpert
Get a good overview?			
Understand the problem?			
Make a decision?			
Confidence with the decision made?			
Explain and defend the decision?			
Get prepared for dialog ?			

4. **How do you feel about the tool:**
   (Rate 1 to 5, 1=No, 5=Yes)

	OLE	Paper-and-pen	EthXpert
Does it work?			
Do you understand how to use it?			
Is it easy to use?			
Does it support achievement of your goals?			
Does it help you make a morally better decision?			

HAS THE INDIAN GOVERNMENT REALLY THOUGHT ABOUT MANAGEMENT OF INFORMATION SYSTEMS SECURITY?

Shalini Kesar

Abstract

This paper highlights some of the preliminary findings of an electronic government initiative within a small region in North East State of India. It focuses mainly issues linked with management of information systems security in an EGov context. Findings of this research can be beneficial to the efforts directed towards overcoming challenges involved in securing confidential and sensitive information from potentially increasing threats such as computer crime.

1. Introduction

Management of Information Systems Security (ISS) is important in any electronic government particularly when it involves confidential and sensitive information. The term ‗Electronic Government' (EGov) refers to the use of Information and Communication Technologies (ICT) to improve delivery of government services, facilitate interactions with business and industry, or empower citizens through access to information. Efforts to offer such services to citizens have intensified across many countries. With this, threats such as computer crime both malicious and non-malicious have also increased in number. Consequently, the topic of management of ISS is both important and topical in view of the recent statistics on breaches of computer crime (outside and within organizations). Although, it is argued that these ‗reported' cases only represent the tip of a potentially large iceberg (CSI/FBI 2008[59]).

Studies point out that the inadequate or lack of basic ISS controls increase the risks of computer crime within the workplace. In order to understand the factors that can lead to the absence or poorly implemented controls, researchers have stressed on the importance of exploring how staff within organizations address the issue of ISS. This is because structures and how information is processed within organizations today is different. Further, much flatter structures of organizations and more autonomy to staff exist today. Increased number of information systems and that most organizations are also networked means that machines can be connected to each other directly or indirectly. This would imply that the likelihood of computer crime would also increase. Therefore, a flawed understanding of the management of ISS itself offers little scope for developing effective solutions.

Seriousness of the increasing problem of computer crime in any country cannot be underestimated. In India, for example, the Computer Crime & Abuse Report[60] highlighted that over 6,266 incidents of computer crime cases affected 600 organizations during 2001 and 2002 alone[61]. Despite this, it is alarming to read reports such as Forensic Accounting Report (2007)[62] point out that given the fast developments in India, awareness level about computer crime is very low.

To combat such threats, the Indian Government gave effect to a resolution of the General Assembly of the United Nations for adoption of a Model Law on Electronic Commerce**.** As a result, Information Technology Act (ITA) 2000 was introduced to regulate and legalise electronic commerce. More recently, the Act was modified to include computer crime such as hacking. However, statistics indicate that very few people have been prosecuted under this Act. Furthermore, the Act has also been criticised for its complexity. Given that the Indian government has initiated a major push towards offering its services through the Internet, it is clear that the potential for computer crime both malicious and non-malicious will also continue to increase within EGov.

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59 See www.gocsi.com

60 Published by The report has been published by the Computer Emergency Response Team of the Asian School of Cyber Laws.

61 See http://delhipolice.nic.in. For cyber fraud resources in India, see http://www.indiaforensic.com/compcrime.htm

62 See http://www.indiaforensic.com/fraudsinindia.htm

Against this backdrop, this paper highlights some of the preliminary findings of an EGov initiative in a small region ("Region One") in North East State of India. The aim of this paper is to throw light on some of the challenges faced by staff at the local level in India in management of ISS context. This can be beneficial to the efforts directed towards overcoming challenges and issues involved in securing confidential and sensitive information from potentially increasing threats such as computer crime.

In light of this, this paper begins by a brief introduction. This is followed by a review of literature in section 2. A discussion of the research method is presented in Section 3, followed by findings in Section 4. Heek's framework is used to tease out some of the preliminary findings at Region One. Section 5 presents a discussion and implications of management of ISS in an Indian EGov context at a local level. Finally, conclusion and future directions of this research is presented in Section 6.

2. Literature Review

Recently, ISS researchers emphasise on the need to consider both social and technical perspectives when managing threats and risks such as computer crime (See Dhillon and Backhouse 2001, Siponen 2001, Kesar 2002, Kesar 2005). Although a few studies exist that depart from a traditional functionalist paradigm where they believe mere implementation of state-of-art technical controls is adequate in minimizing risks and threats (Vroom and Solms 2004). While trying to understand the factors that lead to the absence or poorly implemented solutions, researchers believe that it is important to explore how staff within organizations addresses the issue of ISS in general. This is because staffs' understanding on ISS overall can influence how policies and procedures are perceived and abided in their workplace (See von Solms 1998; Siponen 2000; Schultz 2002; Kesar 2005; Thomson and von Solms 2005; Stanton et al. 2005). In addition, complacency towards ISS can be a major contributing factor for management of threats such as computer crimes (Hinde 2001). Complacency towards ISS combined with inadequate lack of and/or basic security controls could itself offer little scope for developing effective solutions.

In the context of Indian EGov, studies on ISS seem to be lacking. This is not to say that relevant research has not presented important and new insights about management of ISS. In her book chapter, "Regulating India's Digital Public Cultures: A Grey or Differently Regulated Area", Ranagaswamy[63], for example, studies urban cyber cafes in Western India. She discusses public norms governing digital security and privacy in telecom regulation. In addition, the EGov magazine has been publishing articles on EGov related issues for the last five years[64]. Most articles, however, highlight challenges, opportunities and future plans of the Indian government by examining various EGov projects. Interestingly, there were no article(s) that emphasised on the importance of both social and technical aspects of management of ISS in this context.

Recently, Naavi[65], has developed an Information Security Framework, exclusively for Legal Process Outsourcing Companies called LIPS1008[66] and also a more generic framework for Techno Legal Compliance under the new ITA (2008 version) called IIF309[67] which is due to be effective anytime. Although, issues such as human, organizational and technological factors and problems pertain to Indian EGov are highlighted, yet specific studies on management of ISS in this context, as mentioned earlier, still remain largely neglected. Given that reports indicate computer crime in India is an increasing problem, management of ISS should also be regarded as a challenge and a peril in itself. Interestingly in a very recent article (late 2009), perhaps for the first time in India, Naavi presents a new dimension that focuses on "Human Behavioural Aspects of Information Security Management". He presents a Theory of Information Security Motivation to build upon the premise that Information Security adoption in an enterprise should take into account five factors: Awareness; Acceptance;

63 See http://www.springerlink.com/content/242k306460436682/

64 See http://www.egovonline.net

65 Naavi is the popular name of Na.Vijayashankar. He started a portal on Cyber Law (Presently www.naavi.org) to discuss the provisions of the proposed legislation which he rightly predicted would have a profound impact on the society. He also wrote what turned out to be the first book on Cyber Laws in India titled "Cyber Laws for Every Netisen in India".

66 See http://www.lips1008.org/

67 See http://www.naavi.org/cl_editorial_09/edit_mar21_itaa_analysis_17_isframework_ita2008.htm

Availability; Mandate; Inspiration[68]. This clearly strengthens the argument presented in this paper that management of ISS in Indian EGov context warrants both social and technical aspects.

2.1 Brief Background of EGov in India

The initiatives of EGov in India represents a tremendous impetus to move forward in the twenty-first century with higher quality, cost effective government services and a better relationship between citizens and government. In India, the concept of EGov started as early as the seventies where the focus was on development of in-house government applications in the areas such as defence and the deployment of ICT to manage data intensive functions related to elections and tax administration. The efforts of the National Informatics Center (NIC) to connect all the district headquarters during the eighties was a very significant development. From the early nineties, ICT was used to apply wider sectoral applications with policy emphasis on reaching out to rural areas and taking in greater inputs from Non Government Organizations (NGOs) and private sector as well. For the last ten years, the Indian government has initiated various EGov projects both at national state and the local level. Apart from the action plan, Indian Government also established the National Taskforce of Information Technology and Software Development in May 1998[69]. In addition, Ministry of Communication and Information Technology introduced National e-Governance Plan (NeGP)[70] to support the growth of EGov within the country.

Most recently, in 2008, the Indian government implemented a Policy of Open Standards[71] that aims to provide a set of guidelines for the uniform and reliable implementation of EGov. In general, use of ICT has helped in providing electronic services to its citizens. Furthermore, it is hoped that EGov will bring about transparency in the governing process; saving of time and cost due to provision of services to the citizens through single window; better decision making; simplified office procedures; checking corruption; and better office and record management (See Monga ,2008). In the efforts to facilitate, promote advice and support the EGov initiatives at State and local level, the Computer Society of India (CSI) [72] publishes various studies on challenges faced by the Indian government. Some of these challenges include: infrastructure; resistance to re-designing departmental processes; lack of communication between government departments and developers responsible for EGov (also see, Mahapatra and Sahu[73]‘ Monga, 2008).

Keeping in mind various studies in the area of ISS and EGov and focus of this paper, three fundamental issues are significant. Firstly, most cases of computer crime for various reasons are rarely reported. Although, the extent of damage caused by ISS breaches can be gauged by the ‗reported‘ cases, however as mentioned above, they represent only the tip of the iceberg (Parker 1998, CSI/FBI 2009[74]). To further compound the problem of computer crime, most criminal crime acts do not catch the attention of organizations until it is too late. Secondly, there seems to be lack of studies that take into account government officials‘ perceptions and views about ISS, particularly in India. Thirdly, there is a general underestimation of the risks associated in an increasingly electronic and connected environment within government.

Considering that problem of computer crime continues to increase, countries like India when implementing EGov need to examine underlying factors and consequently its implications when securing its confidential and sensitive information. In order to do this, perhaps the first step could be to understand the viewpoints of governmental staff on ISS issues.

2.2 Brief Background of ITA

In 2000, Indian Parliament introduced Information Technology Act (ITA) [75] to provide legal framework to facilitate electronic transactions. The major aim of this Act was to: recognise electronic

68 See http://www.naavi.org/cl_editorial_09/edit_sept27_09_theory_ism.htm
69 For more recent details on recent projects on EGov in India see http://www.egovindia.org/egovportals.html\
70 See http://www.stqc.nic.in/index1.asp?linkid=86&langid=1
71 See: http://egovstandards.gov.in
72 See http://www.csi-sigegov.org/publications.php
73 See http://www.csi-sigegov.org/emerging_pdf/33_303-311.pdf
74 See www.gocsi.com
75 See http://www.mit.gov.in/default.aspx?id=321

contracts, prevents computer crimes, and make electronic filing possible. Significant changes were made on ITA in 2008 regarding cyber cafes. At the time when the ITA was passed several acts deemed to be illegal in most jurisdictions including virus attacks, data theft, illegal access to data/ accessing and removal of data without the consent of the owner were listed as civil penalties under the ITA. ITA 2000 had not defined ―Cyber Cafes" and one had to interpret them as "Network Service Providers" referred to under the erstwhile Section 79, which imposed on them a responsibility for "Due Diligence" failing which they would be liable for the offences committed in their network. The concept of "Due Diligence" was interpreted from the various provisions in Cyber Cafe regulations where available or under the normal responsibilities expected from network service providers. The undersigned had also drawn up a "CyLawCom" guidelines for Cyber Cafes to enable them pass the benchmark test of due diligence and suggested a CyLawCom audit and certification for them.

Unlike the ITA of 2000, the focus of the new ITA 2008 is clearly on Cyber Terrorism and to a significant extent, cyber crime. Moreover, S.84A gives extensive powers to the Central Government to prescribe encryption methods to ensure secure use of the electronic medium and for promotion of e-government and e-commerce.

3. Research Method

Research question for this paper relates to understanding: ―How do government officials responsible for EGov projects perceive and interpret ISS policies and procedures"? It makes specific reference to one EGov project implemented at a local level in India. While conducting this research, it uses the design-reality gap analysis framework based on a multidimensional framework consisting of seven dimensions, namely; Information, Technology, Processes, Objectives and values, Staffing and skills, Management systems and structures, and Other resources (ITPOSMO[76]) proposed by Heeks (1999). While the prime focus of Heeks (2001; 2002) framework is on identifying gaps in the design and development of EGov projects, this paper uses the framework to address the research question stated above. In this paper, both primary and secondary data is used. Primary data involves semi-structured interviews. While secondary data includes documentations and newspaper articles.

3.1 Region One

Overall goal of EGov initiatives in India was that every state would benefit from: cost reduction and efficiency gains; quality of service delivery to businesses and customers; transparency, anticorruption, accountability; increase the capacity of government; network and community creation; improve the quality of decision making; and promote use of ICT in other sectors of the society. A small project was initiated at a local level (Region One) in the North East state of India. At the time of this research, the main goal within the region was to create a website and provide some basic information to its citizen. Region One had approximately 30 staff members, of which, six 6 were at a senior manager level. Staff were responsible for providing information and services to citizens in both the state and English language. It was hoped that electronic services to citizens would gradually improve in quality and consistency by providing information linked with vehicle registration, land records, birth and death registrations, employment exchanges, payment of excise duty, sales tax and local tax, electronic bill payment of water and electricity, computerization of health records.

4. Findings and Discussion

This section uses the framework by Heeks (1999; 2001) to discuss the findings of EGov implementation in the context of research question specified above.

4.1 Information

The common goals of Indian government include providing information to its citizens and by improving the efficiency, reliability and quality of services. In order to achieve this, government at the union, state and local level enhanced and updated their own internal systems and procedures

76 Information; Technology; Processes; Objectives and values; Staffing and skills; Management systems and structures; Other resources: time and money.

accordingly. At the same time, EGov initiatives within different states were encouraged to provide provisions of delivery of services to the citizens through a —single window". As mentioned earlier, Region One was at its initial phase of EGov implementation that required providing general information for multiple services within that region. It had to ensure, however that information posted on the website is not only in English but also in the local state language. Although, technology was available to translate the information, the main problem was to motivate the staff enough to actually to do this task. Some complained about tasks simply being tedious. Whereas, others felt over-whelmed with these extra stringent deadlines and did not understand the need to provide information online. As a result information provided on the website was incomplete and inconsistent in both the languages.

Senior staffs were also questioned about measures Region One had adopted to gauge the effectiveness of their ISS programmes such as training. Surprisingly most of them were not fully aware of such programmes. Those who knew about training programmes did not understand the relevance of them in regard to implementation of EGov. Interviews also revealed that majority of the staff members believed that their task was just to provide information of the website. Further, most staff believed that it was the technical division who were responsible for ensuring minimizing risks and handling of sensitive data.

4.2 Technology

The majority of the technological problems that Region One faced were related to outdated information systems, inadequacy of technical skills of staff and outdated databases that could not be properly populated. It was for this reason some of the staff did not attend training about information systems' maintenance as they felt it was a waste of time. It was hoped that training would not only enhance awareness about risks and threats associated with technology but also about ISS policies and procedures such as ITA. However, as mentioned earlier, most staff opted not to attend training for various reasons such as lack of time and stringent deadlines.

With the help of technology, the NeGP vision is —Make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realise the basic needs of the common man'[77] Although technology can prove to be beneficial, changing the mindset of the government staff who were used to working only in the manual mode was crucial. One of the biggest challenges within Region One was to actually convince the staff of hoe technology could ease their workload and consequently improves productivity within the workplace.

4.3 Processes

The Department of Information technology (DIT)[78] outlines policy framework and strategy for implementation of EGov. It was hoped that this framework would create an enabling environment to facilitate 100,000 Common Services Centres[79] in the rural areas to provide different kinds of government and private services to its citizens[80]. The main purpose behind introduction of website was to improve the quality of information to citizens and to bring the benefits of Internet connectivity (anytime/anywhere access for those connected). In order to provide information to its citizens, Region One had to make major changes on their processes including creating and updating their website. Interview evidence revealed that it had not been an easy task to implement ICT related reforms within Region One. Computer illiteracy was prevalent amongst senior staff as they seem to rely more on junior staff for processes that required electronic data-entry activities.

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77 See http://www.mit.gov.in/default.aspx?id=837

78 See http://www.mit.gov.in/default.aspx?id=12

79 A Common Services Centre is an ICT-enabled Service Delivery outlet providing a range of services to the people in the village / town in which it is located. Various nomenclatures e.g., Common Services Centre, ICT Kiosk, Community Information Centre, e-Community Centre, Rural Service Delivery Points, Village/Rural Knowledge Centre, etc. currently exist in the country for such Integrated Service Delivery Centres, providing similar services to citizens.

80 See Draft Framework for Establishment of 100,000 Common Services Centres, No; No. 1(1)/2005-EGD, August 2005, Department of Information Technology, Govt. of India, Electronics Niketan, New Delhi, India.

Many case studies highlight that processes involving implementing of EGov in India is far more challenging than anticipated by the decision makers in the Indian Government. For example, Monga (2008) pointed out that changing the mindset of the government staff who are used to working only in the manual mode. This is a big task and needs patience and careful planning. Workshops, seminars, and training sessions are required to be organised to spread awareness among the staff at all levels.

In addition, various processes involved in securing sensitive and confidential information was not very well understood by staff within region One. Interviews clearly indicated that most staff did not have a positive mindset about benefits of EGov in general, which had an impact on the workplace such as missing training and complacency towards controls to secure information. As a result, work environment with Region One seemed to be guided by ad-hoc processes where most staff lacked motivation about EGov in general.

4.4 Objectives and Values

The Indian government‘s main emphasis has been primarily on automation and computerization, where state governments have also used ICT tools to connect, network, set up systems for processing information and delivering services. This has resulted in implementation ranging from ICT automation, for example, in individual departments, electronic file handling and workflow systems, service delivery for high volume routine transactions such as payment of bills. Needless to say, the push has varied across initiatives, with some focusing on enabling the citizen-state interface for various government services, and others focusing on bettering livelihoods. As a result, every state has taken the initiative to form an ICT task force to outline ICT policy document that are coherent with the underlying objectivities and values of EGov implementation. These documents also include strategies for securing data provided to its citizen government websites. The ITA was the first step taken by the government of India towards promoting the growth of electronic commerce, which recently has been amended to take into account EGov.

It was seen that objectives and values outlines by NeGP did not transcend to the government staff working at local level of Region One. Ambitious goals of Indian Government to implement EGov were thus viewed with apprehension and therefore any measures such as training, use of technology, change of processes were resisted by the senior staff in particular.

4.5 Staff and Skills

Senior staff of Region One had been around for many years. Rather than understanding the direction Indian government was taking towards the future, most resisted this change. Besides lack of motivation among the staff, some members did not have the necessary technical skills to use the tools that enabled them to complete basic tasks. It was found that majority of staff under-utilised computers in the department. In his white paper, Kanungo[81] commented that lack of computer skills can prove to pose a major challenge during implementation of EGov.

Specific to management of ISS, mindset of senior staffs was that ISS is the responsibility of technical divisions since it deals with technical controls. Perhaps this explains why most staff members did not feel it was their job to deal with issues linked with safety of information provided to citizens on the website.

4.6 Management Systems and Structures

Junior staff turn-over has changed a fair amount as compared to the overall management structure at Region One over the last few years. As a result, Region One lacked a clear reporting structure. Added roles due to EGov initiatives with no clear reporting lines created more confusing and resulted in ad-hoc management structures. Subsequently, it created a working environment where there was little motivation to support the EGov initiative. This is nothing new as it has been pointed in studies that bureaucratic structure in India is inadequate to respond to EGov initiative.

81 See "ASSOCHAM World Bank Vision document" released during the conference titled "E-Governance - Transforming India" on February 17, 2004 in New Delhi.

4.7 Other Resources and Constraints

In addition to the lack of financial resources, other constraints such as lack of awareness about rules, policies, laws and legislative changes in EGov context were not clear among staff in Region One. Also lack of prior experience in offering such services or availability of right technology, guidance on EGov all attribute to challenges in work environment within the region. Researchers have attributed this, for example, to lack of infrastructure (Allen et al., 2001); poverty and e-readiness (See Subramanian et al, 2008). It can be argued that the tendency to rely on ICT and overlook important factors such as pre-existing problems (both management and technical) can affect the overall effectiveness of EGov. Recent studies highlight inadequacy of training (Radhakumari 2006), political environment and resistance to change (Singla 2002) and national security (Riley 2005) can also provide challenges while implementing EGov. There is no doubt, countries like India in EGov context will benefit in improving relationship between government and citizens. However, examining and overcoming barriers linked with not only political, social and economic at local level are important but ISS issues need to be put into perspective for a successful design and implementation of EGov. While doing this, management of ISS needs to depart from traditional viewpoint that threats such as computer crime can be dealt with technical controls alone.

5. Discussion and Implications

Discussion so far highlights the following key challenges in the management of ISS in context of EGov at Region One. First, there a lack of awareness about various aspects linked with management of ISS. In general the staff seemed to be overwhelmed with tasks to maintain the consistency and uniformity of information posted on the website.

Given that training about ISS was a starting point of enhancing awareness of staff, mind set of senior staff about such issues play a crucial role. This is because they can send cues to other staff, which influence how the latter perceive and abide by policies and procedures in their work place. Moreover, the increasing use of ICT in EGov implementation suggests that a technical solution only proves inadequate to safeguarding the workplace from information security breaches. The ITA 2008 has mandated that body corporate handling sensitive personal data need to follow ―Reasonable Security Practices" (RSP), under section 43A, failing which they will be liable for paying compensation to any person who suffers a loss. Similarly, under Section 79, there is a need for ―Intermediaries" to follow ―Due Diligence". Though ―Due Diligence" cannot be prescribed and has to be left to be decided on a case to case basis, in case there exists a standard security practice, it could be a starting point to bench mark the requirements under due diligence ITA

Second, most of the staff had a traditional viewpoint towards management of ISS. Failing to recognise the importance of social issues of ISS itself can limit ensuring confidentiality and sensitive information in future. Given the prevalence of ICT, researchers and practitioners (See Kesar 2002, 2005; Dhillon and Backhouse, 2001; CSI/FBI, 2008 and 2009) argue that social aspects of ISS are necessary to fully appreciate all the elements in minimizing security breaches. Monga (2008), for example, comments that Indian government must address concerns of security and privacy in EGov. This is because steps need to initiate and generate confidence among the individuals and organizations to conduct on-line transactions and communications. Recently, the Indian government plans to launch the Unique ID Project (UID) project in Karnataka. As a part of this pilot project, some suggestions of security requirements are also addressed. These security requirements have been developed based on the Information Security Framework (IISF-309). It will be interesting to see what role this framework plays in enhancing awareness about management of ISS at local level.

Third, despite the positive mindset of Indian government, lack of motivation affected daily activities towards EGov implementation. This resulted in complacency towards taking measures securing information security breaches. It is also clear that staff at Region One did not feel responsible for maintain ISS aspects of EGov. This is a concern since studies highlight that complacency towards ISS can increase the chances of threats such as computer crime.

6. Conclusions and Future Directions

This paper throws light on initial finding in the area of management of ISS in an Indian EGov context. It is clear that in addition to dealing with challenges such as low literacy, infrastructure issues, management structure and skills, enhancing awareness and changing mindset about management of ISS warrants equal attention. All these factors contribute to the effectiveness of EGov implementation. The next phase of this research aims to address specific measures that contribute to enhance awareness about management of ISS in Indian EGov context.

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INFORMATION TECHNOLOGIES, A NEW GLOBAL DIVISION OF LABOR, AND THE CONCEPT OF INFORMATION SOCIETY

Andrzej Kocikowski

Abstract

Utilizing the "old" economical theory of Marx and its conceptual apparatus, we indicate a possibility of **decomposition** of capitalistic economic and political systems; the decomposition can be brought about by **new global division of labour**. We make an attempt at proving the existence of exact correspondence of the ICT revolution and the **efficiency (productivity) of the knowledge production process**; the latter has been tied to general laws of the "old" theory, that is the issue of migration and especially concentration of capital. We propose a new way of looking at the issue of the so-called Information Society.

Key words: global division of labour, Information Society, ICT, production of knowledge, productivity, Marx.

1. Introduction

One can get the impression that due to the deep economic crisis around the world, our attitude to the 19th century theories of capitalism – and to Marx's studies in particular – has changed. We must admit that the author of *Das Kapital* would be surprised to see newspaper headlines (Spring 2009) postulating widespread nationalization of many sectors of American economy, including banking. This belated Atlantic affirmation of the theory of the genius from Trier will soon – as one might guess – cease; you nearly can't hear it yet. However, until it is fresh in our memory, I suggest we jump at the opportunity and use **Marx's "old" theory of economy and its conceptual apparatus** to analyze the present form (stage) of development of the capitalist system. I believe that such an analysis will help us better understand the fundamental changes in the global economic mechanism, in particular the emergence of a new **global division of labour**. Apart from that, it may help us get a better insight into the **essence of the changes** caused by the IT revolution and the role of the latter in the change of **productivity of scientific knowledge production process**. It all greatly simplifies the discussion on the so-called information society.

I present my points in the following order: in point 1, I am trying to present the core of the IT revolution. The analysis is to justify that the achievements of information technology determine the above productivity of knowledge production process, especially as regards scientific knowledge. In point 2, I am confronting Marx's "old" theory of economy and its conceptual apparatus for the first time. I am recalling the rather obvious relation between the quality of generated scientific knowledge and the quality of "means of production" used to generate it. Point 3 is another meeting with Marx's "old" theory of economy and its conceptual apparatus: the notion of capital migration and concentration is used to present the changes affecting the "traditional", if we may call it this way, investment activity. It is about the migration of capital to research industries and its subsequent concentration. In point 4, we will cross paths with Marx's theory for the third time. The analysis will take into account the global business transactions conducted by cross-border corporations. I will try to justify the point about the emergence of the new, global social division of labour and to describe its most significant consequences (in the context of the tasks set forth). In point 5, I will use the most important results of the previous analysis to suggest a different approach to the issues of the so-called Information Society.

2. Productiveness of labour

The thesis that the IT revolution changed our life on Earth has already been convincingly justified; it has been confirmed for almost 30 years in the work of many researchers, including the participants of the ETHICOMP conference. The question still open is the general, theoretical analysis of the functioning of the capitalist system in its present form – with global economy and markets, with an

absolute advantage of cross-border corporations, with a fundamentally changed, the so-called **productiveness of labour**, etc. The last change – as we all know – is a **direct result of technological development** – an indirect result of research development, and an indirect result of the aforementioned **IT revolution**. This revolution determines – that's obvious – the **productivity of all manufacturing processes in the economy**, hence it influences **the knowledge production process**, and above all – the process of **scientific knowledge production**.

A question should arise how does the IT revolution determine the productivity of knowledge production process, scientific knowledge in particular?

An unprecedented achievement of the IT revolution is certainly a qualitative change in the social systems of communication – this peculiar and important **decomposition of the communication area of the whole species**. When this issue needs to be illustrated, the humanists usually reach for the following examples: a computer network and its services, mobile and satellite telephony, computerised cable telephony – also traditional mass media – press, television and radio. All these systems to a various extent make use of sophisticated information and communication technologies, without which none of the related media can function at all. Do we know how this technology works?

Let's have a look at one gadget from this technological field, one of today's most popular – a mobile phone. Using subtle electronics, specialised microcomputers have been built (I mean this is what our cell phones really are) and they have been connected into a strange network system; each system component, after it's turned on, becomes a node within the system. A cell phone network – like any other IT system – forwards data generated in its nodes.

The data generated in the network system nodes are audio signals representing human speech, converted into digital data stream. A telephone must first create them and then send them at a considerable speed into the network, so that on reaching the recipient's phone – after they are decoded and re-transformed into acoustic signals – they can be received by human ear. It is assumed that the time for: data processing and preparation in the broadcasting node, transferring the data through the network into the receiving node, and last – re-transforming the data in the receiving node into acoustic signals, **must be short enough** for the people talking on the line to have the impression they are talking face to face.

Human speech is not a big challenge for today's microcomputers. Sampling such a signal at a frequency of 8 kHz using 13-bit recording format for the recording of each data stream sample, we will generate a sample of 13 kilobytes per second. Once they are encrypted (or rather compressed), one cell phone „pushes" about 13 kilobits per second into the network.

Small data streams can be easily converted into a river of data and the latter in a real ocean of digital information. Let's try to count: a thousand callers charges the network with 13 megabits per second, a million callers gives 13 gigabits per second, etc. Each of these one-million portions of data pushed into the network every second must be permanently controlled. First, it must be accepted for expedition and carefully labelled (from whom) and addressed (to whom). Then the best transmission route must be found in order to transfer the data, which is then verified for completeness. Next, a note on transfer parameters is recorded (including start time, duration, amount of data, etc.) for storing in an archive (for billing purposes). And all that in a millionth of a second, every second.

To effectively complete such a complex task, **every second of the system's work** requires an incredibly huge, **gigantic number of calculation operations**. Only the process of controlling and recording data used for billing purposes requires hundreds of thousands of measurements be made within a fraction of a second, let alone the resulting calculations. They may not be too complicated in terms of mathematics, but they must be completed in a dramatically short period of time – time counted in a millionth part of a second. **At the moment we have no other technology capable of undertaking such an enterprise**.

Or let's take another, very contemporary example: human genome contains nearly 3 billion nucleotide pairs. Loose estimates (Wikipedia) say that in order to print its record, we would have to use hundreds of volumes the sise of a phone book from a city of a 5-million population.

Only these data show the dramatic **qualitative gap** which separates the times of science using notebooks and pencils – and an abacus – or maybe even a logarithmic slider, then an electronic calculator – from nowadays, when the results analysis – not to mention the measurement process, that is data collection for subsequent studies (calculations) – requires calculations on data sets containing billions of billions of components. Taking account of the operation called sequencing (microbiology,

genome) creates a research situation where the broadly understood measurement, evaluation and comparison must be applied to data sets of sises ranging from 10^{12} to 10^{18} elements – or perhaps even bigger. Should only one such measurement and comparison of the obtained results take only one second – I will only remind you that one year is approximately 3.2 x10^7 seconds – the conversion of such a collection of figures without fast computers would take hundreds, or maybe even thousands of years. Which means it would be impossible to **complete it within a reasonable period of time**.

We also have to add that microbiologists have for some time now used computer models simulating biochemical process in the cells. These are standard procedures in branches of science in which computer simulation **is actually the only way** to complete calculations reaching billions operations per second.

So, the fundamental achievement of the IT revolution comes down to the transformation of **each social activity undertaken to satisfy our needs** into a homogenous galaxy of encoded information. The transformation is made using electronic machinery working at unimaginable speed (productivity). The same unimaginable speed (and productivity) is used to process (—alculate") the galaxy of encoded information according to a preset scheme and eventually – also at an extreme speed – to restore its –natural" qualitative diversity from which the whole process started.

Once again, the essence of the IT revolution comes down to a **universal (and universalizing) tools** working at enormous speed. It can convert a variety of **qualities** into uniformity of encoded information, which after processing (purely calculation operations) can be restored to their original, qualitative diversity – of course, in a transformed form. Thanks to that, a large number of activities undertaken by people in order to satisfy their needs can be competed dramatically fast, with extreme efficiency, in an extremely safe manner, etc. **Or** – which is of fundamental importance for our analysis – can be undertaken at all (**like in the case of the identification of the human genome, for example**). And this is why we can believe and state that the IT revolution, like no other revolution, **determines the productivity of the knowledge production process** – especially scientific knowledge.

3. Knowledge

There is a fragment in the introductory parts of the first volume of *Das Kapital* (chapter 1, —Commodities") in which Marx conducts a subtle analysis of fundamental importance for the whole work, i.e. the analysis of relations between the prices and the values of the –world of commodities":

–(...). The value of commodity would therefore remain constant, if the labour-time required for its production also remained constant. But the latter changes with every variation in the productiveness of labour. This productiveness is determined by various circumstances, amongst others, by the average amount of skill of the workmen, the state of science, and the degree of its practical applications, the social organisation of production, the extent and capabilities of the means of production, and the physical conditions. (...)". (K. Marx, Capital, Volume I, Progress Publishers, Moscow, 1954, p. 47)

I recall this issue for several reasons. Well, human uses a variety of **tools** to produce all that he/she needs as a historically developed social being. Some tools are very simple and have not changed for hundreds of years (e.g. a hammer, a plane, an axe), but other – such as **digitally controlled robots**, are a true technical masterpiece. The precision and speed of operation, the incredible versatility (multifunctionality), low energy consumption, remote functionality control etc. – the latest generations of these tools are separated from their predecessors by 25-years' qualitative gap.

For the production of these and similar tools – or speaking more broadly – **means of production** – we need one more important component – **knowledge**. To build a modern, digitally-controlled industrial robot, we must have **top quality scientific knowledge** including many specific disciplines. This raises a question: where to get the knowledge required to produce a robot or other precision tools (means of production) and goods we need for living (more generally: for the social conditions of life reproduction)?

In a capitalist economy based on commodity and money, especially at the present stage of its development, knowledge can (actually) be produced in the same way as most of other technically and technologically advanced products. You get financing for the construction and furnishing of laboratories, you employ scientists and specialists and after some time – as it usually happens in every other business – you get the product – a technical or technological solution, a new technology, new

production materials, plants, chemicals, etc. Sometimes the product is just "pure theory". We sell such it to a contractor or we offer it on the market like **any other commodity**.

Knowledge production, as is commonly known, does not only depend on the sise of the capital involved. Of fundamental importance are two other essential elements of the production process – the workforce qualification (quality) of direct manufacturers – i.e. **the scientists and the specialists** – and the **quality of tools** they use. Only such a combination – sufficient financial resources, highly skilled "scientific workers" and the best possible "research tools" – guarantee the best quality of knowledge required by the market. I emphasise it because – as has been already pointed out – telecommunication and information technologies have impact on the productivity of knowledge production process by providing the best quality tools for its "production".

We must also add that the knowledge required for the production of everything that a human needs or wants is – and it is also commonly known – diversified. For example, the technology used for producing hair dye offering permanent colour marked as "dark" is something different than the technology used for the production of transgenic soya resistant to certain herbicide or the production of reactor fuel – let alone the technology used for manufacturing nanorobots. This is why an important distinctive element is the **importance, which a given area of knowledge (technology) has for the interests of a country (or a corporation) in which or for the money of which it was developed**. This is one of the sources of strength for the complicated system of arbitrary patent and legal regulations used by institutionalised violence to support those **who will violate the rights of an individual, of other countries or fundamental international conventions for the sake of maintaining the exclusiveness of use of a certain technology.**

4. .Knowledge production

The analysis of global financial markets in the last 50 years shows that the **production of broadly understood knowledge** involves enormous funds. Thanks to that, we could observe an unprecedented and incredible increase in the quantity and quality in this peculiar **field of economy**. The scientific and technical revolution that has taken place over that time – the IT revolution being only its fundamental component – confirms the effectiveness of such an investment strategy – **investing in research industries, in the creation of knowledge production industries**.

We have long known that knowledge production may be **a more profitable business** than steelworks or coal mines. Thus – and these are the **principles of Marx's "old" theory of economy**, at any given time and in a given economy, some capitals will move from industries based on raw materials (or "normal", production ones) to knowledge production industries, promising higher profit. **Such a process can be stimulated in a planned way** through rational financial policy of the state, the immigration policy, etc. The United States have for many years appeared as a good example of such solutions.

Along with the migration of capital to knowledge production industries, we will also observe it becomes more **concentrated** – of course, after a certain time and along with the development of this field of economy. Let us remind ourselves that according to the diagnosis formulated by the author of *Das Kapital*, the progressive concentration of capital is the inherent feature of the **entire** capitalist economy; therefore, it must also refer to the **knowledge production industry**. The combination of at least two system trends – the migration of capital to knowledge production industries and its concentration – and **the desire to control the species-strategic production branches** creates a situation in which **the global process of knowledge production** is dominated by capital controlled by people (corporations) and state institutions located in selected geographic territories of the planet.

Just in case, let us remind ourselves that the migration of capital to research industries does not mean that other industries located in a given territory will no longer use, for example, steel or coal. The materials will be bought elsewhere in the world – where their mining or production is locally profitable, and where **the local capital has no real investment alternative** between the production of knowledge and materials.

As we all know, the homeland of computer technologies (information or telecommunication and information technologies) is the United States. It was the first place to use them as tools – originally in support, then also as a replacement to a variety of efforts undertaken to satisfy our needs. **The U.S. has not allowed this leadership to be taken from them until today**, and since the 1980s, they have

strengthened them in a manner almost **excluding any attempt at real competition**. The control over the strategic nodes of the Internet and the global positioning system (GPS) are just the most spectacular proofs of this domination.

The U.S. also have a long tradition – reaching the second half of the nineteenth century – of investing major capital in knowledge production areas and, as I have mentioned before, a positive tradition of creating perfect working and living environments for scientists and top-class specialists. As we have proven before, this is an essential factor determining the success in this peculiar, nonetheless very important field of economy. Therefore, it comes as no surprise to anybody that that it is the U.S. that has for many decades produced knowledge upon which economic processes of fundamental importance for life on Earth depend, in the recent years also including natural processes.

5. Global dimension

We have already mentioned that the today's stage of social development is characterised by: (a) **global business operations of large, cross-border corporations** and (b) **unimaginable concentration of capital** (on a global scale). We can read in a report by the Institute for Policy Studies (*http://www.corporations.org/system/top100.html*) that —51 largest „economies' in the world are corporations and only 49 are countries". Let us recall here – just in case – that the domination of cross-border corporations and the extraordinary global concentration of capital are the result of complicated and long-running economic, political and military processes. Many economic and political crises, wars, military coups, secret service operations, demonstrations of mass destruction weapons, progress of medicine, new scientific discoveries and technologies etc. – they all have had impact on it. This is what Marx's —old" theory of economy holds.

Cross-border corporations, whose suggestions for a long time now have had impact on the governments of the most powerful nation-states, may invest their capital in research (information) industries, using the existing and creating new branches of knowledge production. Here, too, no reasons can be seen for which **the migration – and especially the concentration of capital** – could not develop to a level beyond the reach of many —normal" nation-states. Right now, we can venture to suggest that the **control** of the global knowledge production process **does not depend upon (national) governments** but is rather **the domain of large corporations**. By definition, they are not limited by any geographical territory, but for obvious reasons they MUST use them. Depending on various factors, they will focus on first league territories (like U.S., UK, and Japan), second league (such as China, India) or still others. Of course, there are possible alliances with local, national research industries in different places around the world; in extreme cases, it will be a relatively small network of research institutes, or even a single university. No need to ask who will decide about any research-related issues in this case.

To sum up the current discourse, we can conclude the following: (a) the inter-branch flows of capital and its concentration at the national and super-corporate level, (c) the developed (and monopolised) advantage in the area of IT technologies and other areas of knowledge production – at the national and super-corporate level – all this **results in a new, global division of labour**. Its essence – as I can see it today – manifests itself in the fact that some of Earth's population can focus on the self-controlled and carefully protected territory producing scientific knowledge and state-of-the-art technologies, that is everything that drives and underlies the changes in the **global productiveness of labour**. This community may – on a global scale – achieve a status which even a few decades ago – at an earlier stage of civilization development and in a totally different dimension – belonged to institutions and people focusing on the **production of knowledge at the local level** – in „separate", „national" capitalist societies. This process, describable and empirically confirmable in a manner characteristic of natural sciences, can lead to interesting conclusions (and assumptions) on the condition of today's capitalist economy and on the transformation of the whole social and historical process dominated by this formation.

Taking over the control over the process of changes in productiveness of labour determining the **productivity of knowledge production industries** and its monopolization should be regarded – and this is my opinion, anyway – as the most revolutionary change in the history of mankind – in the entire social and historical process. Let us repeat – there is a relatively **small community** (a corporation or a state institution) which can **monopolise** (on a global scale) the **process of change in the**

productiveness of labour in knowledge production industries – which means it may indirectly monopolise the process of knowledge production on the planet – thus indirectly taking control of the global process of manufacturing everything a human being or the Earth's natural environment needs and will need.

6. Conclusion

Looking at the records from the history of science and invention since – let's assume – the turn of the 18th and the 19th century, we will observe a certain regularity. There is – and let's assume this to be our starting point – a single genius working in a small laboratory full of retorts, melting pots, gas burners, mineral samples, plants, cabinets filled with dead animals and insects, voltaic piles etc. It happens sometimes that the laboratory and the "research programme" are paid for by the inventor him/herself. But even then – and the Darwin case is a classic example of that – some projects could not be carried out without serious financial support of third persons and/or institutions.

This touching image of a "scientist's workshop" is quickly replaced with "knowledge manufactories" which are transformed at the turn of the next century into real factories. There emerge the stubs of future research industries which cannot function without remarkable financial commitment.

Since the very beginning, that is since the times of the "scientist's workshops", knowledge production has been entrapped – generally speaking – by **national economies**. It has not been – and is still not – a surprise. For many decades, the capitalist production has functioned in this very way (national economies) and the cross-border corporations, so frequent in today's economic landscape, were of little importance (if any).

However, the capitalist mode of production has evolved over time, although the basic objective of the system – to maximise profit – has not changed. When it became clear that this goal cannot be achieved within national limitations – they were rejected. The national corporate forms HAD TO be replaced by cross-border forms (super-corporations). This is the vision of the present, but mainly the future, of the economy and research industries.

And by the way: the development of the capitalist system has led us to where it has been easily noticed that knowledge production is a profitable business. Since then, both the capitalist economy and the knowledge production process are subject to different rules – different from the times when knowledge was created in "scientist's workshops", "knowledge manufactories" or the first "factory (industrial) forms". This is undoubtedly a new quality in the historical process. Indeed, an important factor in this new situation is that **scientific knowledge is produced as a commodity – for profit**. In other words, production of a certain type of knowledge is interesting for a corporation (a national or a cross-border one) **as long as it serves the purpose of generating (maximizing) profit from the invested capital** – such are the principles of Karl Marx's "old" theory of economy.

Presently, it is difficult to indicate an area of science, which would achieve spectacular results without gigantic money. There are disciplines in which the minimum investment (just sustaining the life of a discipline) must exceed the GNP of most countries in the world. This has influenced and will influence the "geographical deployment" of research industries. Because, on the one hand, we have the state – a great (and in the past even the greatest) source of funds for research, on the other hand, we have corporations – increasingly serious sources of funds, and maybe the only ones in the future. **All of them** – providers of astronomical research funding – **are usually connected with a certain continent, country, area and/or field of economy**. Therefore, it is easy to justify the conclusion that the highest quality research, which – let us repeat – requires enormous funding, will most likely be carried out in places (geographical location) and in such a way (the most widely understood management) as agreed and accepted by the owners of the funds spent on it. It is obvious that also the profits from this activity will stay where the corporations want them to.

We have made a circle and we can now reach for the conclusions we have made so far. The global capitalist system, in the course of its own development, transforms its production mechanism so that a relatively small community of people (on a global scale) monopolises the manufacturing of a **product** fundamental for the satisfaction of nearly ALL historically developed needs of a human being. The product is **contemporary scientific knowledge**. It is worth considering whether this approach to "research industries" – the way we look from the angle of Marx's "old" theory of economy and its

conceptual apparatus – does not contribute to a better – and more meaningful – understanding of the so-called **Information Society**.

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ONLINE OPEN SOURCE ENCYCLOPEDIAS: REFLECTIONS ON TRUST, EXPERTISE AND TESTIMONY

Paul B. de Laat

Abstract

The ideas behind open source software are currently being applied to the production of online encyclopaedias. In this article a sample of 6 such projects is identified that rely on an open call for contributions that become publicly accessible (for free): h2g2, Wikipedia, Scholarpedia, Encyclopedia of Earth, Citizendium and Knol. How do these projects approach the problem of trusting their participants? Editorial policies in use for processing incoming content are analyzed and shown to display a whole range from full trust to guarded trust. Subsequently, their conceptions of the proper role for expertise are explored and found to range from full acknowledgement to full disregard. In addition, the distinction between editing expertise and subject expertise comes to the fore. These conceptions about expertise are shown to explain editing policies to a great extent. Finally, the problematic of trust is linked up with theories about the acceptance of testimony. Several non-reductionist cognitive practices are argued to be operative in the encyclopaedias sampled.

1. Introduction

We are all familiar with general encyclopaedias from our youth. Whether it was the Britannica, the Brockhaus, or the Larousse that were in our parents' bookcase, they guided our first steps towards acquiring knowledge. This field of learned encyclopaedias was lucrative and stable. Invited specialists wrote balanced entries based on intimate knowledge of their field of expertise, which were bundled in a book, CD, or DVD, and sold for considerable profits. With the advent of the Internet contents also came to be sold as Internet-based subscriptions. However, the Internet hardly allowed the continuation of business as usual - it overturned the field altogether. Most disruptive were efforts towards creating non-commercial online encyclopaedias written by volunteers. Directly inspired by the example of open source software (OSS), people are invited to contribute online whatever knowledge they may possess. In this fashion, a collectively evolving encyclopaedia ensues, available to all. Wikipedia is of course the most conspicuous example of all, establishing on its own the norm for the potential of online collaborative Web 2.0 encyclopaedias.

This field of online 'open source' encyclopaedias is central to this article. These projects seemingly put a lot of trust in their contributors; their trustworthiness as both capable and loyal encyclopaedists seems to be taken for granted. Comments and even whole entries are solicited on the basis of trust as default mode. This is of course an approach full of risk. How can one be sure that (often) unknown contributors do not foul up entries with incorrect details or invented facts ('vandalism')? How to trust details of expertise as divulged by anonymous 'experts' in cyberspace? My attention will focus upon the rules, roles and regulations that such encyclopaedic projects introduce in order to curb the dangers of opportunism and vandalism. So called 'editorial policies' usually delineate roles and procedures for handling incoming content, from the stage of inception to the stage of acceptance.

Let me briefly repeat an argument put forth by Tollefsen (2009) about whether we, the public, can trust Wikipedian entries. She argues that apart from testing the assertions involved against our own background knowledge this question mainly revolves around having trust in Wikipedia as an institution. Does Wikipedia do enough to guarantee the trustworthiness of their contributors? The question whether we can trust Wikipedia can largely be reduced to the question whether Wikipedia can trust its users. It is that question which is central to this research. And the argument can of course be taken to apply to all other encyclopaedic online undertakings.

A further focus of my inquiry is the role of expertise: to what extent do encyclopaedic projects involved acknowledge expertise as being relevant for their efforts? To what extent these conceptions lead to special responsibilities and privileges for reputed experts in the encyclopaedic production

process? Obviously, the more egalitarian the approach towards contributors is, the more strain is put on the notion of and any special role for expertise.

It will be shown that online encyclopaedias of a general nature use a great variety of editing policies, exemplifying varying levels of trust: from full trust to guarded trust. In addition, and connected with this, they employ different approaches towards the notion of expertise: from full acknowledgement to full disregard. Wikipedia, in particular, is the most interesting project of all as far as trust and expertise are concerned, while within their ranks these problems are discussed passionately, and several novel solutions put forward accordingly.

In the final section the analysis of trust is linked up with the epistemological field of testimony. Non-reductionist epistemological stances towards the acceptability of testimony are discussed, and shown to be operative as distinct cognitive practices in the investigated online encyclopaedic efforts.

2. Open Source General Encyclopaedias

First we need to generate an overview of the main online general encyclopaedias of the present that rely on ‗open source' methods. For the purpose of this discussion ‗open source' will be referring to entry creation that relies on (1) an open invitation (2) to contribute comments and/or original content (3) which become publicly accessible. Contributors are collaborating mostly – but not necessarily always - by means of wiki software, to create encyclopaedic entries together. Several aspects of the collaboration are deliberately left unspecified – and need to be investigated more closely: To whom exactly the open invitation is forwarded, and on what terms the product is made publicly available? Notice that for OSS, the inspirational model for all open source like developments of the present, these two parameters have quite specific values: an open invitation to all without entry restrictions, and accessibility on terms of ‗open source licenses' (mainly the GPL and BSD-like licenses).

Online investigations on my part yielded a considerable list of such ‗open source' general encyclopaedias (list obtainable from the author upon request). Wikipedia, although the largest, is by no means the only one. From the whole list six were selected for further investigation: Citizendium, Encyclopedia of Earth, h2g2, Knol, Scholarpedia and Wikipedia (in alphabetic order). The rest of them were discarded. Why this selection?

The focus chosen is on general purpose encyclopaedias that satisfy the following criteria:

(1) They deal predominantly with text, not images. This choice is motivated by the fact that within an open source context textual collaboration appears more challenging than image collaboration. By this criterion, e.g., the Encyclopedia of Life (mainly soliciting photo's and videos of living organisms) was eliminated;

(2) They employ English language. This criterion is mainly a practical matter: let others more versed in a particular language carry out a more thorough investigation. On applying this criterion enough same-language-encyclopaedias (namely English) remain to allow proper analysis. On this count, e.g., Chinese (Baidu Baike), Spanish (Enciclopedia Libre) and Turkish (Private Sözlük) encyclopaedias were discarded. For the same reason, all non-English language versions of Wikipedia were left out of consideration (see also under 5 below);

(3) They are encyclopaedic to a considerable extent; that is, online projects that are a mash up of styles are excluded. On this count, Everything2 (allowing entries on any topic) and WikiPilipinas (being a directory, almanac and community portal alongside) were eliminated;

(4) They intend to produce balanced, objective, neutral-point-of-view entries. On this criterion, several ‗partisan' ideological projects were excluded: Conservapedia (a Wikipedia-clone departing from right-wing Christian beliefs and supporting creationism, which mainly appears to be on crusade against Wikipedia), Metapedia (supporting pro-European, nationalist struggles for recognition) and SourceWatch (an effort to expose propaganda from vested interests that influence public opinion). Also the above mentioned Everything2, by the way, does not qualify in this respect while encouraging original entries without neutrality requirement;

(5) If projects are Wikipedia clones in their workings, they are not considered for analysis. This criterion is simply inspired by the fact that no new results as regards rules & regulations are to be expected – almost by definition. The original Wikipedia offers enough material for analysis. On this count, other language versions of Wikipedia were disposed of (in addition to criterion 2), as well as neutral-point-of-view projects like Kathpedia (for Catholics who can read German) and Orthodoxwiki

(for orthodox Christians). Notice though that in the long run clones may develop distinct policies of their own; cf. the analysis of the German Wikipedia that I refer to below;

(6) Finally, they should preferably be alive, not dead. On this count, the projects Open Site, Project Galactic Guide and Veropedia were eliminated.

	H2g2	*Wikipedia (English)*	*Scholarpedia*	*Encyclopedia of Earth (EoE)*	*Citizendium*	*Knol*
Year of foundation	2001	2001	2006	2006	2007	2008
Site	www.bbc.co.uk/dna/h2g2	En.wikipedia.org	www.scholarpedia.org	www.eoearth.org	www.citizendium.org	Knol.google.com
Focus	General	General	Natural sciences	The earth, its natural environment and society	General	General
Point of view	Neutral	Neutral	Neutral	Neutral	Neutral	Multiple points of view
Signing of articles	Signed	Unsigned	Signed	Signed	Unsigned	Signed
License terms (based on copyright)	All rights reserved by author	By-sa license	All rights reserved, CC-license, or GFDL	By-sa	By-sa	All rights reserved or CC-license (by license as default)
Use of wiki software	No	Yes	Yes	Yes	Yes	Yes
Number of articles	220,000 (unedited) 9,900 (edited)	3,100,000 (total) 8,000 (‚good articles‘) 2,700 (‚featured articles‘) 1,600 (‚featured lists‘)	1,600 (‚reserved‘) 580 (‚accepted‘)	Over 3,500	13,000 (‚live‘) 990 ‚developed‘ 120 (‚approved‘)	Over 100,000
Number of* reviewed *articles: order of magnitude*	10^4	10^6	10^3	10^3	10^3	10^5

*My estimation, based on the row immediately above. CC: creative commons GFDL: GNU Free Documentation License Sources: the encyclopedias‘ websites.

Table 1: Sample of six online general encyclopaedias that employ open source methods: core data (in chronological order of foundation)

3. Six Open Source Encyclopaedias in Comparison

After this exposition about which online ‗open source' encyclopaedias are to be included in the comparative analysis, I now turn to providing some core data about each of the six projects, rendered in chronological order of their foundation (Table 1). The British h2g2 and the American Wikipedia are the founders of the genre, so to speak. Partly inspired or angered by Wikipedia in particular, the other four (Scholarpedia, Encyclopedia of Earth, Citizendium and Knol) followed suit. As regards point of view, most strive for balanced and objective covering, with Knol allowing multiple viewpoints alongside each other for the same topic. Most of the encyclopaedias demand or at least allow creative commons licensing terms, with h2g2 being the clear exception to this rule: authors simply retain all copyrights. Signing one's articles is the rule, apart from Wikipedia and Citizendium. How many entries have been produced until today is difficult to ascertain, while all projects present their own indicators. Nevertheless, Wikipedia clearly emerges as the largest of all, followed by Knol and h2g2. In comparison, Encyclopedia of Earth, Scholarpedia and Citizendium are much smaller.

To what extent does the label ‗open source' apply to this sample? Which content is being ‗open sourced', and which conditions apply? As can be seen from Table 2, open source represents by no means the blanket invitation to everybody to come forward with articles and comments like the stereotype of open source would have it. While Wikipedia comes closest to this image, the other projects take recourse to ever more stringent restrictions. For one thing, the open call may be confined to commenting only (Scholarpedia), or restrict access to experts only (Encyclopedia of Earth). For another, often real names are demanded, in an effort to curb irresponsible behaviours that anonymity might engender.

Encyclopaedic project	*Open call for*	*Issued towards*	*On the following conditions for registration*
Wikipedia	Comments (‗edits')	Anyone	None
	Entries	Anyone	Registration as ‗editor' (username, email)
H2g2	Comments and entries	Anyone	Registration as ‗researcher' (username, email, birth date)
Knol	Comments	Anyone	*Registration* *(username, email)*
	Entries	Anyone	Registration (*real* name, email)
Citizendium	Comments and entries	Anyone	Registration as ‗author' (*real* name, email, bio)
Scholarpedia*	Comments	Anyone	Registration (username, email)
EoE	Comments and entries	Experts in the field**	Registration (*real* name, email, CV)
OSS *(reference)*	*Comments, bugs, source code*	*Anyone*	*Registration* *(username, email)*

*Entries are solicited exclusively by personal invitation of experts. **As approved by their Stewardship Committee. OSS: open source software Sources: the encyclopedias' websites

Table 2: Parameters of the open invitation for content for open source encyclopaedias in the sample (in order of increasing restrictions)

Issuing a call for content is one thing –handling and incorporating incoming content is another. How do the 6 encyclopaedic projects involved handle this issue? What kinds of editing policies can be distinguished? To what extent moderation and review of such comments takes place and by whom? These policies will be discussed in detail for each project, while it is here that the issue of granting trust to total strangers manifests itself to the full. The encyclopaedias that employ wikis (all except h2g2) will be discussed first, to be followed by the non-wiki h2g2.

Wikipedia (at least the English language version) employs the most relaxed and simple kind of editorial policy: all users (‗editors') have the same rights of commenting, adding, and changing content that can be found on its server. In the wiki, editing results are instantaneously visible (‗you-see-what-you-edit'). Users involved in editing a specific entry basically have to sort it out between themselves (apart from several rules to remain polite and abstain from ‗edit wars'); no moderation of the process by anyone is provided for. In addition, Wikipedia has instituted procedures for designating entries as ‗good article' or – even better – ‗featured article'. Any registered user is allowed to review such candidates according to certain criteria (like reliable sources and neutral point of view), and decide accordingly (the nomination succeeds, is put on hold, or fails). In addition, anyone may nominate an article for such statuses. So essentially this is a self-steering process of peer review – peers being anyone who cares to invest time in the process. Note that whichever the status of an article (normal, good or featured), it remains accessible and changeable in the very same open-access wiki.

Citizendium basically employs the same review procedure. Once registered (as ‗author'), anyone may participate in commenting and changing existing entries which are available as open-access wiki. Also here, editing is instantaneous. In contrast to Wikipedia however, due to Citizendium's worries about possible lack of consensus between ‗authors' contributing to an entry the process is moderated (by a so-called ‗editor', appointed by the editor-in-chief). This moderator has to exercise ‗gentle oversight' of the wiki, guiding articles to keep their proper course. Occasionally, he/she may have to intervene and take a stance in edit wars. After a while, if entries have become mature enough, he/she may decide to label an entry as ‗approved' (the analogue of the good/featured status in Wikipedia). From that moment onwards, the public version of the entry is the (unchangeable) approved version. Notwithstanding, the entry continues to evolve, as draft version, in the same open-access wiki as before.

In keeping with its name, Scholarpedia prefers a more scholarly approach. After reputable experts have delivered their entries, specifically commissioned from them, these are subjected to anonymous peer review in a wiki that is only accessible to personally invited experts. Review in this closed-access wiki goes on until consensus between author and reviewers can be reached; no moderation is provided. Upon consensus, the article acquires the status of ‗accepted' and moves to a wiki that is openly accessible to all registered users. So only from that moment onwards, the article is publicly visible. This time, the wiki *is* moderated: a so-called ‗curator' steers the wiki process, and is in charge of approving edits proposed by users. Typically, the original author assumes curatorship.

The Google-initiated Knol provides authors with a whole menu of reviewing procedures to choose from. They have a 3-fold choice. First, they may choose a completely open-access Wiki without moderation (à la Wikipedia) (denominated as ‗open collaboration'). Registered users instantaneously see-what-they-edit. The second option is the same kind of wiki, but moderated this time by the author him/herself who has to approve incoming edits (denominated as ‗moderated collaboration'). While at first not publicly visible, edits once accepted become publicly visible in the knol involved. Finally, Knol authors may choose a closed-access wiki to which only personally invited co-authors have access (denominated as ‗closed collaboration'). Editing results appear instantaneously in the public version (which can only be seen by the public, not edited). Statistics are lacking about the choices that Knol authors make in this respect. But a quick informal scan on my part suggests that the moderated wiki is by far the most popular option (75 to 80%), the open wiki by far the least popular one (5%) - with closed cooperation in between (15 to 20%). A possible explanation for the low popularity of the open wiki might be that signing an entry while simultaneously allowing wiki-collaboration on it do not seem to comfortably go together.

The last encyclopaedia in my sample to use wiki software is the Encyclopedia of Earth. Wiki spaces are reserved however to registered experts whose credentials have been approved. These are invited to come forward and participate as ‗leading author' (starting an entry) or ‗contributing author' (editing

entries). Collaboration is moderated: an appointed „topic editor" is supposed to "settle content-level disputes" and to "delete mediocre work" if necessary (http://www.eoearth.org/eoe/faq). Moreover, once this topic editor judges the entry to have sufficient quality, it appears in a public (non-wiki) version. All the while, the underlying restricted-access wiki continues to operate in order to revise and update entries, yielding ever new public versions.

The remaining encyclopaedic project is the British h2g2. Possibly while wiki software had not yet been invented in the early days of its existence, its review process relies – and continues to rely - on simple commenting upon articles. Authors deliver signed and copyrighted articles to h2g2. Without questions asked, these appear as entries in the „unedited guide". The more ambitious may ask for a peer review procedure - only recommended for articles considered to be in „finished form": the entry is put up for public commenting by other „researchers". After at least a week of reviewing and revisions, but often much longer, the candidate entry might proceed and appear in the „edited guide". To that effect „scouts" have to recommend the entry, „sub-editors" have to edit the entry, and staff members paid by the BBC (which owns and operates h2g2) have to approve the entry. All can be considered to moderate the reviewing process (Table 3). In practice, only 5% of all entries obtain promotion to edited status. Debate about them may continue on the „conversation forum" of the site.

	Form	*Moderation by*	*Status distinctions to be obtained*
Wikipedia	Open-access wiki (continuous)		Good article Featured article
Knol	Choice between: 1. Open-access wiki (continuous)		
	2. Open-access wiki (continuous)*	Original author	
	3. Invited-access wiki (for author and invited co-authors only; continuous)		
H2g2	Open-access space for comments, no wiki (continuous)	„Scouts", „sub-editors", h2g2-staff	Edited entry
Citizendium	Open-access wiki (continuous)	„Editor"	Approved article
Scholarpedia	Invited-access wiki (for invited author and invited reviewers only; temporary)		Accepted article
	Upon acceptance of article: Open-access wiki (continuous)	„Curator" (= original author)	
EoE	Restricted-access wiki (for experts only) (continuous)	„Topic editor"	Public version
OSS *(reference)*	*Open-access project space (with tools like version control system, tracking tool, wiki) (continuous)*	*„Project owner'*	

*Main mode used. Sources: the encyclopedias' websites.

Table 3: Review procedures for open source encyclopaedias in the sample (in order of decreasing access and increasing moderation)

4. Comparison with OSS

We have found that online open source encyclopaedias employ a considerable range of editorial policies. By no means they all employ the same policy as the most renowned of all, Wikipedia. That project set the benchmark for blanket trust by behaving in a most trusting way towards its users: anyone may provide comments on a talk page, perform instantly visible edits in a wiki, and (upon

registration) write new entries from scratch. The other encyclopaedias that evolved introduced ever more rules and regulations. As a result, the need for granting trust is partly substituted for; less trustworthiness on the part of users has to be assumed. For one thing, registration (plus disclosure of real name and/or biography) can be required, only comments be solicited, or only approved experts be allowed in (Table 2). For another, the editing process may come under supervision of a moderator, and the wiki form omitted (Table 3). So both access restrictions and role restrictions are employed. Full trust makes way for guarded trust. In effect, a whole range of governance structures has been developing for online encyclopaedias, bridging the gap between open source Wikipedia on the one hand, and ‗classical' encyclopaedias with an online presence on the other that do not rely on any form of open sourcing at all. Examples of the latter category are the Stanford Encyclopedia of Philosophy, relying exclusively on invited volunteers, and the Britannica, relying on paid assignments.

Before proceeding to a discussion of the role of expertise, I will pinpoint the main distinctions so far by comparing the open source encyclopaedias in the sample with OSS as the reference process of open source. OSS has aptly been characterised as ‗peer production' of knowledge that is ‗commons-based' (Benkler, 2006). For purposes of this discussion, I will add the characteristic ‗moderated' to the peer production process – OSS projects invariably have leaders, either those that started the project or their successor(s). These retain the final say as regards who obtains access to the code tree and which code is incorporated into it. Using the three parameters of peer production, moderation and creation of a commons, and combining elements from Tables 1-3, our sampled encyclopaedias and OSS can be characterised as in Table 4. Ordering is intended to represent decreasing degrees of freedom for participating peers.

Wikipedia	**Unmoderated peer production in a commons**
Citizendium	Moderated peer production in a commons
H2g2	Moderated peer production (not in a commons)
OSS	Author-moderated peer production in a commons
Knol	Author-moderated peer production in a (voluntary) commons*
Scholarpedia	Moderated peer commenting in a (voluntary) commons
EoE	Moderated peer production among experts in a commons

*Main mode used. Sources: based on data from Tables 1-3.

Table 4: Essential characteristics of the mode of production employed by open source encyclopaedias (sampled) and OSS (reference) (in order of decreasing degrees of freedom)

From the table the remarkable position of Wikipedia emerges clearly: it represents by far the most radical approach towards users. Just anybody is allowed to operate in their wiki spaces on the basis of a prima facie assumption of trustworthiness; no review or moderation is deemed necessary. Moreover, commons' licensing is obligatory. In this respect, Wikipedia can be said to be even more radical than OSS that set the trend. Egalitarian assumptions are carried to their logical conclusions.

5. Role of Expertise

It will be argued that these vast differences in governance are intimately connected with the problematic of expertise. While we are dealing with knowledge producing efforts here, the urgent question imposes itself whether and to what extent expertise – of any kind – should play a special role in producing entries. If the answer is in the affirmative, the question has to be answered how these special considerations should materialise into special procedures and regulations. Note that we are not talking here about carrying out (original) research, whether in the natural or the social sciences. We are talking about encyclopaedic efforts that focus on a balanced rendering of the state of the art on a wide array of topics. While the role of expertise in original research seems ineluctable and almost a tautology, its role in encyclopaedic projects seems more open to debate. Prima facie it is not clear at all whether experts are always in the best position to make a state of the art report of the subject matter in their own field of expertise. They may have a particular bias, they may be involved in fierce debates between experts in the field, and so on. One might argue that knowledgeable outsiders are in a better position to produce a balanced view of contested terrain than the protagonists themselves. This of

course shifts the discussion towards defining the term ‗knowledgeable' – opening up the discussion again.

No matter how this question is to be answered properly, the architects of the sampled encyclopaedias themselves do have their opinions about the matter. Also, within Wikipedia and Citizendium in particular, regularly discussions take place about the issues. In the end, these opinions can be shown to have a bearing upon governance structures chosen: much of the characteristics discussed above can be traced back to considerations of expertise.

Let me to this end analyse the encyclopaedic projects in turn. From the beginning Wikipedia has taken a firm stance on the matter: it does not count who you are but what you contribute to the project. Expertise does not entitle to any special privileges or responsibilities. Even the procedures for acquiring the status of ‗good' or ‗featured' article do not grant any privileges to experts of a kind. As it is stated explicitly: "In a content dispute between a scientist and a non-scientist, the two are on an equal footing" (WP:Expert_editors/New_draft). If anything, rather than being privileged, experts are more likely to be discriminated against: they "are regarded with considerable scepticism and suspicion by many editors" (Ibidem).

This is not to say that experts and amateurs are not distinguished from each other. After all, one of Wikipedia's three pillars is ‗verifiability': an article should include reliable sources for assertions that might be challenged (WP:V). Explicitly, ‗academic and peer-reviewed publications' are recommended as being the most reliable sources of all (WP:SOURCES). But Wikipedia places its bets on the amateurs, hoping to mobilise them in their massive numbers to compose entries; the few experts on the topic in question, hopefully, come along later to correct any mistakes that remain. This premise is phrased as follows:

> While not everyone can be an expert in all fields, just about anyone can read and reliably report on the work of others. When a Wikipedia article is written to the highest standards, it extensively cites the work of experts. You don't need to be an expert to read and cite the work of experts; though experts in their fields have greater access to published works, in theory anyone could cite these published works, whether a certified "expert" or not (WP:RCO).

This translates into equal access and rights for all, regardless of expertise. Moreover, no powers of moderation are granted to anyone concerning conflicts over content.

In the Google-initiated Knol experts have no special roles or privileges either. Regulations and procedures in force make no special mention of experts. Governance, as in Wikipedia, is expert-neutral so to speak. But I would argue that, unlike in Wikipedia, the matter of expertise is not addressed directly but rather eschewed by means of their basic set-up. For one thing, authors are allowed to present their personal point of view of a topic, alongside other possibly competing points of view. In such a beehive opinions are not forcibly brought into contact. The clash of opinions is evaded. For another, in the main mode used, the author chooses to exercise moderation powers by him/herself alone. This may be comfortable for the author, but gives him/her the lead in any dispute over content with experts showing up in his/her wiki. The author's own expertise – if any - is thereby given priority from the outset.

In the British encyclopaedic variety, h2g2, experts or expertise do not enjoy any privileges either. Nevertheless, upon closer inspection of their moderation procedure it can be detected that expertise is honoured slightly more than in the above two cases. Their peer review process of entries, only entered upon by the 5% of authoring ‗researchers' who are ambitious enough, is carried out by three layers: scouts, sub-editors (both volunteers) and h2g2 staff (employees). Most of their supervision seems concerned with editing proper (like articles in a newspaper or journal usually are edited). Style, language, consistency, spelling and the like are commented upon and brought in line with the preferred house style.

In addition, however, we see glimpses of the importance of another kind of expertise: intimate knowledge about a specific field of study. This is evident from the sub-editors' home page (http://www.bbc.co.uk/dna/h2g2/A1035145). These are primarily designated as ‗all-round generalists and trivia addicts'. But at the same time sub-editors have each indicated their specialisms - the topics on which they consider themselves to be an expert. Overlap in specialisms between ‗subs' is not considered a problem. Although primarily serving as a guide for aspiring authors in order to know whom to address for help, we see the first signs of the need for expertise proper creeping in.

In the remaining three encyclopaedias the emphasis on subject expertise becomes ever more pronounced. In the process, editing expertise recedes to the background. From the start Citizendium has been conceived as the better Wikipedia, while corrected on two counts: providing real names and a proper role for experts. As to the latter, subject experts are considered to be needed as arbiters in content-level disputes between contributing participants. The weak point in Wikipedia, ever continuing edits wars between parties, has to be overcome (Sanger, 2009). No wonder that the moderators involved (called ‗editors' here) have to satisfy expert criteria: academic degrees, peer-reviewed publications, years of professional experience and professional certification are required to varying degrees, as the case may be (CZ:Editor_Policy). In contrast to h2g2, these are not appointed as ‗generalists' – only as specialists in specific fields. Notice moreover that editing proper is preferably settled on an equal basis between contributors to an entry, not moderated by the ‗editor' involved (CZ:The_Editor_Role).

In Scholarpedia experts not only moderate articles but play a decisive role in their inception as well. As described above, articles are solicited not by open call, but by personal invitation of reputed experts. Thereupon entries are peer reviewed in a closed-access wiki, only open to invited experts (which remain anonymous). Upon acceptance the article is published and continues open for editing in an open-access wiki – but moderated by a curator, typically the author him/herself. This editorial policy, of course, represents the opposite of an egalitarian approach: all along the process, expert participants are ‗more equal' than other participants.

Encyclopedia of Earth, finally, is also steeply marked by dominant involvement of experts. In their editorial set-up the notion of expertise is carried to its logical conclusion: only experts are involved, from beginning to end of the production process. In their own words: "The *EoE* is based on the premise that input from scholars is essential to produce trustworthy information about the environment" (http://www.eoearth.org/eoe/faq). A closed-access wiki, only accessible to experts, is the space for submitting and editing entries. Topic editors moderate the process by settling disputes over content and promoting entries to the status of public visibility. The requirements for becoming a topic editor are, of course, being a highly ‗recognised expert' in one's field (http://www.eoearth.org/eoe/contribute).

As can be seen, considerations about the nature of expertise explain to a great extent the variety in editorial policies, in governance structure of the various encyclopaedias sampled. In particular such considerations become evident in the erection of barriers to accessing the wiki spaces for creation of entries (restriction of access, or by invitation only) and in the creation of separate roles of moderation. It is important to distinguish between two kinds of expertise: *editing* expertise, relating to ‗journalistic' capabilities of editing entries in terms of style, format and the like; and *subject* expertise, relating to intimate knowledge of a field of study. In our six encyclopaedias both kinds of expertise gradually become emphasised as requirements to fulfilling *specific* roles in a project. In h2g2 we observe ‗sub-editors', mainly supposed to be knowledgeable about matters of style; in Citizendium, Scholarpedia and Encyclopedia of Earth we observe moderators being appointed on the basis of subject expertise (roles of, respectively, ‗editor', ‗author/curator', and ‗topic editor').

6. Inside Wikipedia

Inside Wikipedia the policy of full trust towards users of late has been the subject of fierce debate. This mainly has to do with the perception that so-called ‗vandalism' towards entries is increasing: small details are changed, nonsense inserted, obscenities or crude jokes added, or whole pages blanked. The trustworthiness of the encyclopaedia as a whole is being compromised. In order to come to terms with these threats software tools are automatically scanning and patrolling Wikipedia contents 24 hours a day – but that is not considered enough. Therefore a series of procedural proposals is under discussion for checking incoming content. Some proposals assign such powers to experienced Wikipedia users, other proposals flirt with the idea of assigning them to subject experts proper. Let me discuss them in turn.

The main approach is the call for *review*: all changes to an entry should be reviewed first (upon vandalism) before being inserted in the public version of the entry. Many varieties of this basic idea circulate. Is review only to be applied to sensitive entries like the ‗biographies of living persons' or to all entries? Are only anonymous users to be reviewed, or all users? Is reviewing itself entrusted to a

select group of users, or to all equally? In the English language Wikipedia such proposals have met with fierce opposition, while they would undermine the very egalitarian basis of the encyclopaedia. French Wikipedians even voted the scheme down (80% against; October 2009). For the English version, though, it has ultimately been decided to introduce such review for the biographies of living persons to begin with. It would serve as an alternative measure for the usual practice of ‗protecting' the entries in question (i.e., freezing the text for some period of time). As yet this decision has not been implemented. In some other language versions, though, users turned out to be in favour of the scheme. As a result, it has actually been introduced in the German, Arabic, Russian, Hungarian, Polish, and classical Chinese versions (gradually from May 2008 onwards).

In order to get a grasp of what such a review system amounts to I will briefly discuss the German case (German WP:GSV). All entries whichever the topic fall under the system, and all incoming edits of them are reviewed for vandalism first (but see exemption below). Review is carried out by *‚Sichter'* (literally: sifters, sighters) who have to flag revisions as a signal of their approval. For the public in general (unregistered users) the version of an entry on the screen is the latest sighted (‗flagged') version (although by clicking the most recent version is available). This is intended to dissuade vandalism while the immediate gratification of seeing one's disruptive edits show up on the screen is prevented. For registered users the most recent version is set as the default version (as is current practice for the English Wikipedia).

This system is remarkable while it introduces inequalities between users that were non-existent before. Some users become ‗more equal' than others while they acquire rights of review. A moderation process is set in motion of surveying contributions. What kind of capabilities is required, and by what criteria ‗moderators' are appointed? It revolves around capabilities to detect vandalism, to distinguish prima facie unhelpful and disruptive edits from other edits. To my view, this represents expertise that is related both to the subject(s) involved and to editing proper, showing aspects of both. At the same time, it can be characterised as low-level expertise, only pertaining to identifying the most obvious deviations from the bottom line (in terms of both style and content). On the face of it, this resembles the moderating ‗sub-editors' of h2g2.

How may Wikipedians qualify for this task (German WP:GSV)? Any registered user who has been active for 60 days and performed at least 200 edits may apply to become a *Sichter* (‗aktive Sichterrechte'); notice that by the same criteria users become entitled to vote within Wikipedia. For registered users to become exempt from being reviewed themselves and be allowed as it were to approve their own edits (‗passive Sichterrechte'; in Wikipedian English denoted as ‗autoreview' or ‗autopatrol') less experience suffices: 30 days of activity and at least 150 edits. So one qualifies by being an active Wikipedian contributor, in the numerical sense. Notice that in the future the German Wikipedia intends to introduce a more stringent system of review upon quality, to be carried out by *Prüfer* (also referred to as ‗über-reviewers', ‗surveyors'). These *Prüfer* will have to meet higher standards of activity and number of edits performed.

This conception of expertise to be obtained inside Wikipedia is taken to a higher level in sophisticated software developed by Luca de Alfaro et alii (Adler and De Alfaro, 2007; more reputational measures of the kind are explored in a later study: Adler et alii, 2008). They wrote a content-driven algorithm for author reputation which keeps track of the rate of change of entries due to editing. The longer entries and/or edits from an author are preserved, the more his/her reputation rises – and vice versa. Each round of editing is seen as casting a vote upon performed edits that are still in sight at that moment. They argue that this measure of author reputation is especially useful for predicting the value of fresh contributions. Moreover they explicitly propose to use the ratings for issuing an alert when low-reputation authors start editing ‗crucial or controversial' articles. This represents a clear allusion to sighted versioning for sensitive topics, to be carried out by users of higher reputation.

Obviously, this De Alfaro measure is more sophisticated than the crude measure of time inside the system and number of edits performed. The Californian team tries to catch Wikipedian performance not only in a quantitative but also in a qualitative sense. To them it is ‗quality editing' that counts, not just editing. Moreover, as argued in Adler and De Alfaro (2007), the crude measure can easily be manipulated by users splitting each contribution in multiple ones or performing gratuitous edits. This kind of manipulation becomes ever more likely when a crude measure of the kind has been officially

adopted for granting rights. Such manipulation is hardly conceivable for the quality measure of Wikipedian experience.

Let me emphasise nevertheless that these measures of expertise have two aspects in common. Both are content-driven, not driven by how users rate each other (user-driven). More importantly, one's reputation which may entitle to rights of review is earned exclusively within the encyclopaedic institution of Wikipedia. The Wales' project has developed a self-contained process of awarding qualifications to their participants. The Wikipedian virtual academy is involved, not the usual real world academic and/or professional institutions. Only reputation obtained within the system (either the crude ‗German' measure in use now or the more sophisticated De Alfaro measure) is taken into consideration; real world reputation does not count. An intriguing question that remains to be explored is the connection between real world and virtual world measures of reputation. Curiously enough, in real life reputation for expertise is actually differentiated across various disciplines, while within Wikipedia it is uniform throughout.

But discussions inside Wikipedia do not end here. Inspired jointly by worries about vandalism and about quality of entries, several proposals have been put forward for involving *real-world* experts in the process of quality control (English Wikipedia). One modest proposal (WP:EXPREV) aims to invite verified experts to review ‗factual accuracy and coverage' of specific scientific articles. Discussion however does not take place in the usual wiki but on associated mailing lists (say for mathematics) that, although accessible to all, only take posts from coordinator and experts involved. A more rigorous proposal (WP:EXR) wants to bring in verified experts and give them rights to oversee editing discussions, as well as powers of locking pages and banning users. This would apply to say biology, which as a subject is split up in a hierarchical tree of biological subentries. Accordingly, one expert at the top would appoint a hierarchy of biological experts that each would oversee their own specific entry – and no more. Yet another proposal (WP:EXR) suggests to introduce two parallel editing spaces for entries. ‗Expert editing' of the subject is only open to experts (with a PhD and several publications in reputable journals), while in parallel ‗public editing' of the same subject takes place open for all. The idea behind this set-up is that the expert edition is expected to pull the public edition in the right direction. Experts remain free to edit without having to fight cranks, while the public at large is still welcome. All such proposals, however, after lengthy discussions have been judged to be a bridge too far. They are not likely to be adopted soon – at least not in the English language version.

7. Conclusion: Testimony

In the above several lines of analysis have been pursued for the sampled open source encyclopaedias. First, the contributions that were solicited in an open call from the crowds and the terms of registration were investigated. Secondly, the review processes for incoming content were analysed in terms of access levels for types of contributors and moderation involved. Thirdly, it was shown that such variations in governance (or ‗editorial policies') bear a close relationship to conceptions entertained within the various encyclopaedias about the proper role of expertise in producing entries.

In this final section I want to draw some elements of the analysis together and focus upon the kind of trust processes that seem to be involved in governance. Invariably the issue at stake was: can potential contributors be trusted to make proper use of the wiki (or other) spaces involved and contribute in a responsible manner to the evolvement of encyclopaedic entries, without engaging in disruptive behaviour on the level of content or towards persons producing such content? Loosely speaking, in the descending order of Table 3, editorial policies were evolving from full trust in potential contributors to guarded trust. Several rules and regulations were introduced effectively reducing the need for having trust in one's contributors: access to wiki spaces was being restricted to experts, or to experts by invitation only, and several varieties of moderation of content were developing.

These policies can be elucidated, I contend, by making a comparison with an altogether different field of study: the epistemology of testimonial evidence. That field is concerned with the conditions under which assertions or testimony by speakers can justifiably be accepted as being true beliefs. How is the reliability of testimony to be justified? The main lines of argument are either reductionist, seeking for a chain of evidence ending somewhere, or non-reductionist, relying on a priori type of

justification (Adler, 2006). It is my conjecture that non-reductionist accounts in particular can be connected with the editorial policies of trust discerned above.

The most basic – and radical - a priori reasoning can be described as the *‚acceptance principle'*: under normal conditions (i.e., unless special reasons exist that forbid to do so) one is entitled to accept what a speaker asserts as true. Burge (1993) grounds this position in the prima facie rationality of both contents and their sources. Other defences for this position (like the ‚principle of charity' or the ‚cooperative principle') proceed along similar lines. It is this cognitive practice that seems to be adhered to in Wikipedia in particular. The institution invites anybody without making distinctions to contribute, effectively (though not necessarily consciously) departing from the default position that all contributions are true assertions. This does not preclude critical examination against other assertions, in particular by means of software bots, but acceptance is the epistemic starting point.

A second type of a priori entitlement is the *‚assurance view'* (Moran, 2005): when a speaker manifestly stands behind his words and assumes responsibility for them, the hearer is entitled to accept them at face value. Precisely while the speaker gives his word to the hearer, the normative relationship between them is altered. The speaker has made himself accountable, therefore the hearer may justly complain if the assertions turn out to be false. The epistemic value of the assertions is conferred on them by the speaker who offers a kind of guarantee for their truth.

This kind of cognitive practice can also be shown to be operative. I am referring here to the registration procedures for participation as described above. The demand to provide one's real name forces people to stand behind the words they contribute. While anonymity on the Internet dissolves the bond between a contributor and his words, the real name demand is supposed to restore this link. In the same vein the practice of signing one's articles heightens accountability of the author.

Such registration practices are obligatory in all encyclopaedias of our sample – Wikipedia excepted (cf. Tables 1-2). And usually the leadership involved is well aware of the mechanism. At Knol a product manager remarked: „We are deeply convinced that authorship - knowing who wrote what - helps readers trust the content" (http://news.zdnet.com/2100-9595_22-212067.html). At Citizendium the real name policy is justified as follows: „People do tend to behave themselves better when their identities are known and their behaviour is out in the open." Similarly, escaping the rules by taking on a new pseudonym is no longer possible (CZ:FAQ). And the Encyclopedia of Earth remarks about their signing-by-real-name policy that it „motivates individuals to do their very best work" and „will discourage the explicit acts of sabotage that plague other electronic resources where anonymity is the norm" (http://www.eoearth.org/eoe/faq).

The assurance view can be seen as an elegant – epistemic - manoeuvre to be able to continue extending blanket trust towards the assertions of speakers. It defers the need for inferential strategies taking over and asking for tangible evidence of the speakers' abilities. Nevertheless, this threshold from assumption to inference is crossed in the last cognitive practice that can be distinguished: the *‚expertise view'* (my denomination). The testimony of proven experts is taken as more reliable than the testimony of non-experts. The views explicated above about blanket trust (both the ‚acceptance principle' and the ‚assurance view') are only deemed to apply to experts in their respective fields of study. Effectively the message is: experts can and will be trusted upon their word - or even by default - but the assertions of non-experts will have to be checked and verified (by reduction). Such expertise view of trust can be recognised in practices that restrict wiki access to experts only and in the various procedures for moderation that invariably scrutinise non-expert testimony closely (and sometimes expert testimony as well). Practices of the kind are characteristic for Citizendium, Scholarpedia and Encyclopedia of Earth.

Latest developments within Wikipedia, however, show an intriguing bifurcation of expertise involved. The three encyclopaedias just mentioned rely on expertise in the usual sense: proven track record in a specific field of study. Within the virtual academy of Wikipedia, however, we observe another qualification procedure: by being active within the encyclopaedic project, by commenting and editing, and – even better - by ‚quality editing', one acquires a reputation as reliable and able Wikipedian. Wikipedia produces home-grown experts of their own flavour. And, as a last step, it is to such ‚experts' that moderation tasks (of review and, in the near future, of super-review) are entrusted - at least in the German Wikipedia. The ‚expertise view' thereby acquires a novel meaning.

In closing let it be remarked that the open source movement, from its inception, has always clung to the expertise view of testimony – expertise of the old-fashioned kind. Originators of a project put

themselves at the helm as owners and decide on strict meritocratic criteria about the extent of hacker participation.

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–AM I BOTHERED?": STUDENT ATTITUDES TO SOME ETHICAL IMPLICATIONS OF THE USE OF VIRTUAL LEARNING ENVIRONMENTS

Mike Leigh

Abstract

This paper reports a study which investigated the levels to which students are ethically aware of the issues surrounding the use of technology to support their learning. It identifies a selection of ethical issues pertinent to learning activities in VLEs and elicited whether or not the participant students were concerned about them – –Am I bothered?". Focus groups and structured interviews were used to explore the ethical perspectives of the students and these are then discussed in order to identify strategies to ensure sound ethical underpinning of online learning.

1. Introduction

The use of Virtual Learning Environments (VLEs) to enhance the student higher education experience has continued to grow during the last decade. There has also been a corresponding growth in publications and conferences pertaining to their usage. The main focus of this work has been towards technological and pedagogical concerns, with ethical issues being addressed to a much smaller extent. A range of ethical aspects significant to VLEs have, however, been identified and discussed (McRobb and Stahl, 2007; Brey, 2004; Pearson and Koppi, 2006). Research specifically addressing students' attitudes towards the use of VLEs exists but is less common (Stahl, 2002).

This study, firstly, identified a range of ethical issues that are of relevance to students' day-to-day usage of VLEs in their studies. Secondly, it investigated the levels of awareness and the attitudes of students to the ethical dimensions of their VLE usage. This is distinct from much of the previous work that has been undertaken which address the ethical issues of VLEs from an institutional perspective, for example, Jefferies et al, (2007); Jones and Conole (2006), or those that include VLE usage as part of a broader study (Grodzinsky, et al, 2008; Prior, 2004; and Leigh and Prior, 2008).

2. Research Approach

A literature survey was undertaken which, together with the questionnaire results of a previous investigation into VLE usage (Leigh, 2006), was used to ascertain a range of ethical concerns pertaining to Higher Education and the use of VLEs. The primary data collection method for this study was the unstructured interview. Rather than undertake a series of individual interviews, group interviews were held as it was felt that these would allow the flexibility to more fully explore the participants' opinions and perspectives on the various issues under investigation and to benefit from the interaction and synergy within the groups (Cohen et al, 2000). The chosen group sise for these sessions was four students as it was felt that this would be big enough to allow a cross-fertilization of ideas but still be of a manageable sise. There were two group sessions with a focus group approach (Bryman, 2008) being employed in order to explore the students' awareness of the ethical issues identified and their attitude towards them. Purposive sampling was used and students were chosen who had good experience of undertaking a wide range of learning activities within the virtual learning environment. It was identified that the most suitable student participants would be students in the second year of their studies. The reason being that they had been exposed to a wider range of online learning activities than first year students and were more available and willing to participate in the project than were final year students who were very much focused on their studies. This decision was taken in view of the fact that the differences in the experience of VLE usage between second year and final year students is of less significance than that between first and second year students. Participants of these groups were chosen whose profile represented a cross-section of the divergent backgrounds of the university students including gender, age, ethnicity and particular learning requirements.

Additionally, in each of the two groups a student was chosen to participate based on their divergent learning requirements. In both cases the student was dyslexic and was included to try and ascertain any specific problems arising from this. Divergent learning requirements were also further explored by conducting an individual interview with a student who has a severe visual impairment in order to obtain the perspective of an unsighted student.

Further to these sessions a limited amount of data could be obtained by the direct observation of student work within the VLE. For example, in the use of wikis for small-group activities it was suggested that the students within each group might want to develop a set of ground rules for the use of the wiki by the group members. This was not mandatory and, therefore, it is possible to observe directly how many groups did this and also to determine the nature of the rules that they have set. A further example is that as part of the normal monitoring of student work on a module it is possible to observe any unethical behaviour that might occur within discussion groups and to feed this into the research as well as to deal with this behaviour within the group. Finally, the University‘s intranet was accessed in order to identify the official regulations for the use of its IT facilities, e-learning guidelines and the code of practice for Internet usage that have been provided for staff and students.

As outlined in the introduction, the literature review identified a varied range of ethical issues pertaining to the use of VLEs in Higher Education Institutes; however, this study focussed upon those ethical concerns of most direct relevance to the students learning experiences within the VLE. These ethical concerns were focussed upon the areas of access to the VLE and to the learning activities within them; students‘ expectations of behaviour when participating in such activities; the impact of VLEs on student learning styles; and privacy issues associated with their use of the VLE. Issues of privacy and surveillance have been previously explored by Leigh and Prior (2008); however, they were revisited in this study as a triangulation exercise in order to test the validity of their findings.

3. Findings

3.1 Access and VLE Learning Styles

The students in the group interviews were asked to comment upon their experience in accessing module learning materials and learning exercises within the VLE. In particular, they were asked to consider any technical difficulties they might face in using the system itself, and also any issues around the way activities and materials are presented to them. It was clear from ensuing discussions that these students have been able to access the VLE from within the University and at home whenever they wished to, apart from a very small number of occasions during system maintenance. All members of both groups had broadband access to the Internet from their Hall of Residence room or from home. However, it was revealed that there are some students who do not have this facility, and in order to participate in interactive activities they need to attend the University. The students did not see this as a major problem in terms of completing their work and saw it as a minor annoyance rather than it being an ethical issue of inequitable access. They deemed the access provided by the University to be ample. They did, however, raise the issue of paper copies versus electronic copies of learning materials, stating that they thought it unfair that some lecturers did not provide a handout at the lecture but expected the students to print one in advance. Nonetheless, this was not considered to be unethical as a printing allowance is provided by the University.

An interesting theme that developed during the group discussions was that of the VLE‘s role in imposition of learning styles for students. It was felt that to some extent they were being channelled into achieving the learning outcomes in a prescribed way. For example, in one of the focus groups one student stated that, although they recognise the value of using wikis and blogs as learning vehicles, the awarding of marks for their use restricts the student choice of learning approaches. Another student agreed with this and stated that they only participated in wikis and blogs when marks were at stake. Further discussion lead to the agreement that it is the achievement of learning outcomes that should be tested not the mechanism by which this was achieved. Nonetheless, there was general agreement that wikis and blogs are very useful learning tools which provide enjoyable learning environments. It was acknowledged that without marks being given for participation with wikis and blogs then their take-up would be minimal.

An additional comment made regarding VLE access concerned the need to have access to a computer at the time of undertaking learning. It was felt that over reliance on VLEs as the mode of delivering student learning activities could be restrictive. Students felt that they want the flexibility to choose for themselves the mode of learning including use of traditional methods. It was recognised that cheap laptops and easy internet access (including WiFi networks) lessened the seriousness of this access problem, but nonetheless it was seen as a problem of equitable access. It was noted by one student that the move towards mobile technologies as a vehicle for delivering learning activities will create similar problems of access for some students.

The individual interview with the unsighted student revealed some serious access problems and some fairly acute ethical concerns. This student interacts with computers using screen reading software and an ordinary keyboard. It was highlighted that this student faced some severe difficulties in using the VLE. The main problems arise from the nature of the VLE system itself, and also from the design of the content placed there by staff. These problems may be seen from the perspective of access versus usability. It is possible to gain access to certain VLE features but because of technical and design issues they are virtually unusable. For example, it is possible to access information posted as ―Announcements" but due to the fact that the screen reader might refresh the screen several times (and place the cursor back at the top of the page) before the correct information is located, the task becomes tedious and time-consuming. Similar examples include the difficulty of locating hyperlinks on cluttered pages and also in navigating directories in a complex tree structure. Several other technical access problems around the design and implementation of learning objects within the VLE were identified. These are not reported here in full other than to highlight that staff are able to greatly improve access by following good design practices. In particular, usability is enhanced by simplifying directory structures; having uncluttered pages; using common terminology (to assist the screen reader); and by using appropriate mechanisms such as ALT tags and combo boxes. Although these access problems may be overcome, the most serious issue that currently cannot be solved for students with visibility problems is that of participation in discussion boards. The way that they are typically structured within the VLEs (Blackboard™ is used by the university in this study) means that the discussion threads are not visible to the screen reader. This student was, therefore, excluded from such learning activities. Students' interaction through blogs and wikis is, however, accessible even though there are some usability issues.

3.2 Behaviour

The second area of potential ethical concerns to be considered was that of student behaviour in the use of discussion boards, blogs and wikis for the implementation of learning activities based on student interaction. This learning strategy has been implemented on a module that all of the students involved in interviews studied. Several problems that the students encountered were identified within the group interviews. The students reported the most commonly occurring issue to be that of non-participation by some group members in the discussions and learning activities within the group wikis. It was also pointed out that some students only participated in order to obtain marks, that their contributions were minimalist and made just prior to the deadline for submission. Although this type of behaviour is common in group work and is generally considered as a pedagogic issue, the students generally felt that these issues were more focused within the VLE. This is perhaps because outside of an e-learning environment, allegations of lack of participation can be contested by a student, with counter-claims to have contributed just as much as the other members of the group. Within the VLE, however, the level of contribution of each student can be more clearly demonstrated both to the other members of the group and to the tutor, with the system attaching a time and date stamp as well as the student's identifier to each posting or upload of work. Discussion around this led the students to identify that there should be a responsibility to participate and a duty to other group members to do so in a timely manner. It was felt that in some cases students with a low level of participation were being carried through by the other members of the group and that this was not fair.

For the module identified above, it was suggested to the students that within their groups they agree a set of rules for the use of the wikis by group members. It was observed that out of a total of twenty-eight groups, thirteen groups produced a code of conduct whereas the other fifteen groups did not. These codes contained between two and eight rules and were focused on the areas of project management of the group coursework assignment; rules on editing and format of entries on the wiki;

rules on participation and avoidance of plagiarism; and also rules on general behaviour including mutual respect, tolerance, acceptable language and appropriate commenting. In the group interviews all but one student said that their coursework group had produced a code of conduct. It was reported, however, that although these rules existed there were still incidents where individual group members did not comply with them. In each case these incidents concerned attendance at group meetings. There was a general consensus that most students would behave in an acceptable way based on their own personal code of ethics. It was also recognised that because the VLE was owned by the University, then how they behaved within it could be monitored. Additionally, it was noted that within the groups there was generally a high level of trust and respect for each other and the need for a set of written rules was not of paramount importance. It was considered though that their formulation was a useful exercise in thinking about how individuals should be treated. One student reported that within his coursework group there was a lack of respect by one or two members, both of whom participated very little and paid no attention to the group rules.

Behavioural issues concerning inappropriate postings and the ‗flaming' of contributors were not seen to be problematical. Students reported that because they are working within the University's VLE they are careful about what they post and how they reply to other students' comments. They stated that they are more likely to ‗flame' in face-to-face sessions when ―there is nothing in writing". They also reported that they were aware of a small number of cases where other students had posted inappropriate comments, but these comments had been quickly removed and the students responsible dealt with by the module leader.

3.3 Privacy

The University's VLE provides facilities for staff to automatically collect statistics about students' access to materials and learning activities. These are available for individual students and also in an aggregated form for all students on a module. Although staff may observe students' participation in interactive learning activities producing discussion boards, blogs and wikis, it is not possible to see what students have done with the learning materials they have accessed. The system records date, time and frequency of access for these, allowing staff to monitor individual student access as well as aggregated data for the whole cohort. This raises issues of student privacy and surveillance of their activities on the VLE. These issues have been previously reported by Leigh and Prior (2008). They were revisited in this investigation in order to compare the awareness and attitudes of these concerns of the participants in both studies.

There was close alignment of views concerning privacy and surveillance shared by both sets of participants. Since these are detailed by Leigh and Prior (ibid) the findings are only dealt with briefly here. There was agreement that teaching staff should be able to monitor student activities on the VLE as that is considered to be part of the teaching role. They all were aware that monitoring took place but were not sure of the mechanism for doing so; nor were they aware of who could actually see their activities. As with the previous study they were generally comfortable with staff from the module team being able to see their work and participation levels, but not with other staff having this access. Several participants voiced the concern that staff may make judgements about them based on their performance on another module. There was agreement that they wanted to be judged on each module ―at face value".

An implicit trust in the academic staff of the university was expressed, although it was recognised that there was potential for individual members of staff to misuse the access data collected in the statistics and make judgements on perceived levels of activity rather than on actual performance in the module assessments. This study also found conformity with the previous study in that students' behaviour would be influenced if the thought access statistics were being used as a basis of judgement. It was stated that they would access the VLE in a way to manipulate the statistics in their favour. There was overall agreement that statistics ought to be used only in an aggregated form in order to inform staff of participation in learning activities of the cohort as a whole; and not used to scrutinise the activities of individuals.

Overall, the students interviewed felt that they should be informed precisely as to what statistics were being collected and what monitoring was being undertaken by staff; and should also be made aware of the uses to which these data are being put.

There were no significant differences detected between the two studies in the awareness and views of the participants concerning privacy and surveillance. Consequently, further findings are not replicated here.

4. Discussion

The ethical issues concerning students' access to learning materials and activities within the VLE involve the ethical issues of equality, fairness and inclusion. It is necessary that resources are provided to allow all students sufficient access to the VLE in order to be able to achieve the learning outcomes of their modules. None of the students within the group interviews perceived access to be a problem as the facilities provided by the University, together with their own resources catered for their needs. There were, however, issues around technology-driven provision of learning activities; in particular with regards to the prescriptive way in which these activities may dictate students' learning approach. These issues are likely to persist with new technologies, for example, with the advent of learning through mobile technologies.

The access problems encountered by the student with visual impairment draw attention to ethical concerns within VLEs around equality of opportunity in participating in learning exercises, inclusion and also fairness. Clearly, there is an ethical dilemma in this case around the use of discussion boards. As Kienzier (2004) points out, there is a conflict between what is ―good" for the majority of students and what is ―good" for this individual. Obviously it is not possible to design all teaching activities around the needs of the individual, but neither is it right to ignore that individual's needs. In the case of this particular student these tensions were addressed by members of staff implementing alternative strategies to allow this student to achieve the learning outcomes. However, as the student reported these were of mixed success. For example, an area on Blackboard™ was created that held the discussion threads in a plain text file. The trouble with this strategy was that although the student could now read the discussion, they were still not able to make postings. Other strategies implemented by staff were more successful; for instance, instead of providing the student with paper copies of learning materials that are of no value to them, staff e-mailed to the student electronic versions in advance. It should be noted that within the University guidance for staff is provided on dealing with students with dyslexia and dyspraxia, but no formalised help is available for dealing with such cases as this. This means that staff will have to do the best they can by negotiation with the individual student. It is apparent from these identified issues that staff are treating the symptoms of the problem rather than the root cause being addressed. In particular there is a need for institutional guidelines to be produced which will inform staff of the problems faced by students with disabilities and of how to address them within the design of their learning activities. There is also a need for VLE software vendors to provide efficient and easy to use tools, within their products, that facilitate the development of a learning environment that does not discriminate against people such as this unsighted student.

The ethical concerns around students' behaviour during interactive exercises within the VLE include issues of respect, tolerance, trust, duty and responsibility of the students towards other students. It was identified among the students interviewed that their behaviour in such circumstances was governed by their own personal code of ethics and also by codes of conduct issued by the University, although they had made little reference to the latter. Inspection of the existing codes of conduct and guidelines for the students' use of institutional ICT facilities, found them to be somewhat partial, fragmented and in need of rationalization.

The importance of duty and responsibility was recognised but they felt frustrated when there was non-compliance with the codes of conduct that they themselves had produced and agreed to within their groups. Although they acknowledged that the behaviour they objected to were not specific to group working within VLEs, they were, in their opinion, exacerbated by the VLE. As previously reported the main concern of the students participating in the focus groups in the area of student behaviour, within the VLE, was that of poor participation in learning activities by some group members. It was argued that levels of contribution seemed ―more of a problem" when working on-line. The approach taken to the development of the codes of conduct within the student work groups was informal. Conformance could be improved if their development was more formalised within the structure of the module activities.

It may be observed from the findings concerning student privacy and surveillance of their VLE usage that they have a limited awareness of actual and potential monitoring that may take place. They recognise the need for staff to be aware of the participation in online learning but feel that they ought to be more informed as to how, why and when this takes place. A consultative approach to this aspect of VLE usage would make monitoring transparent to students and give them confidence that they are being judged on achievement alone and not on the mechanism by which they met the learning outcomes.

From the above discussion it is apparent that students' awareness of the ethical issues surrounding the use of VLEs is limited to varying degrees and is predicated on their own experience. The participants have clearly developed an ethical perspective on the aspects of VLEs that affect them directly. For example, where other students' behaviour affects their own studies they have strong opinions as to what is right and wrong; fair and unfair; and respectful or disrespectful. It can also be seen that students will apply a behaviour code within particular contexts such as not 'flaming' when using the University's ICT facilities. It was also observed in this study that when ethical concerns were raised, that they were previously unaware of, they adopted a fair-minded approach and gave a considered opinion on it. For instance, when the nature of monitoring within the VLE was explained, they acknowledged an implicit trust in the integrity of staff, but were also able to identify circumstances where there might be misuse of data and why that would be wrong.

It is also apparent in the study that where technology drives developments in social systems there is potential for a policy vacuum and for good practice to lag behind. This is exemplified by the experiences of the student with a visual impairment. There is clearly a need for staff and students to engage in an 'ethical conversation' to raise the awareness of ethical concerns around learning activities in VLEs. This will greatly help in addressing inequalities within the student learning experience and ensure that the virtual learning experience is not only underpinned by pedagogy but also by ethics. Returning to the original question regarding students' attitudes and awareness . . . "Am I bothered?"; I would say yes, students are bothered and are able to contribute significantly to the ethical debate around the use of VLEs.

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WHAT MATTERS TO NON-EXPERTS ABOUT PROPERTY AND PRIVACY RIGHTS?

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Abstract

From an international survey of approximately 400 college students we explored whether non-experts are sensitive to particular contextual norms when considering computer property and privacy rights. We found that respondents approve of surveillance only if consent and knowledge are present. Disagreement to unauthorised access diminishes if permission is provided. We also found instances of significant cross-cultural differences in sensitivity, and to a smaller extent, gender, age, and class year variations. Based on the findings, we recommend that policy makers and system administrators take into account non-experts' normative expectations when developing terms of use and monitoring systems.

1. Introduction

Experts clearly state their preferences regarding software property rights and privacy rights in cyberspace. For example, Richard Stallman cares most about maximum dissemination of software for social benefit. He favours free software over protected software because the former is unencumbered (Stallman, 1992). In contrast, experts representing the Recording Industry Association of America (RIAA) care most about profit from intellectual property and, accordingly, favour strong copyright provisions and enforcement. Stallman and the RIAA stake diametric absolutist positions: Software should be free or protected regardless of the author, the application utility, the economic system, the user intent, etc. For them, specific circumstances do not matter. Helen Nissenbaum (2001 & 2004) has recommended sensitivity to contingent elements both in terms of property and privacy. For her, the details of the case or social context do matter. Her contexts are similar to the "situations" found in James Moor's (2004) privacy theory.

In her article, "Privacy As Contextual Integrity," Nissenbaum (2004) explicitly promotes a context-relative approach. She notes that social contexts are governed by norms of appropriateness and norms of distribution in regard to the flow of information. For example, it is appropriate for a close friend or physician (in a healthcare context) to probe about one's health and emotional state but if a salesperson did this within the context of shopping one would treat it as a violation of privacy. She proposes that "information gathering and dissemination be appropriate to that context and obey the governing norms of distribution within it." (101).

2. Research Question

Given that ethical issues concerning privacy and property affect all users, the authors decided to conduct an exploratory study on the non-expert's attitude about property and privacy rights. Are *they* absolutists or context-relativists? Are there contextual norms or conditions that matter to them? We pay attention to the experts because they help shape the social debate from "above" by means of conceptualization, rhetorical argumentation, and policy recommendation. Nevertheless, non-experts are not without influence--they shape the social debate by their decisions and actions at the ground level through their roles as students, consumers, and employees (see Buchanan (2004) and Gotterbarn (1995)).

3. Research Study & Methodology

Our investigation relies on an international survey of college students conducted in the 2008-2009 academic year, of which we were co-sponsors. Through purposive sampling, approximately 400 college students enrolled in business ethics or computer ethics courses from four campuses in Canada,

the United Kingdom, and the Unites States of America were invited to participate. We conducted an exam-style survey in the classrooms and achieved a response rate of over 95 percent.

Students were asked to respond using a Likert scale (with values of strongly disagree, disagree, indifferent, agree, and strongly agree) to approximately 20 computer ethics scenarios regarding property and privacy issues. In some instances two scenarios were the same except for one variation, for example, the acceptability of making unauthorised copies of commercial software for *private use* and the acceptability of making unauthorised copies of commercial software for *university work*. We compared responses to determine whether or not subjects deviated in their level agreement/disagreement across the two social contexts, such as private versus university. Other pairings allowed us to look for sensitivity to norms of appropriateness and distribution. With the university as the context, for example, participants responded to these paired statements: 1) it is acceptable to use computing facilities for my own *profit*-making and 2) it is acceptable to use computing facilities for my own *nonprofit*-making. The following table lists all the paired statements that we consider in this study.

Norm Pair 1 Nonprofit or Profit	It is acceptable to use the University's computing facilities for my own *nonprofit*-making activities if this has no adverse affect on the University. It is acceptable to use the University's computing facilities for my own *profit*-making activities if this has no adverse affect on the University.
Norm Pair 2 With or Without Permission	It is acceptable for me to use other peoples' access codes/passwords *with* their permission to access data I am not authorised to see. It is acceptable for me to use other peoples' access codes/passwords *without* their permission to access data I am not authorised to see.
Norm Pairs 3A & 3B With or Without Consent & Knowledge	Employers are entitled to use electronic surveillance to monitor employees' performance in the workplace *with* their consent & *with* their knowledge. Employers are entitled to use electronic surveillance to monitor employees' performance in the workplace *without* their consent & *without* their knowledge. My university is entitled to use electronic surveillance to monitor students' use of university IT resources from university residences *with* their consent & *with* their knowledge. My university is entitled to use electronic surveillance to monitor students' use of university IT resources from university residences *without* their consent & *without* their knowledge.
Context Pair 1 Work or Residence	Employers are entitled to use electronic surveillance to monitor employees' performance in the workplace *without* their consent & *without* their knowledge. My university is entitled to use electronic surveillance to monitor students' use of university IT resources from university residences *without* their consent & *without* their knowledge.
Context Pair 2 Private or University	It is acceptable for me to make unauthorised copies of commercial software to use for my *University work*. It is acceptable for me to make unauthorised copies of commercial software for my own *private use*.

Table 1: Statement Pairings

4. Results

We see from Table 2 that over three-fourths of the respondents were under 25 years of age, most were from the USA (two-thirds of the sample), with mainly 2nd Year, 3rd Year, and 4th Year students participating in the study. The ratio between male and female respondents was approximately 3 to 2.

In the tables that follow we present findings derived from two techniques that compare participants' responses on the paired norm and context statements. The first technique is simply a side-by-side display of the corresponding frequency tables. With regard to the second technique, we noted the difference in a subject's responses between the paired statements according to the direction and the number of ordinal levels of separation. For instance, a "strongly disagree" on *profit-making* is two levels lower than an "indifferent" on *nonprofit use* and a respondent with this pattern would have been scored a 2 level decrease. A frequency table was generated to tally the number of respondents per magnitude/direction of difference.

Variable	Value	Frequency	Valid Percent
Age	Under 25	293	80.9
	25 - 40	58	16.0
	41 - 50	7	1.9
	Over 50	4	1.1
Nation	USA	251	66.6
	United Kingdom	85	22.5
	Canada	41	10.9
Class Year	2nd Year	72	22.5
	3rd Year	138	43.1
	4th Year	96	30.0
	Graduate programme	14	4.4
Gender	Male	227	61.5
	Female	142	38.5

Table 2: Demographics of Participants

Turning to Table 3 we find that respondents were more likely to agree and strongly agree with nonprofit use of university computing facilities than with profit making--71.4% versus 41.1%. According to Table 4, just about one-half (48.5%) of the respondents had a decreased level of support for profit making while about the same percentage (48.2%) showed no difference in the way they responded to the two versions. Not many respondents (12) were more accepting of for profit use of computing facilities.

	Nonprofit Frequency	Nonprofit Valid Percent	Profit Frequency	Profit Valid Percent
Strongly Disagree	19	5.1	51	13.7
Disagree	31	8.4	84	22.5
Indifferent	56	15.1	85	22.8
Agree	189	51.1	117	31.4
Strongly Agree	75	20.3	36	9.7
Total	370		373	

Table 3: Frequency Distributions for Norm Pair 1: Nonprofit or Profit-Making Use of University Computing Facilities

Value	Frequency	Valid Percent
4 level decrease	1	.3
3 level decrease	15	4.1
2 level decrease	61	16.5
1 level decrease	102	27.6
No difference	178	48.2
1 level increase	10	2.7
2 level increase	2	.5
Total	369	

Table 4: Nonprofit to Profit and Change in Agreement Level

From the next set of tables it is clear that most respondents do not find it acceptable to access data by using another person‘s password without authorization. Permission makes a difference but mainly in terms of the level of disagreement. Two-thirds of the respondents strongly disagree when permission has not been provided as compared to one-quarter when permission has been given. Sixty percent of respondents increase their level of disagreement when responding to the no permission scenario. Few respondents select a higher level of acceptance under the scenario in which the norm in question is violated.

	Permission Frequency	Permission Valid Percent	No Permission Frequency	No Permission Valid Percent
Strongly Disagree	92	24.9	246	66.0
Disagree	137	37.1	103	27.6
Indifferent	59	16.0	11	2.9
Agree	71	19.2	9	2.4
Strongly Agree	10	2.7	4	1.1
Total	369		373	

Table 5: Frequency Distributions for Norm Pair 2: With or Without Permission to Use Others' Codes/Passwords to Access Data I Am Not Authorised to See

Value	Frequency	Valid Percent
4 level decrease	7	1.9
3 level decrease	30	8.2
2 level decrease	62	16.9
1 level decrease	120	32.7
No difference	135	36.8
1 level increase	8	2.2
2 level increase	4	1.1
4 level increase	1	.3
Total	369	

Table 6: Permission to No Permission and Change in Agreement Level

By far the greatest turnabout occurred when respondents were questioned about the legitimacy of employers using electronic surveillance to monitor employees' performance in the workplace. We see in Table 7 that nearly 80% of respondents accept this insofar as employee consent and knowledge are obtained, and the same percentage reject this when consent and knowledge are absent. According to the next table, over one half of the students dramatically decreased their support by three or four levels (moving from the agreement to disagreement side). Fewer than twenty students were contrarians.

	Consent & Knowledge Frequency	Consent & Knowledge Valid Percent	W/Out Consent & Knowledge Frequency	W/Out Consent & Knowledge Valid Percent
Strongly Disagree	21	5.7	181	50.6
Disagree	30	8.2	100	27.9
Indifferent	23	6.3	34	9.5
Agree	169	46.0	33	9.2
Strongly Agree	124	33.8	10	2.8
Total	367		358	

Table 7: Frequency Distributions for Norm Pair 3a: With or Without Employees' Consent & Knowledge for Employer Surveillance

Value	Frequency	Valid Percent
4 level decrease	83	23.3
3 level decrease	97	27.2
2 level decrease	66	18.5
1 level decrease	31	8.7
No difference	61	17.1
1 level increase	7	2.0
2 level increase	8	2.2
3 level increase	2	.6
4 level increase	1	.3
Total	356	

Table 8: With Consent & Knowledge to Without and Change in Agreement Level (Pair 3a)

	Consent & Knowledge Frequency	Consent & Knowledge Valid Percent	W/Out Consent & Knowledge Frequency	W/Out Consent & Knowledge Valid Percent
Strongly Disagree	30	8.6	131	38.4
Disagree	47	13.5	125	36.7
Indifferent	47	13.5	49	14.4
Agree	149	42.9	29	8.5
Strongly Agree	74	21.3	7	2.1
Total	347		341	

Table 9: Frequency Distributions for Norm Pair 3b: With or Without Students' Consent & Knowledge for University Surveillance

Value	Frequency	Valid Percent
4 level decrease	48	14.1
3 level decrease	53	15.5
2 level decrease	84	24.6
1 level decrease	40	11.7
No difference	102	29.9
1 level increase	7	2.1
2 level increase	2	.6
3 level increase	1	.3
4 level increase	4	1.2
Total	341	

Table 10: With Consent & Knowledge to Without and Change in Agreement Level (Pair 3b)

The same questions regarding surveillance with or without consent & knowledge were asked in terms of universities monitoring student use of IT resources from university residences. A similar pattern of responses as described above were found and are displayed in the next two tables. As compared to employer surveillance, respondents showed less enthusiasm for university monitoring even with student consent and knowledge; for example, 21.3% strongly agreeing to residence surveillance versus 33.8% for workplace surveillance. The turnabout in attitude was evident in responses to the residence scenario in which the privacy norm of consent & knowledge is violated, but the shift to disagreement was somewhat less pronounced. Approximately 30% of the students dramatically decreased their support by three or four levels.

Tables 11 and 12 provide a more direct comparison of workplace and university residence as settings for surveillance without consent and knowledge. The response pattern was very similar with a small percentage of the sample registering agreement (12% for workplace scenario and 10.6% for residence) and a large percentage disagreement (78.5% compared to 75.1%). Nearly 63% of the students chose the same answer for the two statements and less than 20% responded two levels or more apart. Across the contexts most respondents cared to an equal degree about the norm being violated.

The final comparison is between the context of University work and private use in regard to the acceptability of making unauthorised copies of commercial software (see tables 13 and 14). The response pattern is remarkably similar across the two scenarios. Over 50% of the respondents answered the same way on both statements and less than 14% diverged by two or more levels.

	Workplace W/Out Consent & Knowledge Frequency	Workplace W/Out Consent & Knowledge Valid Percent	Residence W/Out Consent & Knowledge Frequency	Residence W/Out Consent & Knowledge Valid Percent
Strongly Disagree	181	50.6	131	38.4
Disagree	100	27.9	125	36.7
Indifferent	34	9.5	49	14.4
Agree	33	9.2	29	8.5
Strongly Agree	10	2.8	7	2.1
Total	358		341	

Table 11: Frequency Distributions for Context Pair of Workplace and University Residence Surveillance without Consent and Knowledge

Value	Frequency	Valid Percent
4 level decrease	4	1.2
3 level decrease	6	1.8
2 level decrease	17	5.1
1 level decrease	21	6.2
No difference	211	62.8
1 level increase	42	12.5
2 level increase	21	6.2
3 level increase	8	2.4
4 level increase	6	1.8
Total	336	

Table 12: Workplace to University Residence Context and Change in Agreement Level

	University Work Unauthorised Copying Frequency	University Work Unauthorised Copying Valid Percent	Private Use Unauthorised Copying Frequency	Private Use Unauthorised Copying Valid Percent
Strongly Disagree	76	20.4	73	19.5
Disagree	120	32.3	143	38.1
Indifferent	81	21.8	85	22.7
Agree	75	20.2	58	15.5
Strongly Agree	20	5.4	16	4.3
Total	372		375	

Table 13: Frequency Distributions for University Work or Private Use and Making Unauthorised Copies of Software

Value	Frequency	Valid Percent
3 level decrease	5	1.3
2 level decrease	28	7.5
1 level decrease	67	18.1
No difference	197	53.1
1 level increase	55	14.8
2 level increase	15	4.0
3 level increase	4	1.1
Total	371	

Table 14: University Work to Private Use and Change in Agreement Level

Dependent by Independent Variable	Mean Differential	Significance
With/Without Permission by Gender	Male -.824 Female -1.122	.015
With/Without Permission by Age	Under 25 -1.035 25 over -.662	.013
With/Without Permission by Nation	USA -1.008 UK -.631 Canada -1.103	.019
Residence Surveillance-- With/Without Consent & Knowledge by Nation	USA -1.390 UK -1.690 Canada -2.256	.006
Copy Software – Work/Private Use by Nation	USA -.088 UK -.317 Canada .175	.032
Work Surveillance-- With/Without Consent & Knowledge by Class Year	2nd Year -2.016 3rd Year -1.874 4th Year -2.489 Graduate -1.500	.026

Table 15: Significant Mean Differentials in Responses to Paired Statements by Demographic Variables

One last set of statistical tests was conducted using comparison of means tests to determine if 1) men and women, 2) those under 25 years of age and older, 3) students in the three nations, and 4) students of the 4 class years differed significantly on the average differential in their responses to the paired norm and context statements. Significant differences were not found except for those listed in Table 15. On average women, younger students, Canadian and American students as compared to men, older students, and United Kingdom students had a more marked shift in attitude according to presence or absence of permission. Canadian students responded most vigorously to the absence of consent and knowledge for residence surveillance and United Kingdom students showed the largest differential when responding to copying software-- work versus private use. Students in their 4th year had the most dramatic shift in attitude regarding work surveillance and the presence or absence of consent and knowledge.

5. Discussion of Findings

Although this study is limited in generalisability-- with the non-random sampling method the findings apply only to the participants-- it does provide some evidence of non-experts' sensitivity to contingent elements in their attitudes toward property and privacy rights. This was most pronounced for the norm of obtaining consent and knowledge before engaging in surveillance. Under these conditions most of the college students would allow surveillance, but with this norm absent, most found monitoring unacceptable. Very few of our respondents were absolutists and held a consistent favourable or unfavourable attitude toward monitoring. For them, it all depends on how it is done.

Those who favour data security, password integrity and vigilant gate keeping would be heartened that most respondents strongly disagreed with the statement that "It is acceptable for me to use other peoples' access codes/passwords *without* their permission to access data I am not authorised to see." Nevertheless, strict protectionists would be appalled that giving permission, as this study has found, makes a difference in the level of disagreement. With another norm pair, we found that half of the respondents saw greater legitimacy with nonprofit use of computing facilities as compared to profit-making. This study tested the importance or relevance of just a few norms. A more comprehensive study should be conducted to test the significance of others, for example, reciprocity. Even so, we find preliminary evidence to recommend that system administrators be aware of normative expectations when developing monitoring systems and terms of use.

Our findings regarding the importance of social context, for instance, university or workplace, are inconclusive. College students opposed surveillance in both contexts if conducted without consent and knowledge. We conclude that informed consent is a norm that these individuals expect to be honoured in both contexts. Similarly, most of our respondents disagreed with copyright violation regardless of University and private use contexts. Proper authorization appears to be normative for both contexts, as well. We did not find respondents attuned to specific norms in one context but not in another, however our investigation was limited in scope. Following the aforementioned recommendation, researchers could assess the significance of more norms within these contexts to better assess the possibility suggested by Helen Nissenbaum that norms of appropriateness and distribution may differ among social contexts. Also, it will be worthwhile to include for consideration more contexts, for instance, family/household or public library and, in terms of online environments, sites that encourage or discourage anonymity.

Context norms and sensitivity to such norms may vary across cultures or social groups and we found instances of significant differences in sensitivity between students from the three nations, as well as, one significant comparison of means result each for gender, age, and class year. A future study could sample a more diverse population and include participants with a greater range of occupation, age, and ethnicity/race in order to assess more cultural and subcultural nuances.

6. Conclusion

We are encouraged by the findings from this preliminary study to recommend increasing the scope of research. Information technology users make ethical decisions on a regular basis. If further study reveals that context and norms matter to these individuals, ethicists and policy makers need pay attention. Imposing absolutist paradigms or codes of conduct on context relativists creates tension and invites defiance. In contrast, while exercising a degree of pragmatism we show respect for users by

taking the time to look into their normative sensitivities and evaluations as they strive to do the right thing in various social contexts.

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MULTIPLE E-IDENTITY NARRATIVES IN SOCIAL NETWORKS

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Abstract

Individuals produce multiple identities through a discursive process of building a digital presence in Social Network Sites (SNS). Identity is produced via specific discursive processes where the "identity narratives" become central to the way in which a person can create sense of the self. It is possible to create focused identity narratives that offer a specific component of a person's identity through a specific SNS. As a result the process of identity production becomes problematic when multiple virtual faces are constructed by the same individual operating within the "public" sphere of different social networking Web sites.

1. Introduction

The adoption of the telephone as a popular means for interpersonal communication in the United States led to the development of a curious social experiment that was called "party line." This was a popular technology that would allow many people, often women, to connect with each other in a synchronous manner and talk over the phone for long periods of time and share a variety of information about each other, and most importantly, about others in the form of gossip (see, e.g., Rakow, 1988). This was an extension of a social network that could overcome the barriers of space with people in different locations being able to participate in the conversation. Much of social networking prior to the adoption of tools like the party line were restricted to certain place, like a neighbourhood, and the creation of the network depended on people congregating in real life in a real place. The telephone allowed the network to transcend the barrier of space. The telephone also allowed for the creation of a mediated social network where the glue that held the network together was a technological system. In many ways, the computer allowed for the extension of the social network to larger spaces bringing together greater number of people. This was made possible by systems such as listservers and Usenet groups that were popular in the late 1980s and early 1990s leading to considerable discussion about the creation of "virtual communities" as demonstrated in anthologies such as *Virtual Culture* compiled by Jones (1997) where scholars examined the ways in which special communities could be imagined around shared discourses on the Internet. The technology was not sufficiently sophisticated to allow for sharing of much beyond written texts that would create the discursive space where the virtual communities would be formed (Mitra, 1996, 1997). The social networks that have become popular in late 2000s are structurally a technological extension of the virtual communities of the 1980s, which were essentially an improvement on the party lines of the 1910s.

2. Overview of social networking

The shift to the new technologies for creating communities became noticeable around 2005 when users discovered sites such as MySpace and Facebook that quickly came to be known as social network sites (SNS) and users migrated from their existing virtual communities to the SNS forums because these offered a greater degree of technological sophistication in terms of the way in which the users to interact with other members of the SNS. As pointed out in the articles in the special theme section of the *Journal of Computer Mediated Communication* compiled by Boyd and Ellison (2007) there were numerous SNS forums that came and went in the latter 1990s and the early 2000s, with different SNS providing different kinds of functionality and attracting different levels of following among users. For instance, MySpace was an open site that was popular among a large cross-section of users since it provided unrestricted access to the SNS, and the creators of MySpace stayed well in touch with the users to provide specific features that the users demanded. On the other hand, the early version of Facebook was restricted to young people in academic institutions and most of the users of Facebook had *a priori* connections with each other and the SNS was an extension of the real life

connection as compared to MySpace that facilitated connection between people who might not have known each other in real life. Other SNS were restricted to specific parts of the World as in the case of Bebo which had a large following in Europe but not in the rest of the World, and Orkut that had an initial following in Brazil, and later in India. The development of SNS was relatively uneven in the early days, but by 2009, the participation in SNS was becoming commonplace and a large number of people Worldwide had experienced digitally mediated social networking.

The experience is made up of several factors. One of the most important aspects of social networking is the ability to make connections with people who are spatially distant from an individual. Much like the process of connecting with party lines, it is possible for members who belong to SNS to be able to make connections with other individuals who might be spread out all across the World. The barrier of distance for networking was quickly taken down by SNS changing the nature of social networks which was originally defined by Barnes (1954) around a continuum of stability and function of the networks where a network was made up of a limited number of spatially adjacent people who would create a connection to achieve a particular purpose. In the case of Barnes, his focus was on a small Norwegian community where he noted that the networks were of three major types: Stable organizations with formalised modes of interaction, unstable connections that were created for specific functions, and networks based on interpersonal connections where other social phenomenon like class would play a critical role in the creation and maintenance of the network. To be sure, all these connections were based on spatial proximity limiting the number of participants in any network.

The replacement of the real person by the virtually available discourse also created a condition where the discourse became the primary mode of creating a presence of the person. This presence was removed from the real because it might have been impossible to ever have a clear understanding of the real entity since the entity was always produced by discourses that are available in cyberspace. This phenomenon produced specific issues related to the authenticity of the entity that would be available in a discursive way (Mitra, 2002). It would be impossible to be sure that what was being presented in a discursive form was indeed what the entity was. This phenomenon extends to all entities that have a digital presence – from a person to an institution – and the presence is often the careful construction of a "face" that is visible to the World (Hyde and Mitra, 2000). The user of the information must decide if the presence is authentic and trustworthy so that the observer can make specific attributions about the real entity that is depicted online. The matter, naturally, is simpler if the observer has some *a priori* information about the real entity. For example, if one were to know that a person is likely to exaggerate then this prior information would attenuate the interpretation of whatever is reported in an online situation. In such cases, the real and the virtual coalesce to produce a specific cybernetic presence where both the real and the virtual are considered together to understand who a person is. This specific phenomenon of discovering the real and the virtual presence of a person have become particularly predominant with the growth of digitised social networking.

One of the ways to understanding the digitised social network systems is to place it in an appropriate place between the social networks that are based on real life interactions and those that are based entirely in the virtual as in the case of SL and massively multiple user games where the digital players might never know the real self of the other speakers. The digitised social networks offer a mixture where the real and the digital could coalesce into a single entity when members of the digital social network are also tied with each other in real life, as in the early manifestation of Facebook when it was restricted to specific academic institutions (Boyd and Ellison, 2007; Livingstone, 2008). Only people who already knew each other would be able to overlay a digital social network on top of their existing real network. Presence on Facebook could open up the opportunity to network with other people who have extended themselves to the digital forum. In this condition, Facebook did not represent a new network but primarily an extension of an existing set of connections. Other digital systems, most notably MySpace, however, operated more in line with the MUD model where a person could set up a digital presence and then wait for others to stumble on to the presence and make a connection. MySpace offered the opportunity to extend real networks to the digital realm, but the "openness" of MySpace, as compared to the limited scope of the early Facebook, offered the open ended potential of creating connections where the real people might never network with the real bodies. At that moment, MySpace became much more like SL. The uniqueness of digital social networks is significantly obtained from this uniqueness where these networks represent a phenomenon that is not necessarily technologically unique but offers certain networking opportunities that neither real life by itself or the

virtual by itself can provide. The digital social networks operate in cybernetic space where the real and the virtual create an organic whole – sometimes the real becoming peculiarly central and at other times the virtual trumping the real. This fluidity offered by the digital social networks is central to the focus of this essay which deals with the notion of identity.

3. Thinking about Identity

There has been significant attention paid to understanding the notion of identity and one specific strategy to understand the concept of identity is to focus on the narrative construction of identity, which has been examined from many different disciplinary and intellectual perspectives (see e.g., Autio, 2004; Bers, 1999; Bucholtz, et., al., 1999; Hall, 1992; Jones, et., al., 2008; Redman, 2005; Ricouer, 1984; Whitebrook, 2001). In most cases it is argued that identities are deliberately produced through specific stories one tells about the self. To be sure, there are some identity characteristics that are indelible in real life – one can not easily change one's skin colour – and the white person would remain white, but there are some identity elements that are much more pliable and it is possible to produce an identity by manipulating the specific components of identity that can actually be controlled. Many of the elements of the flexible component of identity are based on a discursive process where an entity – person or institution – could actually tell specific stories about itself to produce the specific identity it wants to create. This is commonly done by institutions that want to promote its products and services. Advertising and "branding" are ways of creating an identity that is built around a specific discourse where the name of a product, and an accompanying tag line, becomes the way people would think of an institution and remember it. The same principle extends to individuals where the fundamental building block of the "constructed" identity begins with naming a person. Thereon, much of identity construction depends on how well a person is able to tell a story about the self. These are not stories in a fictional sense but represent the specific narratives that accumulate to produce an identity. It is often these stories that a person shares with others to present the personal identity. Therefore, in addition to interacting with a real person, people often interact with the stories that the person has shared, and the synthesis of the real person and the stories "produces" the person in real life who becomes a part of a social network.

In the digital social networks, because of the nature of the technology, the focus could easily move away from the real person, whose physical attributes might not be evident on Facebook, but the "face" of the person is a purely narrative construction. It is important to appreciate this change even in the case of digital social networks which might connect together people with prior relationships – such as people who might have gone to high school together 25 years ago. It is not difficult to imagine how radically a person's real face and appearance might have changed in the quarter of a century, but the Facebook presence might not reflect that change at all. In such situations the real face of an old friend is as obscure as the real face of a person with whom the connection is based solely through the digital social network without any opportunity of real life interactions.

The development of digital social networks and its relationship with real social networks offer the opportunity to examine the ways in which the digital system is altering the way in which identity is produced, maintained and negotiated on and through the digital systems. Understanding this becomes especially important as more people, with fewer former connections, are populating the networks. Simultaneously, a single individual is a member of multiple networks which are all visible to anyone interested in learning about a person. This transparency offers a much more elaborate opportunity of learning about the identity of a person. And those who are curious about a person and those who are creating their identities are both aware of this opportunity and can manipulate the narratives appropriately to manage the composite narrative produced across multiple digital social networks. Thus, the key question for this essay is: What are the different attributes of the way in which narrative identities are produced across multiple digital social networks?

4. Deliberate identity

All the digital social networking systems make an assumption that members would be interested in creating specific identity narratives about themselves. This is facilitated at the time of subscription when new members are requested provide some basic information about themselves. All the digital social networking sites ask the participants to deliberately and consciously disclose nuggets of

personal information that can be pieced together to create the identity narrative. The sites are differentiated from each other on the basis of the kind of information that one can put into them. For example, Orkut seeks information about political views as in the case of Facebook, but also asks about the sexual orientation of the member as well as ask the participant to disclose what one might find in the person's bedroom. Any member who is willing to provide an answer to all the queries offered by the computer system that drives the digital social networking sites would have to offer a significant amount of information that would help to create the identity narrative for that person. In a similar fashion, LinkedIn also asks for information, but given the more "professional" focus of this digital social network the queries are less personal and more professional with the site asking for detailed academic and professional background so that an observer can piece together the identity narrative of the member.

All the processes offer the user an opportunity to deliberately offer information that the controls and constructs. There is nothing taken for granted in the process. Unless a person completes the gender information, or provides a picture there is no natural way of discerning that information, particularly for skilful users who are willing and able to withhold that information. This significantly differentiates the digital social networks from most other networks, and it would be useful to consider the implications of this process. One important implication is understanding the kind of information that is usually provided.

5. Identity Narbs

Most digital social networking sites including Bebo and MySpace information is shared through "narrative bits (narbs)" that must be carefully selected by the person who is providing the narbs. These narbs are made up of statements like, "dry, sarcastic, clever witted," which are some of the pre-formatted descriptors of humour in Orkut that the member must choose from. The choice of the narbs is a mindful and deliberate process where the member is consciously offering up specific pieces of information about oneself. This is very different from the process of identity management in real life where some attributes are communicated without much control as in the case of many non-verbal responses to the environment. In the case of the digital social network there is nearly nothing that is not controlled or constructed by the person providing the narbs. This deliberate process is continued by the person who is looking at another person's narbs. The observer must also deliberately try to piece the narbs together into a complete narrative. This too is a mindful process where a certain amount of sleuthing is necessary on the part of the observer. For instance, in the case of Facebook, when one looks at another person's "profile" the information is presented as narbs that might be distributed in different places and all the pieces must be collated to create the identity narrative. What becomes most evident in the case of Facebook, particularly with those members who are frequent users of the system, that the narbs are dynamics bits of information that tend to constantly change allowing the observer to "update" the narrative information that is produced from the narbs.

Most of the digital social networking systems allow the members to constantly change the narbs. These changes could be in the form of updating personal information, adding new information, or reporting on the status of a person at any time. These make up different kinds of narbs but all add to the overall sets of information that is available to the observer who is trying to put together the composite identity narrative of a person. Some of these updates, as in the case of Facebook, can be done in a dynamic way where the member can send the updates from a cell phone. When someone looks at the profile of the user, they could see a series of updates that tell a story and connects with the identity narrative of the person. Consider for instance the opportunity offered by Facebook to create a box that shows the different cities one might have visited. Choosing to use this function is the first narb that is deliberately used by a member; next the member might choose to update this information whenever the member actually visits a new city. Thus, for an observer, it is possible to create an identity narrative that includes the component of travel and the observer would be able to tell that the identity of an individual is indeed closely tied to travel if a member claims, for instance, visiting more than 300 cities in 23 countries. These narbs are supposed to be updated and each update adds to the identity narrative. The process is true for both Orkut and LinkedIn where members are able to also update there profiles with changes to narbs.

The outcome of the process of creating dynamic narbs is the slippage from a stable identity narrative. It is difficult to find the seminal narrative about another person if the person is deliberately changing the narbs that become the building block of the narrative. The changes could appear to be minor, but they all impact the narrative that must now be produced dynamically about a real person who might be placing narbs across many different digital social networking systems. These narbs all eventually become virtual references to a single real person. Yet the identity narratives of an individual created by different sets of narbs selected from different places in cyberspace could be remarkably different from each other, further complicating the way in which identities are produced and maintained by digital social network systems.

6. Selecting Narbs

As suggested earlier, individuals often are members of multiple digital social networks (see, e.g., Lenhart, 2009). The process of signing up for different networks might be motivated by different reasons, but from the perspective adopted in this essay, the process of signing up involves providing new sets of narbs that are available in cyberspace. Moving from one digital social network to another involves nothing more than opening a new page on a Web browser. Unlike real life, where moving from one network to another, as in the case of the movement from a neighbourhood to a work place, involves real travel through space, there is no such affect in hopping from one digital network to another. There is no difference between the networks other than the "look" of the Web site that serves as the point of entry into the network. The primary difference is in the narbs that are deliberately shared on specific networks. Those who are interested in constructing the identity narratives of another individual could be confronted with very different narbs based on the digital social network being observed. Most individuals would present completely different sets of narbs on different networks not only because they want to do so, but also because the network systems are designed to accept only a certain set of narbs. The differentiation between identity narratives is the product of the way in which the narbs are used in different parts of cyberspace.

Consider for example a basic narb – the personal picture. People who are members of all the three networks might not use the same picture in all the sites. For instance, one member uses a small cartoon face on Facebook, a personal picture on Orkut, and a cropped down version of the same picture in LinkedIn. These are three different narbs that contribute to three different identity narratives. Substituting a cartoon face for the real face could indicate a variety of things including a desire for privacy on a predominantly social network as opposed to using a professional looking picture on a more "professional" network. These are specific choices made by the member and the observer must create the narrative based on the available narbs. Another individual who resides in all three networks claims on LinkedIn that the person worked in creating online advertising after earning a masters degree, the same person claims in Facebook that the person is politically very liberal and looking for friendships, and on Orkut the person claims that in fashion the preferred choices are, "alternative, casual, contemporary, smart, trendy, urban." These are different narbs distributed in different places in cyberspace and each narb could be the source of a specific identity narrative. All the different narratives would perhaps provide a glimpse at the real person.

Eventually, the members are able to carefully select the narbs that would be used in these networks and the narbs are distributed across numerous virtual spaces each of which might contain a certain set of narbs. Each collection of narbs on specific digital social networks represents fragments of a person's identity. Assuming that a person does present a unified identity at any point in time, that identity gets necessarily fragmented across the numerous digital social networks that eventually becomes the cybernetic dwelling place for that person. Unlike the real place that the whole person occupies, the digital person remains fragmented and scattered on narbs across cyberspace.

7. Discussion

The way in which the narrative shifts as new narbs arrive eventually makes it especially difficult to pinpoint the static identity that could be used as a template for interaction. It is no longer the case that it is possible to claim that a certain person has a set of essential traits that could be expected to stay true for a length of time. As soon as an identity narrative is inferred, it can change with new narbs. Yet, much of interaction is based on having some sense of the narratives that provide the guidelines for

interaction. Phenomenon like multiply distributed digital social networking makes it increasingly difficult to find the sense of stasis in identity. This change could implicate the way in which the digital social networking sites could develop in the future. On one hand, it is possible that these systems will evolve into dynamic and distributed systems that allow people to constantly produce new identities and monitor how identities could shift. On the other hand the way in which such narbs are used could have an impact on the way in which members decide to deploy narbs. There is evidence that some counsellors have been advising people about the "proper" use of narbs to manage the identity narratives that could be obtained from the digital social networks; this process is evident with some Universities that offer specific advice to students about Facebook (see, e.g., Mitrano, 2006). If more users would follow those guidelines then the very nature of these systems will begin to alter and what started as an extension of real life networks could transform into managed identity documents that are skilfully and deliberately produced around carefully selected narbs. Such a transformation could indeed be antithetical to the original purpose of systems like Facebook that allow people to share narbs for the purpose of building community and not necessarily to "sell themselves."

It is probably too early to obtain a final word on this but one exit out of the conundrum could appear in the form of specific digital networks like LinkedIn which claims to be a professional network and external observers would be more careful about selecting the appropriate narbs from relevant digital networks to piece together the identity narrative knowing all the time that what has been inferred is indeed provisional and incomplete.

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JAPANESE RISK SOCIETY: TRYING TO CREATE COMPLETE SECURITY AND SAFETY USING INFORMATION AND COMMUNICATION TECHNOLOGY

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Abstract

The construction of a secure and safe society using information and communication technology (ICT) is recognised as an urgent issue in Japan. This recognition is based on public fear for crimes and the fear has created the social atmosphere that hasten to develop and implement security systems using ICT such as security cameras, smart IC cards and mobile phones to establish complete security and safety in Japanese society. However, the illimitable, never-ending quest for social security and safety with ICT will inevitably cause manufactured risk which should lead to serious problems in the future. We have to recognise such risk and control it appropriately.

1. Introduction

It is alleged that we are now living in *risk society* as a consequence of modernisation or industrial civilisation (Beck, 1992) where *manufactured risk* should be recognised as social concern even though such kind of risk cannot easily be perceived (Giddens, 1999). In this circumstance, a society is intended to be organised in response to risk.

In Japan, information and communication technology (ICT) is expected to serve as a key component of policies to deal with such risk and to construct a secure and safe society. In fact, policy proposals made by IT Strategic Headquarters, which is a governmental organisation across the office and ministries and was set up within the Cabinet in August 1994 originally as Advanced Information and Telecommunications Society Promotion Headquarters, emphasise the necessity of establishing the world‘s leading secure and safe society using ICT (IT Strategic Headquarters, 2008). They seem to be trying to create complete security and safety in Japan. Local communities as well as private companies also take a proactive stance in the policies. However, this trial can ironically bring about manufactured risk, but nonetheless they have made little mention of it.

This study attempts to examine what risk is going to be caused by the construction of a secure and safe society using ICT in Japan and why, taking Japanese socio-cultural circumstances surrounding technology and governmental policies into account. Through the examination, the authors would like to consider what Japanese people are going to throw away in return for personal security and safety attained by the government-led deployment of ICT-based information systems. Risk we focus on in this study is invasion of privacy and social sorting inherent in the surveillance society (Lyon, 2003), which is being constructed with multipurpose ICT, and consequent suppression of intellectual freedom including freedom of speech and action. Considering the global nature of ICT as well as risk, this study could have significance for the world as a whole even though the study focuses on Japan.

The structure of the remainder of this paper is as follows. In the next section, we describe why the construction of a safe and secure society is recognised as an urgent issue in Japan and what role ICT is expected to play to establish such society. After that, in Section 3, the transformation of Japanese society caused by industrial civilisation and risk entailed in it are analysed, and what risk is going to be manufactured by the effort to create a completely secure and safe society using ICT in Japan is examined.

2. Construction of a Secure and Safe Society Using ICT

2.1 Collapse of the Myth of the Safe Japanese Society

Most Japanese believed that a peaceful and safe society had been constructed in Japan since the end of World War II in step with Japan‘s successful economic growth till the early 1990s. In fact, Ben-Dasan (1971) described that Japanese people believed public safety and drinkable water cost nothing,

and many people had retained sympathy for this phrase. However, several atrocious cases such as a series of child abduction-murders committed by an *otaku*, an anime and/or videogame geek, in 1988 which caused moral panic (Jones and Jones, 1999) against *otaku* people, the sarin gas attack in the Tokyo underground system in 1995 conducted by the Aum Shinrikyo cult and a series of child murders in Kobe in 1997 known as the *sakakibara* case committed by a 14-year-old boy which gave Japanese people an impression that an ordinary youngster could be a criminal sowed the seeds of terror or anxiety in people‘s minds that the myth of the safe Japanese society had already collapsed.

Repeatedly reported heinous crimes, including the cases of stalking murder of a college girl in Okegawa in 1999 about which the police agency were criticised that their hesitation to intervene civil cases caused the fatal result, indiscriminate child mass murder at a primary school in Osaka in 2001 committed by a man who had a history of mental problems and random street assaults in Akihabara in 2008 conducted by a 25-year-old male temp, have given Japanese people a realisation of the serious deterioration in the security situation. Indeed, Council of Ministries for Crime Control (2003) declared that Japan‘s public safety was in serious danger due to, in particular, steep increase in street and invasion crimes, a rash of heinous juvenile crimes and atrocious crimes committed by foreign visitors. The crime statistics compiled by the National Police Agency (NPA) show the increasing tendency of the number of violent crimes and the decreasing tendency of arrest rate from 1996 to 2004. The number of injurious assaults surged in 2000 (National Police Agency, 2009). An opinion poll on public security conducted by the Cabinet Office in 2006 shows that 84.3 % of the three thousand respondents feel that Japan‘s public security has become worse in these ten years (Cabinet Office, 2007). In addition, the 9.11 terrorist attacks in 2001 gave a significant impact on policies for securing public safety in Japan. Most of litter bins at train and underground stations were removed not to be set time bombs in the bins by terrorists. Latent threat of terrorism has been repeatedly emphasised in government statements as well as in media reports which seem to attempt to promote people‘s sense of fear. Moreover, the increasingly atrocious nature and the lowering trend in the age of juvenile crimes and the threat of the increasing number of crimes committed by foreign visitors have been trumpeted. Consequently, the (re)construction of the *anshin* and *anzen* society, where people can *anshin-suru* or don‘t need to concern about security of their living environment and, simultaneously, *anzen* or safety of the society is maintained, became a central policy issue.

However, the recognition that Japan‘s public safety has seriously deteriorated is not necessarily correct. Nominal figures of crime statistics have fluctuated based on NPA‘s policies on police activities which tend to be affected by the public sentiment and media reports and it is reasonable to conclude that public safety of Japan as well as capability of the police has not deteriorated and Japan is one of the safest countries in the world when the statistics regarding crimes are perused. The number of crimes has not increased and the increasingly atrocious nature of crimes has not been observed. Crimes committed by juveniles as well as foreign visitors have not brought about a serious situation on the whole (Kawai, 2004; Hamai, 2004; Tsunoda, 2005; Kubo, 2006).

Then, why public concerns about the deteriorating conditions of social safety have been growing? Kubo (2006) describes that the perception of the deteriorating Japan‘s public safety is a product of media reports of atrocious crimes, educational activities for crime prevention undertaken by police agencies and local governments and communities and sales promotion campaigns made by the security industry. The production of the perception has been promoted by the sense of stagnation caused by the prolong recession and the advance of globalisation.

Hamai (2004) points out that *the myth of collapsing safe society* has been created because (a) Japan is experiencing a major social and economic shift and (b) public confidence in constabulary capability is eroded through the sensational media reports of murderous rampages and of the police‘s difficulties in responding to the crimes. These have caused a vague feeling of uneasiness among Japanese people and the idea that expanded police forces are necessary and acceptable.

Additionally, people‘s awareness of necessity to support crime victims and families of them was raised in the mid-1990s. Supported by mass media, politicians, civil-rights advocates and specialists in law, psychology, medicine and so on, the movement towards changing laws in order to protect rights of crime victims and their families, to satisfy their emotional request for harsh penalty and to impose harsher punishment upon victimisers became active. It has become common-sense to assume that rights of criminals should be restricted in accordance with the extent to which they trampled others‘ rights. One of major targets for amending laws to support crime victims and their families was the

Juvenile Law (Act No. 168 of 1948) (Hamai and Serizawa, 2006). This law, which was enacted originally to protect and reclaim young offenders, became to be considered to provide them with excessive, unnecessary protection in the end of the 1990s. Under this law, personal information of juvenile offenders, including names, addresses and photographs, was unpublicised and juvenile trials were held behind a closed door. With the strong support of the substantially influential media campaigns for changing the law and the public opinion that protection of rights of victims and their families was more important than reclaim of juvenile offenders, the law was revised in 2000 so that the age of criminal liability was lowered, a juvenile offender was sent to a public prosecutors for a criminal trial in a case of death by his/her intentional act and victims and their families could be informed outcomes of juvenile trials and get trial records. The tendency of toughening laws was also observed in the enactment of a new type of crime, vehicular homicide, which was supported by a media campaign as well.

Ironically, the resultant revised laws provided the general public with the impression that the deterioration of public safety was a matter of certainty and toughening laws was inevitable, even though harsher punishment does not necessarily have a crime deterrent effect. In this circumstance, public concern about the social background of atrocious and brutal cases, investigation of which is expected to help prevent similar incidents, has diminished and, instead, finding out and/or monitoring suspicious or aberrant individuals such as lowlife people, nowhere kids, precariat workers including NEET, non-white foreigners and mentally disabled people, and setting up security systems in order to prevent heinous cases have socially been recognised as urgent issues. The enactment of Treatment and Probation Law for Individual Committing Grave Act under Insanity (Act No. 110 of 2003) reflects this social trend (Hamai and Serizawa, 2006).

2.2 Anxiety to Regain Public Security and Safety

It may be understandable that those who have been engaged in crime control can never believe in the safety of Japanese society because they‘ve often witnessed the scenes of crimes and interacted with crime victims and their families. Goto (2009), who was a top-level bureaucrat at NPA and has undertaken aid for crime victims as a lawyer, states that Japan faces an era when people are killed without any reason and atrocious crimes have not been extraordinary events, continuing that anyone can become a brutal criminal and this tendency is enhanced by the widespread availability of the Internet. He criticised the excessive protection of victimisers‘ and would-be criminals‘ rights by the Japanese criminal law system and activities of advocates of privacy and/or freedom of speech and conduct, and asserts that social safety perceived by Japanese people, although the crime statistics show the decreasing tendency of the number of violent crimes in recent years, should be improved and preventive measures against crimes such as installation of security camera systems have to be adopted in order to protect the rights of children and women as the social vulnerable.

Hamai and Serizawa (2006) mention that behind the Japanese people‘s anxiety to regain public safety is their perception that many crimes involving children have been occurring throughout the country and their children may become a victim of a crime. Even though the crime statistics show no clear evidence that Japanese children are in jeopardy, a series of sensational media reports of child murder cases have built such perception or a feeling of fear among Japanese people since the end of the 1990s.

In response to a decrease in the number of crimes recorded in 2003 and 2004, National Public Safety Commission and NPA, which have called for expanded police forces and attempted to convince local governments to set up a community safety ordinance, emphasised that important was improvement of public safety perceived by the general public, not objective or statistically measurable one (National Public Safety Commission and National Police Agency, 2005). This allegation appealed to Japanese parents who had concern about safety of their children and was affirmed by news media. Consequently, the people‘s perception and repetitive media reports of deteriorating public safety conditions have created the social atmosphere that encourages citizens to develop a cooperative relationship with police agencies to enhance social safety (Kubo, 2006). Environmental criminology including the broken-windows theory and the crime opportunity theory theoretically endorses the cooperative relationship and citizens‘ active involvement in crime-prevention activities. Actually, increased activities of community policing such as civilian anticrime patrol, creation of community crime maps and installation of security camera systems have recently been observed (Ito, 2005).

2.3 ICT as an Indispensable Component to Construct a Secure and Safe Society

Social concern about security and safety and the corresponding social acceptance of expanded police forces have facilitated the use of ICT as an indispensable component of a secure and safe society. ICT is expected to make up for the personnel shortages of the police and to provide efficient and effective support for social security and safety. In particular, the ICT‘s functional capacity to monitor, track and record individual behaviour is considered to be valuable.

Indeed, security cameras have been installed in public as well as privately-owned areas and videotapes recorded by the cameras are ready to be handed over to the police by their request. Cameras have been installed at train and underground stations, at lifts and entrances of buildings and on streets of city areas. A security camera is called *bohan kamera* in Japanese which means a camera to prevent occurring crimes, even though any clear evidence of such an effect upon crimes has not been presented. Installation of security camera systems are supported by two types of logic: one is crime prevention and the other is avoidance of false accusation (Serizawa, 2009).

According to the interview with inspectors of NPA, the Tokyo Metropolitan Police Agency and the Ehime Prefectural Police Agency conducted by the authors in 2008, the crime-prevention systems using high-tech security cameras have been steadily improved. For example, the security camera system installed in *Shinjuku Kabukicho* in Tokyo, the busiest downtown area in Japan, provides police officers with a function of real-time tracking of a crime suspect using video images when an incident happens. In the east exit area of Kawasaki rail station, the high-end security cameras which were equip with the function of detecting abnormal or irregular behaviour using pattern recognition technology were set up on December 22nd 2009. Installation of these camera systems is hailed by the local residents because they are eager for security and safety in their cities, and any system, the inspectors emphasised, equips a privacy-protection function and operation of the systems is highly privacy-conscious.

The *all in one* IC card is another technology which is useful to maintain social security and safety through enabling real-time tracking of individuals‘ behaviour and, thus, establishing security and safety in the public transport. For example, *Suica*, a prepaid rail pass card with Sony‘s FeliCa built-in smart IC chip developed by East Japan Railway Company (JR East), which is equipped with an electronic money function, is used by more than six million people. To each Suica a unique ID number is assigned and in the IC chip variety of individual passenger‘s data including information concerning rail service usage and shopping paid by Suica are stored. JR East has already developed the real-time passenger tracking system which can track each passenger holding Suica and, they say, will be used to improve levels of customer service. It goes without saying that this system can function as a crime detection system in conjunction with the security cameras installed at the rail stations.

Multifunctional, global positioning system (GPS) locator-equipped mobiles, which are popular among Japanese people, can also be used for real-time tracking of individual users‘ behaviour. In fact, these types of mobiles, with a laud alarm, are essential to security services for protecting children. An article of IT Media News in 2006 reported that 64% of the 880 parents considered that they liked to let their children have a mobile phone with the crime prevention facilities (http://www.itmedia.co.jp/survey/articles/0602/02/news018.html accessed on 16.01.2010). The *all in one* mobile which is equipped with facilities of rail pass card, driving licence, health insurance card and the *Juki* net card with owner‘s biometric information will be developed and be used to show personal identification as a basis of social security.

Many motorcars have already been equipped with an automobile navigation system with GPS, a terminal of the electronic toll collection (ETC) system and a vehicle video system. In conjunction with the N system, the automatic number plate recognition the police operate, these equipments are able to be utilised for almost real-time tracking of motorcars.

Ordinary Japanese seem rather to hail installation of these traceability systems than to despise due to convenience as well as security and safety they can provide. Behind this attitude Japanese people‘s trust in the governments‘ benevolence exists. This reflects the fact that Japanese tend to have little awareness of their rights (Kawashima, 1967). However, this tendency may let them miss manufactured risk the systems can bring about.

3. Aspects of Japanese Risk Society

3.1 Industrial Civilisation and Resultant Risk in Japan

After defeat in the war, Japan arose from a devastated land and has become one of the world's top economic powers. The heavy industries had been a driving force of the miracle economic growth at least till the early 1990s and the industrialisation brought about significant social transformation. For example, urbanisation accompanied with the development of commuter towns had eroded functions of traditional local communities. On the other hand, Japanese companies' employment systems based on lifelong employment developed the centripetal force of companies and people's sense of belonging to their companies and communities centred on businesses, which are typically observed in business castletowns and company housing still now, were formed. This can be understood that rural collectivism was transformed into urban collectivism through the industrialisation in Japan. *Seken*, which is a small world, Japanese people believe to live in, defined by relationships with others whom the person recognises a present and/or future connection with and, therefore, considers the need to do his/her duty toward and to have human empathy with (Abe, 1995), was modernised.

However, the burst of the bubble economy in 1991, the economic policies adopted by the Koizumi administration which sought a smaller government and aimed at revitalisation of private-sector economic activities and the resultant change of employment systems in Japanese companies made risk which had been manufactured imperceptibly during the industrial civilisation come up to the surface. The social functioning of both traditional and modernised *seken*, and consequently of families as well, was deteriorated and this made people more individualistic than ever as seen in the new trend of people to find a positive meaning of job-hopping as well as of divorce for their lives. Long-term relationships with other individuals and organisations have not necessarily been assumed in business and community lives. Unashamed mammonish behaviour engaged in by businesspeople, which was deterred by the functioning of *seken*, has often been observed recently. The maturation of domestic economy and the consequent globalisation have spurred this tendency.

3.2 Reflexive Assurance Society

In terms of their ways of thinking and behaving, Japanese people are living not in society but in *seken*. They consider that disasters, illness, war and crimes are from *ikai* or a different world from *seken* as the normal world (Nakada and Tamura, 2005). People living in *seken* feel that *seken* is the secure and safe world and they don't need to be sensitive to crime prevention because it is assumed that all the people in *seken* have long-term, mutually interdependent relationships. Instead, *seken* often has the exclusive nature and people tend to remain aloof from those who are outside *seken*. As described above, however, the social functioning of *seken* has already been deteriorated. Kawai (2004) states that the traditional social structure to maintain public safety has already changed and this change has brought about public concerns about the deteriorating conditions of social safety in Japan. It has become hard to set a boundary between a safe area and a dangerous area as well as a safe period of time and a dangerous period of time; heinous crimes occur not only in a entertainment district in the night but also in a residential district in the daytime. Kawai's indication means that Japanese people recognise the boundary between *seken* and *ikai* has already blurred and everyone can be a suspicious person.

Japanese psychologist Toshio Yamagishi expresses a similar view. Through the psychological experiments, he clarifies that the level of mutual trust, which is defined as one's expectation of goodwill and benign intent of others, among Japanese is lower than among Americans and points out that Japanese people's expectation of benign behaviour of others has been based on assurance or *anshin*, the knowledge of the incentive structure surrounding the relationship with them. In the collectivism society, Japanese people enjoyed living in assurance society, or modernised *seken*, where stable relationships with a limited number of fellow people or organisations guaranteed their benign behaviour. The recent public concern about social security and safety reflects the dismantling of assurance society (Yamagishi and Yamagishi, 1994; Yamagishi, 1998).

The current efforts to regain public security and safety undertaken in Japan seem to be an attempt to reconstruct assurance society. Risk which can disturb assurance in modernised *seken* is analysed with science and technology after the fashion of risk society and countermeasures against the risk are

developed and implemented. However, such reflexive assurance society may amplify people‘s distrust against strangers and fear for crimes and sap social vitality.

3.3 Risk Manufactured by Illimitable, Never-ending Quest for Security and Safety

Japanese people, who have accustomed themselves to living in assurance society or modernised *seken*, may recognise it is an ideal to construct society where an incentive system works well so that everyone doesn‘t need to concern about public security and safety at all. Actually, the government-led proactive approaches to pursue complete public security and safety using ICT have been taken in Japan based on public fear for crimes. This reflects the paternalistic tendency of the Japanese public sector and Japanese people‘s general trust in the governments. A significant number of people strongly support the approaches (Ito, 2005; Aoyagi, 2006, Goto, 2009).

However, these types of approaches inevitably entail considerable risk. Is it correct to prepare for crimes assuming that anyone may commit a crime? Anticrime measures based on the belief that everyone can be a suspicious person and the theories of environmental criminology, which are prone to be the cause of mutual distrust among people, would require tireless 24/7 security activities with use of both human and electronic eyes. The slippery slope scenario would be realised; anyone would be monitored anytime and anywhere. The phrase that if you have done nothing wrong, you have nothing to fear would legitimatise the man-machine monitoring. Under the circumstance where the surveillant assenblage (Haggerty and Ericson, 2000) in which human and electronic little brothers (Whitaker, 1999) participate works well, people would be encouraged or coerced to behave as others, in particular regulators, expect. This may cause a totalitarian atmosphere in society.

A variant of panoptic sort (Gandy, 1993) or social sorting (Lyon, 2001; 2003) is another type of risk manufactured by illimitable, never-ending quest for security and safety. Target of the sorting would be strangers including foreign visitors, seemingly delinquent youngsters and mentally disabled people. One‘s unordinary features and behaviour would easily be detected by the monitoring systems and could be a legitimate reason to exclude him/her from the community. This would bring about social intolerance towards diversity and suspicious people would be rounded up by *proper* citizens. Elimination of suspicious people from local communities may bring about emergence of slums which have not existed in Japan. In addition, the construction of a community surrounded by the invisible wall of the man-machine surveillance systems to protect children may affect their mental growth; when they grow up, they would become adults who would not be able to evaluate risk properly and would have trouble trusting and cooperating with others.

Moreover, installation of the anticrime systems has tended to be decided through sub-politics in local communities with the cooperation of local police agencies. Security gadgets and gizmos as well as security services have been invented by companies in the security industry through their own sub-politics. Desultory, stopgap development and implementation of high-tech surveillance systems as measures against deteriorating conditions of public security and safety may cause serious problems for the future generation. Such implementation would bring about increasing asymmetry in the monitoring process (Andrejevic, 2007), although the socio-political context in which the high-tech systems are operated should be appropriately controlled by citizens through democratic processes. In addition, the existence of the high-tech surveillance systems itself contains the potential risk. This can be operated as a strong tool to control people and it is not necessarily true that an administration established through democratic procedures never adopt repressive policies. This type of risk should not be underestimated.

4. Conclusion

Ironically, development and implementation of ICT-based security systems aimed at constructing a completely secure and safe or no risk society would inevitably entail manufactured risk which should lead to serious problems in the future. Japanese, who seem to engage in creating this sort of society have to recognise that it is very hard to pursue complete security and safety using ICT without losing anything. What is important for them is to analyse, evaluate and control the risk appropriately.

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THE HUMAN MASTER WITH A MODERN SLAVE? SOME REMARKS ON ROBOTICS, ETHICS, AND THE LAW

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Abstract

The purpose of this paper is to focus on two of the most relevant ethics-related issues of robotics, that is, agency and responsibility. In order to prevent some exaggerations and misunderstandings in today's debate, a legal perspective provides a common framework so as to understand why robots may be comprehended as a sort of modern slave. Like slaves in Ancient Rome, robots are reckoned to be simple 'things' that, nevertheless, play a crucial role both in trade and commerce. While, from an ethical point of view, the paper suggests that robots should be considered as moral patients and as an increasing source of both good and evil, this novel kind of agency raises new responsibilities, *i.e.*, robots' liability for specific contractual obligations and human liability for their artificial agents' behaviour. Some of the most relevant issues concerning the future of ethics and robotics are strictly entwined with this latter form of extra-contractual liability, that is, human legal responsibility for others' autonomous acts.

1. Introduction

Ethical issues of robotics are cutting the edge nowadays. It suffices to mention the "Roboethics Roadmap" of the European Robotics Research Roadmap (EURON) from 2007, in which:

- The specificity of robotics is stressed and three "main positions" for roboethics are proposed; namely, disinterested in ethics, interested in short-term ethical questions, and involved with long-term ethical concerns;
- A roboethics taxonomy is presented by distinguishing humanoids, advanced production systems, adaptive robot servants, network and outdoor robotics, health care and life quality robots, military robotics, and edutainment-related robotics;
- The particularity of the problems that have emerged in each particular field is pointed out.

For example, dealing with humanoids, we should tackle the reliability of their internal evaluation systems, the unpredictability of their behaviour, the traceability of evaluation and actions procedures, as well as matters of safety and security. While "wrong action can lead to dangerous situations for living beings and the environment, (…) ill-intentioned people (could) modify the robot's behaviour in dangerous and fraudulent ways." (EURON's Roboethics Roadmap, 7.1.4)

In order to theoretically address these problems and deepen some of the ethics-related issues of robotics in today's debate – foremost, liability and agency – this paper is presented in seven sections, which are divided in two parts.

In the first part (sections 2-4), I examine three legal metaphors on robots, that is, robots as killers, as fridges, and as slaves. Let aside Leibniz's seminal remarks on machines and the law, there is in fact a long and well-established tradition on this topic which is entwined with the use of analogy in legal reasoning. It is enough to recall that the "Automaton's law" was a very popular subject among German scholars in the late 1800s, as shown by Günther's *Das Automatenrecht* from 1891, Schiller's *Rechtsverhältnisse des Automen* from 1898, and Neumond's *Der Automat* from 1899. This tradition has established a common framework which represents a good starting point for dealing with robots and ethics. Since "there is no single generally accepted moral theory, and only a few generally accepted morals (…), the legal framework provides a system for understanding agency and responsibility, so we will not need to wait for a final resolution of which moral theory is 'right' or what moral agency 'really is' in order to begin to address the ethical issues currently facing robotics." (Asaro 2007, 2)

In section 2, I explain why legal scholars do not buy the popular idea "that robots can and will commit crime" (Reynolds and Ishikawa 2007). As a matter of fact, it would be legally meaningless to discuss before a judge whether or not a robot ought to be found 'guilty.'

In section 3, I present the more traditional legal viewpoint, according to which matters of liability and responsibility involving robots mostly concern private law. In other words, robots should be considered as a sort of "refrigerator" (Floridi 2007), a "toaster" or a "car" (Asaro 2007), rather than a "killer" to be judged before a Court (Epstein 1997).

In section 4, I point out that both the unpredictability of current robots' behaviour and their capability to act on human behalf call for a rethinking of the traditional legal framework. If robots can hardly become 'killers,' it is also unlikely we can go on conceiving them as simple 'fridges.' We are dealing with a new form of agency that has suggested some scholars to think about robots as if they were 'slaves.' As Katz (2008) claims, "like a slave, (the robot) is capable of making decisions which will affect the rights (and, in later law, the liabilities) of its master. By facilitating commercial transactions, autonomous agents have the ability to increase market efficiency. Like a slave, an autonomous agent is capable of doing harm."

In the second part of the paper (sections 5-7), I insist on some flaws of the analogy and, more particularly, of the parallelism between slaves and robots as 'things' that play a crucial role in trade and commerce. By stressing the differences between metaphors, rhetoric, and models of science, Max Black (1962) has already shown why metaphors may be useful but do not play a crucial role in sound scientific research (Pagallo 2008). This means that thinking of robots as modern slaves entails the risk of an anthropocentric standpoint which falls short in coping with today's ethics-related issues of robotics.

Yet, the analogy grasps one important aspect, in that robots shape new forms of human legal responsibility for *others'* behaviour (*e.g.*, tort law and vicarious liability in the common law tradition and its counterpart in civil law systems, *i.e.*, objective responsibility).

In section 5, I illustrate why this *new* form of liability – *pace* Asaro – suggests we rethink the traditional legal framework in the light of the current debate in ethics. A good starting point is offered by Floridi and Sanders' (2005) remarks on "the morality of artificial agents." This view enables us to properly define the concept of agency and to separate the concerns of morality and responsibility of the agents.

In section 6, the specificity of both ethical and legal issues concerning robotics is examined in connection with Bynum's (2006) general account of the nature of information ethics and the idea that what is good or bad, even in robots' behaviour, can be defined as anything that improves or damages the informational nature of the universe. This allows us to overcome some deadlocks of today's debate, as exemplified in Teubner (2007).

The conclusion is that the analogy of Roman slaves should be cautiously used both for legal and ethical reasons: While some scholars (Moravec, 1999) have already proposed a sort of 21st century Hegelian master-slave dialectics, it is important to understand the uniqueness of the problems we are facing in terms of moral agency and legal responsibility for others' behaviour.

2. The metaphor of robots as killers (and why lawyers do not buy it)

The common legal standpoint excludes robots from any kind of criminal responsibility because they lack psychological components such as intentions or consciousness, *i.e.*, the set of preconditions for attributing liability to someone in the case of violation of criminal laws like murdering or stealing. Robots would not be epistemically aware of their own behaviour like 'wishing' or 'wanting' to act in a certain way. Since consciousness is a conceptual or moral prerequisite both for legal and "moral agency" (Himma 2007), the conclusion is that even when Robbie CX30 assassinated Bart Matthews in Richard Epstein's story on *The case of the killer robot* (1997), the homicide remains a matter of human responsibility. Whether the fault is that of the Silicon Valley programmer indicted for manslaughter or of the company, Silicon Techtronics, which promised to deliver a safe robot, it is still meaningless, according to current legal science, to put poor Robbie on trial.

In fact, most legal systems provide for the criminal responsibility and agency of some 'artificial' persons like companies, organizations, governments, or corporations. Yet, their liability is always reducible to an aggregation of human beings as the only relevant source of their action. Even when considering "a new kind of escalating technology – autonomous robots soldiers – and with them new pressures to revise the rules of war to accommodate them" (Asaro 2008), threats and challenges in

lowering the barriers of entry to war, provoking accidental wars, etc., do not concern robots' own responsibility.

It is still highly debatable, however, whether robots lack all types of agenthood. After all, we already have proper 'artificial agents' that are interactive, autonomous, and adaptable. According to the criteria pointed out by Allen, Varner, and Zinser (2000) in their work on the status of artificial moral agents, robots respond to stimuli by changing the values of their own properties or inner states and, what is more, they are able both to modify these states without external stimuli and to improve the rules through which those very states change. These capabilities do not only imply the unpredictability of robots' behaviour as well as their ability to act on human behalf. They also suggest that we are dealing with a new source of moral agency, since robots, like animals, children and, obviously, adult human beings, can cause actions, morally qualifiable as good and evil (McFarland, 2008).

Consequently, robots may represent a meaningful target of human censorship. We can, for instance, take the following actions: "(a) monitoring and modification (i.e., 'maintenance'); (b) removal to a disconnected component of Cyberspace; (c) annihilation from Cyberspace (deletion without backup)." (Floridi and Sanders 2005, 24)

Nevertheless, by extending the class of morally accountable agents so as to include the artificial agency of robots, we need not admit either their moral responsibility or their criminal liability. As in the case of children's actions or the behaviour of animals, the reason hinges on the need of differentiating the source of relevant moral actions from the evaluation of agents as being morally responsible for a certain behaviour. This is why Floridi and Sanders, who acknowledge the moral accountability of artificial agents, readily concede "that it would be ridiculous to praise or blame an artificial agent for its behaviour or charge it with a moral accusation." (*op. cit.*, 17) Once we can tell moral accountability from moral responsibility, we can address Daniel Dennett's question on "who's to blame, when HAL kills?" (Dennett 1997, 351), by saying "that HAL is accountable – though not responsible – if it meets the conditions defining agenthood." (Floridi and Sanders 2005, 26)

As far as the state-of-the-art in criminal law is concerned, it is thus pointless to debate before a judge whether or not a robot should be considered a 'killer,' a 'robber,' and so forth. Even if we assume that some sort of moral accountability is a necessary requirement for legal responsibility, the former does not represent the sufficient condition of the latter, because respondents ought to be subject to the ordinary process of moral appreciation in order to determine whether or not they are guilty in the name of the law. Otherwise, by blurring accountability and responsibility, we would be forced back to the days when criminal trials were commonly performed against animals (Ewald, 1995): The reasons underpinning the legitimacy of inflicting punishment in modern criminal law such as the theory of retribution, of special and general prevention, would be devoid of meaning. Can we reckon robots paying their debt to society? Can we correct their moral character so that robots fully understand why they ought not to repeat an evil action? Should we punish them so as to dissuade human beings from committing similar wrongs?

Because lawyers believe that homicides and other criminal matters necessarily presuppose the responsibility of human beings, the state-of-the-art in legal science does not think of robots as 'killers' or 'robbers.' Rather, according to its conception, "robots are completely unremarkable technological artefacts, no different than toasters or cars." (Asaro 2007, 2) Let us examine the scope of such an idea.

3. The metaphor of robots as fridges (and why lawyers should abandon it)

Today's legal robotics are relevant exclusively for the realm of private law, namely, in dealing with contractual and extra-contractual obligations. Robots are in fact considered as simple 'objects' with which we successfully tackle a task, "even if they have the intelligence of a refrigerator." (Floridi 2007)

While examining some legal aspects regarding the production and use of robots, I set strict contractual obligations aside, because conditions, terms, and clauses depend both on the voluntary agreement between private persons that a court will enforce, and on the commercial or non commercial nature of that agreement. It is enough to recall the difference between surgical robotics and robot toys, between industrial and military robotics, and so forth.

Beyond the panoply of strict contractual obligations, there is what U.S. lawyers define as torts, that is, "obligations between private persons that are imposed by Government." (Abernathy 2006, 646) More particularly, lawyers distinguish the responsibility for the production and use of robots in the

light of three different kinds of tort: Intentional, negligence-related and grounded on ‗objective responsibility.‘

First, we have intentional torts when a person has voluntarily performed the illegal action.

Secondly, there is negligence when the ‗reasonable‘ person fails to guard against ‗foreseeable‘ harm.

Finally, objective responsibility is at hand when the law imposes liability without regard to the intent of the tortfeasor as in the paradigmatic case of the ‗tort of product liability.‘ This is why we find those extremely detailed and sometimes strange labels on products, according to which the manufacturer warns about risks or dangers involving the improper use of the artefact.

However, compared to this traditional legal framework, robots are raising brand new problems, implying that they should not be considered as simple ―enhanced toasters" (Asaro 2007).

On the one hand, these artefacts are (and will increasingly be) capable to learn the features of their surrounding environment and of the living beings who inhabit it, while gaining knowledge or skills from their own behaviour. This capability means that robots will not only be unpredictable for their users but for their human designers as well. ―So, without necessarily imagining some Sci-Fi scenarios where robots are provided with consciousness, free will and emotions, in a few years we are going to cohabit with robots endowed with self knowledge and autonomy – in the engineering meaning of these words." (Verruggio 2007, 27)

On the other hand, it is likely that autonomous robots will create new forms of legal agency, intended as the relationship by which a party grants authority for another to act on her behalf so as to deal with a third party. ―Accordingly, the legal responsibility for the actions of a robot falls on the individual who grants the robot permission to act on their behalf. (…) Such a law might, however, place a too heavy burden on the owners of robots, preventing the adoption of robots due to risk, or unfairly protecting manufacturers who might share in the responsibility of misbehaving robots due to poor designs." (Asaro 2007, 3)

The result is that both the unpredictability of robots‘ behaviour and their capability to act on human behalf call for a rethinking of the traditional legal framework. If robots can hardly become ‗killers,‘ it is also unlikely we can go on conceiving them as simple ‗fridges.‘ Let us examine the third image of robots as possible ‗legal slaves.‘

4. The metaphor of robots as slaves (and why lawyers should take it seriously)

Taking the autonomy of artificial agents seriously, some scholars have proposed a suggestive parallelism between robots and slaves insofar as the jurists of Ancient Rome would have anticipated many of today‘s issues involving artificial agents and robots, ―by defining an advanced legal framework to cover the rights and obligations arising from slave ownership." (Katz 2008, 2)

In order to understand how the law can cope with the enforcement of rights and obligations created by robots, on the one hand, and the question of liability for damages caused by them on the other, let us focus on the Roman idea that slaves were ‗things‘ that, nevertheless, played a crucial role both in trade and commerce: The slave élite, as in the paradigmatic case of the emperor‘s slaves, were estate managers, bankers, and merchants. They had the legal capacity to enter into binding contracts, to represent their masters, to hold important jobs as public servants or for their masters‘ family business, to amass, manage, and make use of property. Although most of the slaves certainly had no rights to claim against their own masters, some slaves enjoyed a significant ―autonomy" (Ŝtaerman & Trofimova 1975, 53). Consequently, by considering how today‘s artificial agents negotiate, make contracts, establish rights and obligations between humans, is there something we could learn from Ancient Roman law?

One of the most interesting institutions is the ‗peculium.‘ In the phrasing of the Digest of Justinian, it is ―the sum of money or property granted by the head of the household to a slave or son-in-power. Although considered for some purposes as a separate unit, and so allowing a business run by slaves to be used almost as a limited company, it remained technically the property of the head of the household." (Watson 1998, xxxv-xxxvi)

As a sort of proto-limited company, the peculium aimed to strike a balance between the claim of the masters not to be ruined by their slaves‘ businesses and commercial activities, and the interest of the slaves‘ counterparties to safely transact with them. While, most of the times, masters‘ liability was limited to the very value of their slaves‘ peculium, the legal security of the latter guaranteed slaves‘

counterparties that obligations would have been met. Thereby, depending on both the kind of activities and status of the slaves as *dispensatores*, *ordinarii*, etc. (for the long list see Ŝtaerman & Trofimova 1975, 82), there were different types of lawsuits or *actiones*: *exercitoria*, *institoria*, *tributaria*, etc.

Some scholars (Katz 2008) have thus suggested to apply this old institution to contemporary transactions mediated by artificial agents and tomorrow‘s intelligent robots. Given the increasing extent of their autonomy, a new sort of peculium could in fact represent the right way to approach and balance the different human interests involved. While, by employing robots or artificial agents to do business, transactions, or contracts, people could claim a limited liability, robots‘ peculium would guarantee their human counterparties, or other robots, that obligations would really be met.

Besides, when compared to other artificial agents and the typical issue of anonymity on the internet, most of the interactions with robots will have the advantage of avoiding the though issue of anonymity, in that transactions, contracts, businesses, will often be in the ‗real world.‘ This does not mean, of course, that we will need no new business models as those proposed for artificial agents: It is enough to recall the insurance model illustrated by Curtis Karnow (1996), or the authentication model of Andrew Katz (2008). Robots will raise issues of trustfulness, reliability, traceability, identifiability, and the like, along with psychological problems related to the very interactions with robots as matters of attachment and feelings of subordination, deviations in human emotions, etc. (Verruggio 2007, 29)

Nonetheless, from a legal viewpoint, we should not miss the crucial point: The very idea of the peculium as well as the parallelism between robots and slaves are so attractive, because they show a sound way to forestall any legislation that might prevent the use of robots due to their risks and the consequent excessive burden on the owners (rather than, say, on the producers of robots). By striking a balance between people‘s claim not to be dilapidated by their robots‘ activities, and the interest of the robots‘ counterparties to be protected when transacting with them, an updated form of peculium seems particularly interesting in order to address a new generation of contractual obligations and a novel source of agency as well. Regardless of whether you are ready to admit that robots would be ‗legal persons‘ (Solum 1992), the characteristic pragmatism of the jurists of Ancient Rome indicates how to achieve both forms of limited liability for the owners of robots and of business warranty for robots‘ counterparts.

5. A final metaphor: robots as pets?

There is something problematic with the metaphor of robots as slaves and, even recently, it is noteworthy that some scholars have proposed further parallelisms, *e.g.*, robots as pets (McFarland, 2008).

A reason against the metaphor of robots as slaves concerns problems of extra-contractual liability for damages caused by robots. This scenario transcends the mechanism of peculium and involves what Roman jurists defined in terms of Aquilian protection (Zimmermann 1996, 1017), namely, the form of responsibility which stems from the general idea that people are held liable for damages caused to others because of their own fault.

As stressed above, this type of extra-contractual responsibility comprises specific forms of ‗strict liability torts‘ which correspond to the idea of ‗objective responsibility‘ in the civil law tradition. In other words, people are held liable both for the damages caused by their own dangerous activities, as in the case of some torts of ‗product liability,‘ and the harm caused by their children, animals, and even employees, although there is no illicit or culpable behaviour of the human held liable by a given system.

Hence, by considering that robots are interactive, autonomous, and adaptable, we need a new conception of responsibility for *others*‘ behaviour: While the institution of peculium can guarantee a form of legal accountability for what robots do in the field of contractual obligations, it is likely that we will face a novel kind of ‗objective responsibility‘ for the consequences of the behaviour of robots in the realm of extra-contractual obligations. In order to illustrate how such a new responsibility may be construed, it is important to understand how the burden of proof is allocated in similar cases.

Sometimes, law imposes liability without regard to the intent of the subject or her use of ordinary care. Employers, for example, are often held liable for any illicit action the employees engage in under their working contract activities. In the case of robots, such a policy could obviously be mitigated so as to prevent the risk that people think twice before using or employing robots at all. We could

perhaps make insurance compulsory as we have done in most legal systems with cars. We might also extend the mechanism of peculium by determining that human extra-contractual liability should be limited to the value of their own robots' portfolio (plus, eventually, the compulsory insurance mentioned above).

Anyhow, legal systems also provide for limits to such objective liability. This is what typically happens to parents who evade responsibility for their children's behaviour when they prove they could not prevent their own children's actions. This is also what occurs to the owners of animals when they prove that a fortuitous event happened. Regarding the set of dangerous activities, some legal systems exclude responsibility if there is proof that you had taken all the 'appropriate measures' in order to prevent damage. This aspect of extra-contractual responsibility is useful for attempting to understand what sort of limited liability fits our robots. Once we agree they are neither killers nor simple fridges, should the behaviour of our modern slaves be legally assimilated to our children's actions? Alternatively, should we assume that the behaviour of robots is ontologically or intrinsically dangerous? Or, as David McFarland (2008) claims, should we compare robots' behaviour with the actions of our own pets?

All in all, although the image of robots as 'pets' sheds further light on many aspects of tomorrow's legal status of robots, it is unlikely to run across one single metaphor able to grasp all of the next generation of robot-related issues in the realm of extra-contractual liability. What is highly probable, in fact, is that the key legal point will concern how we educate, treat, or manage our robots, as it occurs with pets *and* children. This kind of extra-contractual liability does not exclude robots' autonomy since they will keep a certain sphere of 'freedom' which is compatible with the legal responsibility of the owners. Besides, this sort of objective responsibility for what an artificial state-transition system *chooses* to do, suggests new forms of prosecution in the hypotheses of humans who unjustly damage or destroy their own artificial companions. Contrarily to the status of slaves in Ancient Rome, it has been argued that robots have or should have some specific 'rights,' insofar as they represent "new juridical actors" with "legal capacity of action" (Teubner 2007). After general matters of moral accountability and legal responsibility, let us now look at this specific point.

6. Moral robots

Legal systems provide for a number of sanctions in the case of intentional misuse of power, mistreatment of animals, vandalism, etc., that could easily be adapted to ensure robots' protection. The reason hinges on what Luciano Floridi illustrates as "the most general common set of attributes that characterises something as intrinsically valuable and hence as subject to some moral respect, and without which something rightly be considered intrinsically worthless or even positively unworthy and therefore rightly to be disrespected in itself." (Floridi 2003)

From this outlook we should admit that robots are informational objects par excellence and, more particularly, that they are moral 'patients' or receivers that deserve respect and protection as such. The "legal personification" of robots as slaves with no rights (or duties) appears ethically flawed since robots enrich and improve the informational complexity of the universe. In the terms of Terrell Bynum's account of information ethics, evil appears "as everything that damages or impoverishes" the informational nature of the universe (Bynum 2006, 17), so that it is hardly debatable that what robots most of the times do is 'good.' In the hypotheses of humans who unjustly damage or destroy their own artificial companions, legal systems ought to properly envisage forms of prosecution so as to preserve consistency between robots and their owners.

However, what about robot soldiers and the menace of artificial agents that act and decide beyond any control of their human counterparties?

For example, some scholars, like Gunther Teubner (2007), stress the "striking differences" in today's "legal personification" of both robots and animals. Because "animal rights and similar constructs create basically defensive institutions" – and, hence, "the old formula of social domination of nature is replaced by the new social contract with nature" (Serres 1995) – Teubner argues that "for electronic agents, the exact opposite is true. Thus legal personification, especially in economic and technological contexts, creates aggressive new action centres as basic productive institutions." (Teubner 2007, 20)

From this perspective, the ethics-related issues of robotics would then update problems of alienation and reification of social relations which troubled both Karl Marx (*Entfremdung*) and Martin Heidegger (*Verdinglichung*). What is new about roboethics is a "socialization of things" where electronic agents act and decide beyond human control. "In the dynamics of alienation and re-appropriation the question of the law is: Will new constitutional guarantees be in a position to counteract the infamous 'Code', the electronic architecture of the internet? Will economic, social and technical transactions run by electronic agents be brought back under human control?" (Teubner 2007, 21)

An informational perspective allows us to address these issues by paying attention to the ways in which people, animals, and robots interact and how they improve or impoverish the informational nature of the universe.

So, on the one hand, Teubner is wrong by focusing exclusively on the differences between today's "legal personification" of robots and animals. Regardless of their artificial or natural status, they are both moral patients and source of good and evil, that deserve respect and protection as informational objects.

On the other hand, it is likely that "if we are to build robots that have artificial intelligence and the potential to harm us, then we must ensure that they behave ethically" (Blake, Stahl, and Fairweather 2008), so as to prove how it is possible that by "using technology we can make life comfortable and fulfilling" (Blake 2007). In fact, this is not only crucial when we examine – as we did in section 4 – the moral accountability of robots and some specific forms of *their* legal responsibility in the realm of contractual law. The ethical behaviour of robots is also relevant because their potential harming us proposes a new kind of human liability for *others'* actions (see *supra* section 5). If this is not the first time that legal systems and lawyers tackle the autonomy of artificial agents, it is however the first time that this modern form of legal liability is not reducible to an aggregation of human beings. At the end of the day, we should be prepared to accept a new category of behaviour which is not purely human nor barely animal, yet produces multiple relevant legal effects.

7. Conclusions

In the first part of this paper, I have insisted on the distinction between moral accountability and moral responsibility, and why robots do not raise matters of criminal liability: From a *legal* viewpoint it is *hors de question* that homicides, robberies, and the like, necessarily imply the responsibility of human beings.

Next, I noted that, along with traditional cases of tort law and contracts, robots propose a novel generation of ethical and legal issues, *e.g.*, new forms of responsibility for *others*' behaviour. Even though the metaphor of robots like slaves appears both ethically and legally flawed, it allows us to grasp one paramount aspect of the ethics-related issues of robots: Whether or not you admit their moral agency, robots *legally* act.

Such a new kind of agency implies new responsibilities like robots' liability for specific contractual obligations or people's responsibility for some of their artificial agents' autonomous behaviour. Among the most relevant issues concerning the future of ethics and robotics, this latter form of extra-contractual liability should be morally addressed by scholars in order to define its limits, as lawyers do when distinguishing between a fortuitous event (robots as pets) and the prove that you could not prevent a robot's action (robots as children).

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BLOGGING AS A UNIQUE EXAMPLE OF POLITICAL SHOW IN CYBERSPACE

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Abstract

Politics marks its presence in the cyberspace very distinctively. A frenzy of blogging has recently set in the political arena. To my mind, it is a relatively new, yet still underestimated, but very promising element of the political show. As a web service a blog is not a new phenomenon. This category is researched by numerous fields of science, which keep track of the latest communication trends. Nevertheless, the application of this particular tool in the political arena still remains unexplored. This work aims to prove that, on one hand, blogs take political debates to the next level and, on the other hand, in final calculation this phenomenon is positive for democracy development. Furthermore, it finally must be pointed out that political blogging (this terms refers both to creating a blog and to a simple participation in it) leads to the reinforcement of the active stance in the political culture.

1. Political blogging

Before the problem can be discussed, a proper introduction must be made and the basic terminology explained. At this point I will present a definition of a blog, which is adopted for this work in particular, and will elaborate specific characteristics of a political blog. A blog is an Internet diary, which is based on the World Wide Web, that is one of the most popular web services. In other words, it is a website, the content of which is created by both its author and the Internet users, who enter it. It is the author, who decides (to a smaller or larger extent), what a blog looks like and submits new content with new diary entries (so called posts). The website visitors can also add posts and comment the author‘s entries. The literature of the subject provides numerous definitions of a blog. For the purpose of this work I will adopt the definition of a blog by Olechnicki, for whom blogs are private diaries made public in the Internet, systematically updated Internet websites, which are organised in a chronological order (Olechnicki 2009). However, the chronological arrangement is different than in the case of a traditional diary. In the case of the latter, entries go from the oldest to the latest. While entries in the Internet diaries begin with now and go back into the past. It is assumed that the first modern blogs date back to 1999, yet Susan C. Herring argues in 'The Past, Present and Future of Weblogs' (2003) that the first website, which can be considered a blog in the true sense of this word, was created already in 1996 ('Scripting News' by Dave Winer), and the term 'weblog' was coined in 1997 by Jorn Barger (Olechnicki 2009), a programmer at Northwestern University‘s Institute for the Learning Sciences. He established one of the first interactive diaries (Robot Wisdom). Some time later Peter Merholz re-phrased the term to 'we-blog', which next was shortened to a 'blog', which is so popular today.

Blog authors most frequently use specialist services, which make diary keeping easy and comfortable (simple content management systems). The same goes for adding new texts, archiving old posts and providing comments by the visitors. At the moment the cyber space is cramped with various kinds of blogs. There are many typologies of this phenomenon. Numerous types of blogs can be enumerated by pertinent criteria. For instance, blogs can be divided by:

1. Their character and subjects discussed:
 * personal character, in the form of Internet diaries;
 * specialist, similar to vertical portals (the above blogs are most frequently kept by one Internet user, while the thematic blogs are sometimes kept by several authors – this is what we call a collective blog – see below);
2. By the number of authors:
 * individual blogs, i.e. kept by one person only;
 * collective blogs kept by several authors (for instance,: Slashdot, Ohmynews, iThink.pl) – they can often be considered media, thorough which civic journalists publish their articles.

3. By content matter:
 * text blog (news, guides, diaries, books);
 * videoblog (or a vlog), features a video;
 * photoblog, features pictures;
 * audioblog, features audio recordings (for instance, podcasts);
 * linklog, features links;
4. By the blogging instrument:
 * traditional blog, kept on a computer;
 * moblog, kept on mobile devices: cell phones and palmtops;
5. By the frequency of posts and comments:
 * dynamic blog – features posts made at least once a day and a large number of comments;
 * undynamic blog (Jeleśniański 2008).

This work however does not seek to render a meticulous typology of blogs, but to discuss one category only, that is a ―political blog". Wikipedia defines this term as follows – ―a common type of blog that comments on politics. In liberal democracies the right to criticise the government without interference is considered an important element of free speech. In other jurisdictions bloggers use the uncensored nature of the internet to bypass state controlled news media but as a result may find themselves persecuted (Wikipedia 2009) political blogs particular trends, which are a projection of the authors' subjective perception of the political reality, are more or less distinct. After all the blogs are kept, in a vast majority of cases, by persons either eagerly interested or directly involved in politics. Political affiliations of such people are usually very well-formed. It is for this partiality that an Internet diary, as a type of a media message, can be considered as a genuinely journalistic piece, while its informative values cannot be ignored.

This category can be further distinguished. For instance, Blogcatalog.com, which gathers bloggers from the entire world, divides political blogs as follows: anarchistic, conservative, democratic, ecological, comical, pro-independence, liberal, libertarian, moderate, informative, religious and pro-republican (Blogcatalog.com 2009). For the purpose of a preliminary analysis it seems sufficient to assume that the diaries are either kept by the politicians themselves and by the politically active Internet users (hence, people interested in politics) – observers of a particular political show. It must be noted that a large number of blogs (not only political ones) are ephemeral. The scene of political blogs is guarded by the best and the most persistent journalists, whose pieces are eagerly read and whose diaries are regularly updated with new posts, which in turn translates into plenty of visitors. Others either close their websites or simply abandon them by stopping to add new posts. These blogs sooner or later either are deleted or simply vanish in the abundance of cyber space information.

2. Political culture

―Political culture" is yet another term, which must be discussed. Social sciences are ambiguous about a proper definition of the discussed term. The term is most thoroughly elaborated in the political science literature, which describes and explains the problem for various analytical purposes. In this context a political culture can be defined as the values, attitudes and ideas as well as the civil approach to politics. The values are most frequently understood as fundamental, deeply-rooted convictions and instructions concerning what is desirable and also binding for us and for the entire society. The attitudes pertain more to the political system institutions and are less imbued. Ideas are treated as the most superficial form of communicating one's opinions or temporary preferences, which can quickly change (Meyer, Sulowski, Łukowski 2007).

It is crucial to realise the difference between the scientific definition of the term ―political culture" and the wide-spread, normative idea popular in the society, which is understood as a culture of political actions both taken by the society and by the politicians. The latter is more about elements of the political life, such as honesty, morality or tolerance, the style of mutual public relations, the manner of solving disputes, etc. For the purpose of this work the scientific description of the term ―political culture" seems more relevant, yet the normative aspects cannot be disregarded.

Political sciences distinguish many political culture typologies. The classical distinction into 3 basic types of political culture was put forward by G.A. Almond and his colleagues (Garlicki, Noga-

Bogomilski 2004). The division is into ―parochial", ―subject" and ―participant", which must be treated as ideal types. In reality political culture is a mixture of – to a larger or smaller extent – all three ideal types. Thus, we can discuss a predominance of a particular type of political culture in a given society:

1. **Parochial type**: It is characterised by a small interest in politics and hence a small political activity. The members of a given community are not fully aware of the existence and functions of political mechanisms. They know little about the political system, within which they exist and know even less (or nothing) about other political systems in the world. The community is not keen on maintaining relations with the outside world and the tribal life style is considered constant. At present this type of political culture is basically a historical model. It was characteristic for a majority of primordial societies and in Europe it was very popular in the early Middle Ages. Nevertheless, it is not totally defunct. It is still present in some African tribes on a low civilization level (Garlicki, Noga-Bogomilski 2004), where tribal lifestyle is handed down and magical rituals are more important than other forms of public activities. The chiefs of the tribes hold the political, religious an economic function. This type could be adopted in present democracies, but it is individual in its nature and stems from a specific approach to political problems in general (for instance, lack of any interest in the issue).
2. **Subject type (or subject political culture)**: It is present in communities made up of individuals aware of their political system and its mechanisms and influence on people's lifestyle, but who are passively subject to the decisions taken by the authorities. Under this type, people are not motivated to actively participate in the political life and do not take any initiatives. For the individuals there is no need to take political actions and they accept the fact it is the task of the elite at the helm to go into politics. This type means a total subjugation to the dominating power. It is evident that particular citizens can air their own opinions about the system and the dominating power (often critical about the authorities), yet they do not exert any influence on the political reality, as the citizens remain politically passive. This type of political culture is characteristic for authoritarian and totalitarian societies or for post-transformation societies, which are not ready yet to live in a democracy. This type can also appear in democracies, yet in such a case it does not cover the entire society but only its particular groups.
3. **Participant type**: Members of this society are fully aware of the political mechanisms and are ready and eager to take political actions, execute power. What is characteristic about this type is the fact that individuals co-creating the society seek to be able to influence the authorities and to make demands or to communicate their expectations towards the state authorities. Using the terms popular in political sociology we could name this engagement as an involvement in the process of ―political articulation" (Garlicki, Noga-Bogomilski 2004). This type of culture is characteristic for societies with deeply-rooted democratic traditions and it is prevalent in most of the developed democratic countries.

The abrupt ICT changes, which are connected with the establishment of the information society, undeniably support the development of the participant type of the political culture. Numerous culture theories prove that for a culture to survive, it must process and copy its rituals through communication (Grad, Kaczmarek 2005). Hence, even the first symbolic human behaviour (as referred to by Edward Leech. see: Goban-Klass (1999)), in the form of paintings on cave walls, can be considered an attempt to preserve a culture. Similarly, a political show resembles a specific religious ritual participated by masses (Cwalina, Falkowski 2006). In essence the show (with elections as its climax) is all about reconstruction and reinforcement of a particular model of political culture. Consequently, on one hand a political ritual preserves a political culture, but on the other hand, if a culture is reconstructed and creatively processed, it can be altered.

The first two types of the political culture (parochial and subject) are either based on a lack of a political ritual or on a ritual based on a mechanism with a minimum or no individual approach and a total subjugation to the dominating authority. From the point of view of the decision-makers from the first two political cultures, it is highly undesirable to express any independent political opinions, in particular if they are not in line with the ideology of the dominating authorities. Thus, the parochial and subject types of the political culture challenge free communication, which is characteristic of the information revolution. Thanks to various communication tools – including a blog – citizens (voters) stand a chance of expressing political opinions of their choice. As a result, through a blog, an independent point of view of an individual citizen can become a public opinion and create a sort of a ―community of ideas" or a ―community of experiences", that is a community of people sharing similar opinions on social, political and economic issues.

Interesting examples are to be observed on the Polish political scene. Under the previous administration (Prawo & Sprawiedliwość – Law and Justice) the language of politics grew more and more fierce. The rhetoric became more and more aggressive as the Polish society grew more and more polarised. The two opposing camps attacked equally ruthlessly. Interestingly enough, in this state of affairs political blogging became popular and politics was on everyone's lips. This was evident when the Polish voters went to the polls in 2007 with a highest turnout in years. Polish Internet users made an active use of the Internet, where they held their various political campaigns. Most of the information portals were bursting with comments and fierce discussions concerning every piece of political news. The trend was also observable in the local blogosphere, where both people not directly involved in politics and politicians discussed vehemently often slinging mud on their adversaries. This is when the term blog entered (or became popular) the language of Polish politics. Interestingly, on their blogs politicians resorted to blunt words, which they would never use on TV or in public. Despite the fact that numerous lawsuits followed and the political debates are less heated after the change of the administration in 2007, politicians are still insulted on blogs. This became a vital element of the Polish political culture. For instance: in late 2009 Leszek Miller - a left-wing Polish politician — called Wojciech Olejniczak, another left-wing politician, a —boyin short pants"(Wprost.pl 2009). Some time earlier, on his blog Janusz Polikot, a representative of the political centre, described Lech Kaczyński, the president of Poland, a —lsrimp" (eFakt.pl 2010). In early 2009 the same politician called reporters —tsuck-up turkeycocks". There are many more examples of this sort. It goes without a shadow of doubt that the bigger the interest in politics is, the more popular political blogging becomes. Jarosław Kaczyński, the leader of Law and Justice, after the 2007 defeat, admitted that the party was voted out to a large extent by young people – bloggers, who motivated their peers on-line to go to the polls.

Nevertheless, it must be stated that despite the fact blogs are, at least in theory, private Internet political diaries (after all this is the main purpose behind the web quasi-service), in fact they merely constitute (more and more frequently) elements of sophisticated political game. In a blog you are free to air your opinions, which you would not or could not share in front of a TV camera, in a radio or newspaper interview. This is the domain where politicians could use specific rhetoric. Blogs tend to feature words and characteristics, which are harsh and extremely personal. Their form and style make blogs the most aggressive elements of political discourse. After any unsuccessful clash with another politician (for instance, in a popular TV or radio programme) or an unfavourable press release, it is the blog where the defeated take revenge (in a ruthless and unrefined manner). Furthermore, it is here that a blogger can retaliate easily and without any repercussions whatsoever. There seems to be a certain unwritten rule at work, which says that every blogger can blog back. In reality it means that if you happen to come into harsh criticism (insults, slanders, etc.) at the Internet diary, your rebuttal can take the same form and manner. It appears evident that representatives of various parts of the political arena entered into a certain agreement, by virtue of which they are at liberty to sling mud at one another without any consequences at an Internet website. If in fact this is the case, then in the political show (with the traditional mass media playing the key role) a blog is a crucial valve, thanks to which all problems are kept at bay. Interestingly enough this process is international and common for various cultural circles.

Blogging has undoubtedly become an element of mass culture, as it is fundamental to the World Wide Web, which is one of the most prevalent web services. However, bloggers do not necessarily fit the generally accepted paradigm of mass public. I would rather describe them as politically involved Internet users, who, from the point of view of Internet-related issues investigation, do not match the description of a regular Internet user – a consumer of the symbolic content of the cyberspace. They do not passively browse through popular Internet portals (as it is the case for millions of average users of the global computer network). They are more viewers and participants, who make contributions to the show. Posts submitted by Internet users are saved on a server of a particular blog and can be read at a website, unless they are removed by the author (and, most frequently, an administrator). By rule administrators do not intervene or act upon the content of discussion fora. Under extreme circumstances, they remove posts which violate the accepted rules and regulations or generally approved norms or standards. Hence, administration is not (or at least by definition, should not be) so much about censorship but about elimination of vulgar and widely understood inappropriate posts (among others, advertisements). However, the task is challenging as political discussions always come

with extreme emotions. For many it is an opportunity of a lifetime – for the first time in the history of mass media, every participant of the political show can type his mind bluntly and juicily. He no longer has to shout at the top of his voice at a political rally (where additionally he could be pilloried), march in a manifestation (against or in favour of a given cause), leave his home or even an armchair. This entertainment is perfect for all those hungry for political sensations, who stand firmly by their beliefs. The extra perk is that it is all done anonymously. Particularly sly bloggers would even use their neighbours' names to sign their posts. At this point, the illusion of anonymity will not be elaborated on. Recapitulating, an Internet diary of a public figure constitutes a unique place in the cyberspace, where particular (social or political) affiliations can be easily expressed. Furthermore, it is also a place to observe social moods and collective expectations.

It should be emphasised that the Internet is very different from other mass media. Reporters, rather than politicians, inform us about politicians' activities. Hundreds of people come to meet a politician, while thousands come to a rally. Several hundred thousand readers can read about the meeting in a newspaper, while several millions can watch a TV report about it. Traditional media mediate between politicians and the public in the political show. This middleman is required but not always favourable and criticised. By creating an Internet blog, a politician gives up the burdensome mediation service. Whatever he writes at a cyberspace blog directly reaches the public, and the other way round. As a consequence, this can be seen as a specific type of a media show.

3. Conclusion

As a result, it seems justified that a blog is a useful tool for political debates and exerts a positive influence on the political culture. To my mind, this influence is observable in the political culture's shift towards the participant type and its reinforcement. I took up a similar subject five years ago at the 2004 Ethicomp conference in Greece in "The direction of evolution of the political culture" in times of violent expansion of informative techniques". At that time I sought to prove a more generic thesis, that is the positive influence of the cutting-edge ICT on the political culture. Hence, in this work the subject matter is more specific and the article discusses an aspect of a comprehensive process elaborated by me several years ago.

As observed by me in the past few years, the language of political discussions becomes more and more vehement. Owing to the marked high level of aggression in the language of modern political bloggers (it must be taken into consideration that this phenomenon depends on social and political factors different in every country), on one hand, we can talk of changes in the normatively considered political culture, which make it more fierce and also more impoverished. On the other hand, changes in the descriptive model of political culture are observable. Citizens – Internet users and bloggers (Internet users creating or reading blogs) - are more involved in the world of politics. These observations led to further research into political blogs in terms of the level of aggression in the political culture. As at this stage the research methodology is compiled, this work is above all a hypothetical and deductive article. Thus, it represents a valuable contribution to the scheduled research and an attempt to present the fundamental premises as well as to provide a theoretical discussion on the main ideas.

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EMPLOYING SOCIAL MEDIA AS A TOOL IN INFORMATION SYSTEMS RESEARCH

M.J. Phythian, N.B. Fairweather and R.G. Howley

Abstract

This paper examines how phenomena that are frequently called social media can be employed in information systems research. The paper describes social media and the issues underpinning the decision to develop and employ a number of those tools in a research project investigating the use of electronic services by UK government, along with feedback on others considered but not employed. The paper then describes the outcomes and benefits of using social media, along with the downsides, and some questions to be further researched. The primary conclusion is the improvement in turnaround time for feedback from academic research into the practitioner community.

1. Introduction

This paper deals with how phenomena that are frequently called social media can be employed in information systems research. The aim of the paper is to describe the decision to use social media, and outlines the development and employment of a number of social media tools in assisting a research project investigating the use of electronic media in UK government. The use of these tools was to gain contact with, and feedback from, the researchers' practitioner audience around the model being developed, along with raising awareness of key items from the literature being reviewed. The paper presents a summary of the findings around the use of social media as a research tool, and also briefly examines the reasons behind one particular finding, that some government IT managers are guarded about the use of social media.

1.1 Background

Social media, also known as Web 2.0 services and tools, can perhaps be best defined by comparing them to their opposites, industrial media such as newspapers, radio and television. 'Social media' started as small-scale self-publishing employing tools such as Internet forums, weblogs, social weblogs, wikis, podcasts, and video, although now there are elements of industrial scale projects. O'Reilly (2006) is named as the author of a number of definitions and the latest and most complete appears to be:

"Web 2.0 is the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them. (This is what I've elsewhere called "harnessing collective intelligence.")"

In this research the harnessing or employment of collective intelligence was very important since, as described by Brabham (2008, p.81), "the web is the necessary technology that can realise the four-pronged specifications of crowd wisdom and flex a mass of users into productive laborers." In the academic instance this is important because as Floridi (2009, p.33) states it provides "a whole new generation of an increasing number of participants escalates the peer-review effect." In a recent example, the value of blogging as a research tool was evaluated by Vanattenhoven (2008) in the particular context of employing a weblog as an alternative to the traditional research diary. In reality the harnessing of "collective intelligence" is nothing new having been cited by Galton (1907), but employing the Internet as a mechanism for it is still in its infancy.

Meanwhile, as DiMaggio et al (2001, p.329) decry, sociologists were slow to study the Internet itself, most work being done by non-academic bodies, whilst the Internet is an instrument in itself! But usefully, one study of social networks, Kostakos (2009, p.5), considered a community of mostly experts to be less biased when reviewing work, despite the absence of quality mechanisms. A paper by Beer & Burrows (2007, p.1) describes itself as introducing "the idea of Web 2.0 to a sociological audience as a key example of cultural digitization that is moving faster than our ability to analyse it."

They also consider the role of Web 2.0 as research tools, along with considering the study of the —blogging in itself."

As highlighted by Mergel et al (2009, p.30) —what has fundamentally has changed with Web 2.0 technologies coupled with the Internet, is the ease in which interactive collaboration can occur between organizations or between individuals with very little technical know-how." Having access to such relatively easy-to-use tools in a fast changing practitioner world was a key factor in their employment, particularly when the research was in the area of government electronic service delivery and many of those practitioners involved should be investigating the use of such media as a part of their role in communicating with citizens.

1.2 Research instrument

As a part of a PhD research programme, one of the researchers developed a model, following a large-scale literature review, to consider the employment of feedback across multiple channels for all services, as a mechanism for local government service improvement. In order to test ongoing developments and any additional reading or events that might ratify or affect the model, it was decided to develop and use a weblog, as one of a range of tools which were employed to facilitate discussion of these ideas. The weblog was entitled —The Great E-mancipator" to provide a suitably memorable title relating back to the potential emancipatory power of electronic government as envisioned by various politicians, as observed by Maeijer & Zouridis (2004, p.2) —E-government has put a spell on public administration from Singapore to Uruguay and from the United States to Hong Kong."

The weblog became a _golden thread' of continuity or central vehicle throughout all phases of the research. The writing of it first started, towards the end of the initial literature review; it then became a promotional tool for the research, linking to best practice from the academic and practitioner literature; and to assisting in the promotion of the surveys; then to the collection of feedback across a range of related topics. Importantly, a hardcopy research diary was also maintained in the background, although the weblog itself became a diary of events and thoughts upon the literature, academic and industrial.

Establishing the weblog using standard tools available from Wordpress was relatively easy. As with any tool, practice made use easier and the main challenge was then to provide interesting content. Sources of material came from reading a range of publications, both academic and from the government IT industry, but, in addition, setting up an automated daily Google newsfeed to search for anything e-government-related brought up content both for the weblog and the research, this involved registering with Google to provide the emailed results of keyword searches on —e-government" and —transformational government" on daily basis. The newsfeed provided a daily email of any additional mentions of _e-government' discovered by the Google search robots as they crawled the Internet, allowing the very latest news across the world to be researched and reported upon, if felt worthy. It also became necessary to subscribe to electronic media sources, such as newsletters from the major consultancy companies with an interest in e-government.

Although with practice, posting and managing the weblog, along with occasional changes to layout became easier, there was still a certain amount of time required for extracting, writing and establishing well-linked posts. After a while it became apparent that averaging ten posts per month maintained an active number of visitors, it also became clear that around two hours were employed drafting, finalising and laying out each weblog entry. In some cases it was possible to extract information from the draft dissertation to be employed as the weblog post, whilst other entries became content in the draft dissertation following posting on the weblog, when their value was realised. The blog was established with a static home page in order to explain the nature of the project and emphasise the ethical and academic standing behind the research to any visitors. The home page also provided a simple ongoing survey of visitors as to their preferred measurement for channel management, which also provided a differing visual impact to the lists of posts, ranges of links to other sites, list of comments, search box, subscription buttons and —tag cloud" that made up the page. The use of the static page may have been at variance with traditional rolling weblog pages but in this instance it was believed key to emphasise that this was a research project with ethical approval.

The weblog was also a launch pad for the surveys, enabling supporting materials to be read, and then the survey to be reached by those wanting to complete it. This was also convenient when encouraging responses, since each posting was used to promote the survey, in the case of the second survey, along with later posts reporting initial feedback and thus prompting additional responses. Having the weblog

as a base for the survey, there was also an opportunity to have the ethical prologue displayed, along with background to the research, and interim feedback, which is highlighted by Denscombe (2005, p.8) when he concludes that ―research project Home Pages offer a voluntary, self-initiated means for dealing with the requirements of research ethics. They provide an eminently practical tool for ‗self-governance' that addresses a public audience of a) potential participants, b) actual participants, c) other researchers."

1.3 Other tools

As the weblog developed additional tools were discovered and introduced including a Really Simple Syndication (RSS) feed, a subscription tool and a tag cloud. The RSS feed was employed by another major public web site to deliver the weblog to a potentially different readership.

There were also some additional tools employed, such as the Google newsfeed, the Google Feedburner, which permitted people to subscribe to the weblog posts, along with employing other social media, such as Twitter, which was used by the researchers themselves to promote particular topics on the weblog as they arose. It was later thought necessary to maintain a record of Twitter followers, since these would probably be separate from any subscribers and might not necessarily link to the post in the same way.

Looking at additional tools that might be used included a brief exploration of wikis, video sharing and podcasting, which haven't been used to date, although the initial proposal considered a wiki but thought that encouraging content would be even harder than gaining feedback to the weblog from previous experiences with university department wikis and the well-know Blackboard application.

If a number of further applications failed to make the test bed, it was only due to shortage of time and energy. Learning about and applying material to each new wave of developments ate away at time for employing the traditional research tools needed for triangulation. As the project proceeded, additional tools for developing easily maintainable web sites became available and may have even provided a more aesthetically pleasing instrument, but it was important to remember that this wasn't ―vanity" publishing but a research project that needed to maintain a reasonably consistent and professional profile.

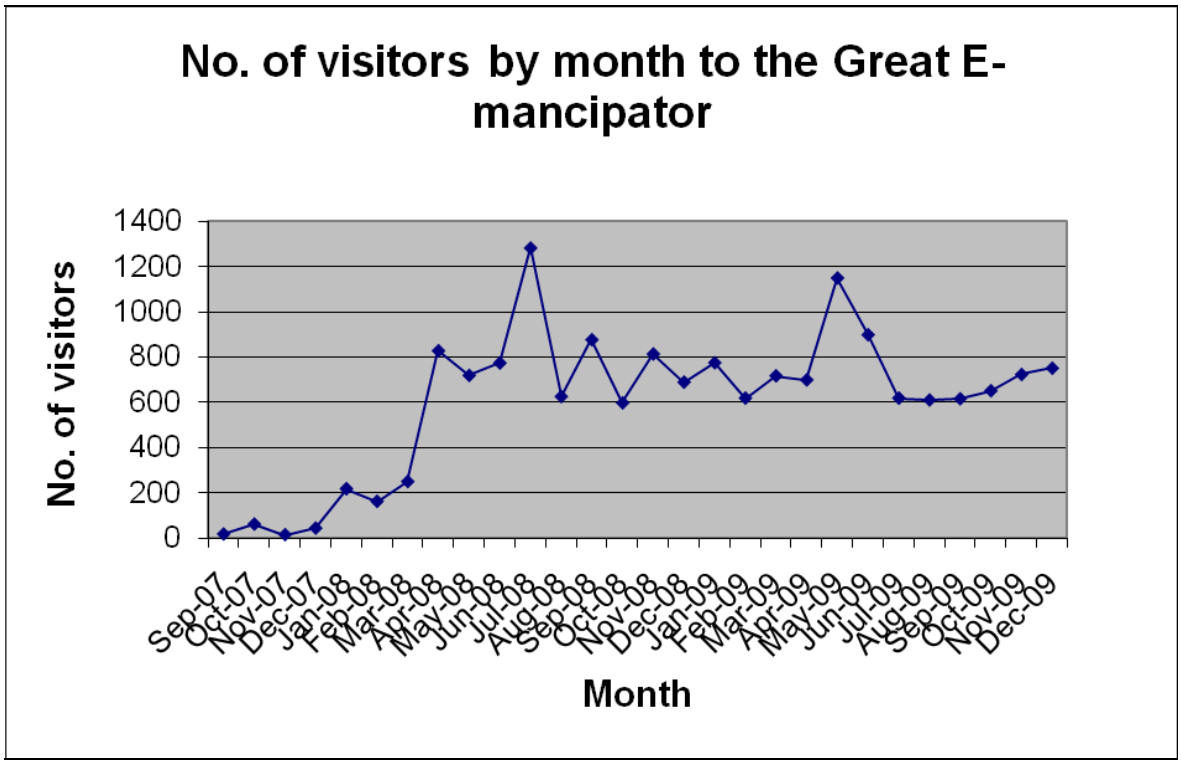
2. Outcomes

The researchers maintained spreadsheets of a range of figures recorded on the tools from the number of visitors, the number of words written on the weblog, to the numbers subscribing to the weblog and its feeds which were used to try and understand activity with the media and adjust posting to trends.

In the first figure, the number of visitors can be seen to grow from the launch but then stabilizing, with peaks at times when the surveys were posted on the weblog and promoted by mass emailing, along with promotion on other electronic media.

When the subscription and RSS feed features were added in May 2008 it became possible to record those individuals or organizations following the regular postings. Subscribers receiving an email of the post no longer needed to visit the weblog to read the posts. From August 2008 when a major local government news web site syndicated the weblog within its own site, further visitors were attracted, along with those being picked up by the researchers posting the web address when commenting upon other weblogs or when emailing others in the industry. A business card was also created with the web address, along with a leaflet, to hand out at seminars and conferences. A list of software applications and their developers with links and descriptions was also developed and posted upon the weblog, which could be used by local authorities to identify suppliers of applications for National Indicator 14 and recording citizen satisfaction, by November 2009 this had reached version 8 and suppliers themselves were subscribing to the weblog.

The weblog also provided a central repository for material that was sometimes spread across numerous government departments, many suppliers and a range of commentators, thus making it easier for those interested to keep up-to-date with rapidly changing circumstances



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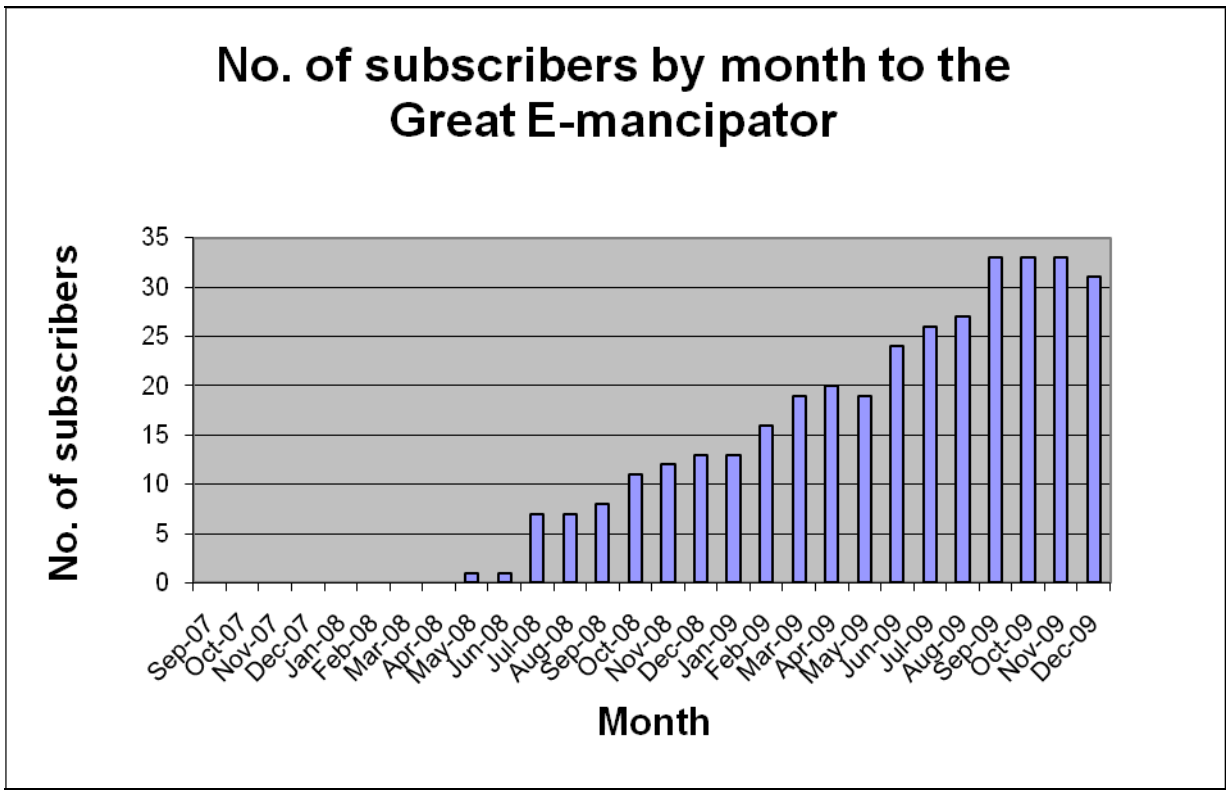
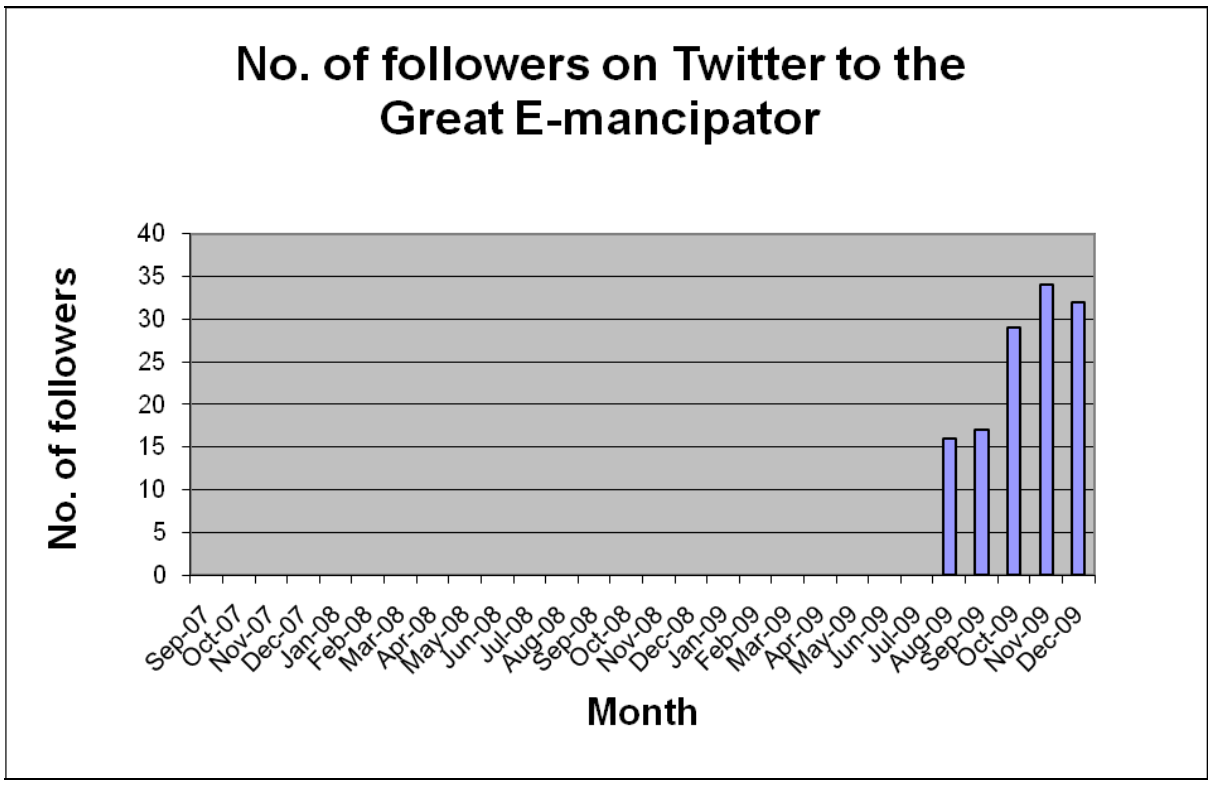


Similarly Twitter was employed to record the entry of new posts onto the weblog or similar events and although the researchers hadn't recorded initial "tweets", the term for Twitter posts, which started in late February 2009 and numbers were initially slow, it was decided to record them on a month-by-month basis, as they started to attract followers. It should be noted that Twitter followers were probably different to those subscribing to the RSS feed or the posts, so two separate streams of people

were actually reading the posts in addition to those finding the site through search engines, or as posts were repeated by the syndicating publishers of other sites. Amongst the followers from Twitter were identified a number of academics, journalists and other specialists in the field of e-government.

It became apparent to the researchers that the number of words being published on the weblog were potentially going to exceed those produced for the research dissertation itself and would be an interesting record. This reporting occurred as they settled upon two or three posts per week as a steady output which would maintain readers whilst not detracting from research efforts too much.

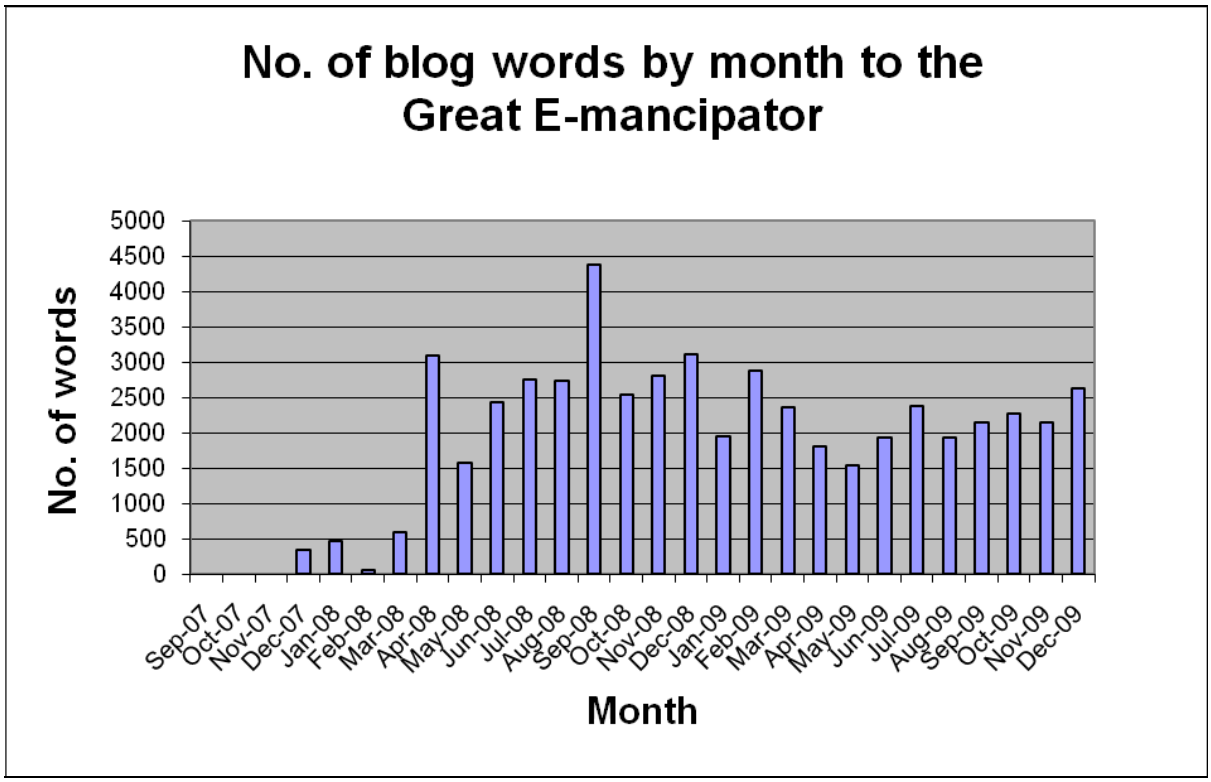
A key area for any researcher considering employing social media might be to ensure that the tools included sufficient and accurate mechanisms to aid the recording of statistics, be this the number of visitors per period, the number of words written, the capture of any keywords or links employed to find the site or tool. In the early days of web sites much was made about the use of "hits", which were found to be misleading, so the availability of measures that can be employed in a longitudinal study to reveal changes is fundamental.



3. Benefits of using social media

As reported by Research Information Network (2009, p.37) when describing traditional research timescales "The timescales are often long, and usually unpredictable. The length of time before the outputs of research are recognised, acknowledged and cited is even longer and more unpredictable."

The benefits of using social media in comparison with traditional tools are obviously one of speed, since it is obviously difficult to get research reported quickly across the conventional mass media and Beer &Burrows (2007, p.1) highlighted a world where 'internet time' now runs at a clock speed several orders of magnitude faster than that of academic research." However, self-publishing does not have the credence of a peer-reviewed journal, although employing an Internet of potential reviewers can help iron out errors and clarify theory, prior to reaching the desk of the journal editor. The researchers had considered employing a "wiki" as the core tool but whilst that might have worked in a closed research environment, expecting random visitors to the site to help in drafting research feedback around service delivery metrics was likely to have a poorer result than using a weblog.



The potential societal divisions of the audience, by focusing on a medium only available to Internet users i.e. taking into consideration the problems of digital exclusion, were not seen as an issue in this particular context of an academic research project, particularly when the researchers intended to continue to employ face-to-face communications in the promotion of any outcomes, along with interviewing others who may not have been aware of the other research methods used. In addition, the research was also primarily focused upon e-government, which largely required use of the Internet.

A major benefit of using this approach was the need to keep up with the academic and grey (or industry and government) media in order to provide appropriate and timely content for the weblog. Whilst the researchers would have been aware of some of the material, the actual need to hunt widely and find up-to-date material possibly provided research material that may not have been directly or immediately viewed otherwise.

4. Downsides of using social media

After promoting the first questionnaire and the limited number of responses it became clear that there was an issue around workers in government gaining access to the weblog. Fortunately a number of contacts employed at local authorities notified the researchers and informed them that social media, including weblogs, were blocked by their IT departments. There was no way of working around this but attention was brought to the fact amongst those promoting the use of social media in a government context. Government organizations were originally resistant to the use of email and the Internet as an office tool, but as it became more widespread had no choice to adopt it, along with ensuring greater levels of security and responsibility in its employment.

Writing the two or three posts per week for the weblog, which after 24 months had reached over 50,000 words, was sometimes a distraction to developing the content of the PhD dissertation and the conference papers expected from the research. A weblog will only be read if the content is of sufficient quality to attract readers and keep them returning to read more. The fact that the number of subscribers continued to gradually increase and that a very relevant news web site had syndicated the weblog onto its own site provided some confidence of the quality of material and that the audience was interested in reading the posts. Later in 2009, as the number of Twitter followers grew, this also provided some additional confidence.

In the normal realms of weblogs, when they are being maintained just as an electronic diary, the creation of content is just a case of recording day-to-day happenings. In a focused, academic weblog there has to be a number of regular news feeds away from the more obvious industry sources or material "hot-off-the-press" from government departments and quangos.

One concern was the limited number of comments made, some 55 over 209 posts and over 16,000 views but Arthur (2006) reported "an emerging rule of thumb that suggests that if you get a group of 100 people online then one will create content, 10 will "interact" with it (commenting or offering improvements) and the other 89 will just view it." Which while not consistent with the researchers' own figures, indicated that the number of those taking direct action was limited. There was also a substantial amount of spam detected by the weblog's own defences or deleted as a part of the approval process rather than being allowed to appear as comment automatically.

As observed by Winner (2005, p.129), "the Internet seems better suited for venting, flaming and withdrawing from politics than for seeking democratic solutions. I know of no conversations or practical initiatives that tackle this widely noted phenomenon." In order to prevent aggressive comment (described by Winner as venting and flaming) the weblog required all commentators to register and comments were also vetted by the researchers prior to publication. Since the weblog was a tightly focused and somewhat academic site, it was less likely to suffer such attacks, especially with the editorial control and the spam protection. However, managing postings also possibly restrained a potentially active audience from commenting.

One limitation to using social media that needs to be observed, is that compared with traditional research methods for surveys those responding are likely to be self-selecting since it is reliant upon those who come across the survey by chance. To be significant, an audience would need to be invited from and cover an appropriate target group. This was the case with the surveys and interview for the actual research, the blog acting as an actual home for the survey and ethical guidance whilst the participants were invited and scoped on an ongoing basis to ensure appropriate cover of the different types and sises of authority. Thus, researchers cannot expect to obtain statistically significant quantitative data by this approach.

5. Contents of the posts

Initially the posts had been about appropriate academic literature where the content was felt to be of value to practitioners. Then, draft documents started to be released about a new government performance indicator, National Indicator 14 (NI 14), which linked to reporting what was finally labelled as "avoidable contact", a proxy measure for the quality of service delivery in local government. This came to be the most debated of the new batch of performance indicators and the weblog was heavily involved in the debate, along with promoting each new version released to a wider public for consultation, which helped increase the readership.

When the annual surveys, which carried questions about the use of NI 14, were carried out, the interim and final results were reported on the weblog and record numbers of readers as can be seen by the two major peaks on the graph of visitors.

Along with academic papers, the major content of the posts came via the appropriate grey literature from industry and government that was producing papers about related topics such as co-production, service channel metrics, customer satisfaction measurement, e-government and e-governance. These were all topics of interest to those in government IT, web and customer service.

6. Questions for the future

Since the sphere of social media is far from static, as new tools are continually being developed, the use of it for research also needs to continually develop, but as with existing areas of the Internet there is still some way to go in developing, employing and maintaining metrics that can be meaningfully employed to reveal best practices.

There are ongoing ethical issues to ensure that those on the receiving end of research tools are aware of what any information provided may be used for, and whilst this is relatively easy on a web site, as newer media develop this will obviously bring added difficulties.

7. Conclusions

The key benefit of employing social media, in the form of a weblog, was that it provided a home for the survey tools, along with the ethical background materials. In a study around electronic service delivery, the employment of social media as a tool is highly appropriate, since it enabled the researchers to operate within and outside of the original policy space, along with the material being presented in other spaces.

Amongst the downsides is being able to produce regular and interesting pieces of writing or links to appropriate news items with commentary. However, this is also a positive result developing the PhD researcher‘s writing skills, along with promoting and maintaining an active review of conventional academic literature along with grey sources.

The primary conclusion to the employment of social media was that it facilitated the delivery of academic research to a wider audience, enabling a much quicker and more responsive feedback loop than purely relying on academic journal publishing, which may be little read outside of academia and takes a substantial time from research to publication. It also can potentially reverse this by providing awareness of government or grey literature to the academic world that may be potentially isolated from it.

Unfortunately it was also realised that there was reluctance for some government staff to be allowed access to social media, possibly due to concerns around security and time-wasting, that were fed back to the researchers, but these same concerns were also noted at the introduction of email and Internet access to government and business and so may disappear following a suitable learning period.

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EDUCATION 2.0: TOWARDS OPEN KNOWLEDGE SOCIETY

Adam Pietrzykowski

Abstract

In the time of network society the ICT give the worldwide community of teachers and learners a groundbreaking possibility of fulfilling the Enlightenment ideas that make the fundaments of education – knowledge sharing. The technology, social and intellectual propriety constitute today a proper context to fully materialise that idea. Online courses, textbooks, articles, science books and many others freely shared through Internet are reshaping the reality of education leading us to a paradigm shift. Are our societies evolving to a new form – an open knowledge society - or is it only a temporary trend is a question this paper addresses.

1. Introduction

Looking through literature one can found that knowledge is beneath the most important attribute of a perfect society. Beginning with Plato's *Republic* through Thomas More's *Utopia* and Thomas Campanella's *City of Sun* ending with contemporary Herbert G. Weels *Man Like Gods* humans put hope in knowledge and reason as the main fundament social and individual well-being. Today there is a great opportunity to fully materialise this part of human utopia that can be defined as knowledge democratisation. Knowledge is accessible everywhere, every time and by everybody. As modern economies main resource is knowledge it's even more important to put into effect this honourable idea and adapt education to a globalised reality.

Open Education is an idea that uses the possibilities given by Information and Communication Technology (ICT) to form new knowledge production and distribution patterns. Based on international communities of teachers and learners that freely share knowledge and cooperate at producing new one, this model seems to be something more than a temporary trend. To find whether —opening the knowledge" in such manner together with collaborative potential of voluntary teachers can lead to an evolution step in the shape of modern societies, to an open knowledge society, the idea of Open Education will be presented in its full spectrum.

Firstly a historical outline showing the arising and developing of the idea will be presented. The second part will present technology, culture and law policy context as the main determinants for Open Education to arise and function. After that a topology of initiatives within the idea based on examples will be given. One particular type of initiatives, defined as —amateur-made", will be presented in a separate part as they're provoking some problematic issues related to knowledge and society. As the Open Education functions between two poles, the next part will focus on some positive and negative changes when local perspective confront global. The last part before final conclusions will show the main problems and priorities both for developed and developing countries that must be overcome to unleash the revolutionary potential of Open Education idea.

2. Rising of the idea

In 2001 Massachusetts Institute of Technology (MIT) made their digital educational resources widely available. The project called MIT OpenCourseWare (OCW) shared educational materials through a website aiming to support the stationary education. These included syllabi, lecture notes, assignments and examinations. The decision behind it was preceded by a large discussion about the MIT's strategy on the field of e-learning. The model to share materials for classroom-based learning has won with the second option to create new online courses for sale. The announcement was covered on the front page of *The New York Times* and in the article MIT's President Charles Vest described the vision of the project:

> —This is a natural fit to what the Web is really all about,' Dr. Vest said. 'We've learned this lesson over and over again. You can't have tight, closed-up systems. We've tried to open up software infrastructure in a variety of ways and that's what

unleashed the creativity of software developers; I think the same thing can happen in education."(Goldberg, 2001)

The MIT OCW initiative was a breakthrough in the education world beginning a year later an international discussion about the role of open resources in today's time higher education. The 2002 *Forum on the impact of open courseware for higher education in developing countries* organised by UNESCO in cooperation with William and Flora Hewlett Foundation came to a conclusion that such open resources are highly important as today the knowledge has become a principal force of global transformation. (UNESCO, 2002). Also a name and strict characteristic of open resources was proposed. Open Educational Resources (OER) that are digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research.

From that moment the amount of initiatives and reports about OER's potential have been rising in enormous speed. One of the reports of OECD, *Giving knowledge for free* shows that in 2007 there were 3000 open online courses in over 300 universities (OECD, 2007). Beside courses new initiatives addressing different needs of education have appeared. Open textbooks, collaboration platforms, resource collectors and many other countless individual actions. All that diversity lead from a single perspective of OER, free materials to wider way of thinking about this trend , a new global pedagogy model – Open Education.

The 2008 Cape Town Open Education Declaration was the act of that change. An international community of interest has made a worldwide manifesto directed to governments, institutions and individuals to raise the awareness and stimulate actions accelerating the process of shifting into this new pedagogical paradigm where knowledge, ideas, teaching methodology and technological solutions related to education are open in the sense of availability, changeability and free distribution. Looking at the educational landscape the declaration seems slowly achieving its success.

3. Open Education's perfect storm

The situation in which the idea of Open Education appeared seems very promising. The synergy of technology, culture behaviours and law policy is creating a fruitful environment for this idea to develop. These three determinants include ICT along with hardware/software characteristic, a sharing-friendly digital commons culture oriented on non-economical values and a specific philosophy of intellectual propriety. Presenting them will help in understanding the complexity of levels on which Open Education idea functions.

3.1 Technology

Thinking about technology determinant we can point three fields which create a complementary system of coding, distributing and manipulating the information: the characteristic of digital information storage, second the World Access Network that is Internet and the software its runs.

Numerical representation of information

The specific of digital information is that on the upper symbolical level it is represented by digits. This fact implicates three important capacities: lossless replication, any-where-any-time modification and eternal durability. The lossless replication of information means that copying information does not affect its quality. The first and the million copy are the same. Anywhere-any-time modification is the ability to change, delete or modify every segment of information on every moment of time. The last capacity - eternal durability - means that the information is independent from its material base and do not disintegrate through time as the hardware base does. Summing these capacities, it can be said that the information has merely transcend the physical level of dependence and has given a new possibility in storing immaterial culture artefacts like educational resources.

Together with cheap computers and storing devices it has given the education a possibility of transcoding analogue didactic materials into digital information and replicate it infinite times nearly without costs.

Connecting islands

The rise of networks has showed the full potential of shifting from analogue to digital. The isolated PC users were now connected to one virtual space of communication. A superstructure made of optic fibre with a specific set of computers running 24/7 to serve their requests. Today the global meta-network Internet gives the education the fastest, the widest and the most interactive knowledge distribution channel that technology can ever give.

Programming the digital realm

This determinant is about software that shapes the Internet giving some possibilities. It can be divided into two separate issues; the Web software and the proliferation of free/open source software. First issue is strictly connected with the WWW and the way of presenting and interacting with hypertext content. The paradigm shift called by Tim O'Reilly Web 2.0 is a change from read-only Web software architecture to the architecture of participation (O'Reilly, 2005). It means that users are no longer consumers. They are the creators who define the content of Web. This change was possible by building a simple yet powerful interface of Web and convergence of different Internet services into one browser based. For education this fact is important because of the development of easy-to-use collaboration and sharing Web software, often available as free/open source software.

Free and open source software gives a set of technological tools which can be used or adapted for the needs of education. This costless commercial alternative is available for all kind of software: operating systems, educational programs, games, media object creating tools to others. Therefore it's not a surprise that open source software is recommended by European Union as one of the remedies for digital divide and as most appropriate type of software to use with Open Educational Resources (UNESCO OER Community, 2006).

2.2 Sharing culture

Earlier determinants showed that the technology is the most important factor as it makes an appropriate environment. But as we shape our tools they afterwards shape us to recall the famous McLuhan expression. The social context of Open Educational idea is culture that is inherited to Internet. As file sharing is nearly costless a culture of sharing has easily arisen in cyberspace. This gift culture include also a new model of production that's defined by Yoachi Benkler as peer production – a self-organizing communities of individuals who come together to produce a shared outcome (Benkler, 2006) or Wikinomics (Tampscot, Williams, 2006). This new model of production was not meant to be according to our widely spread view on human economical behaviour. The well known examples of it are open encyclopaedia Wikipedia and free/open source operating system GNU/Linux. Aside from their origin they are competitive for their commercial equivalents.

Internet is as social space filled with sharing and producing actions that are strongly affecting the society awareness. It builds a new form of social interaction which is oriented for non-economical values. For open education this *status quo* cannot be better. Moreover, social movements that have arisen from this sharing atmosphere like for example Open Access, focused on opening science articles, Open Data, opening science data or more general ‚Free Culture, opening all cultural artefacts, are creating supportive ~~i~~ideosphere" for education 2.0. As new generations are growing up shaped by this situation there is a strong assumption that the digital natives will continue this direction (Tampscot, 1998).

2.3 Law regulations

Sharing culture born within Internet has showed how inadequate and unprepared are our law structures for such technological change. The clash of digital era reality with copyrights regulations from the industrial, analogue era leads to a dissonance between the technological possibility of sharing and present intellectual propriety regime. The protection of intellectual goods that serve the rights of individual cause that using of materials accessible in network has become inconvenient or even impossible. But this situation has changed along with strengthening of an alternative way of thinking about intellectual propriety and its role in society. This new philosophy highly valuate creativity in culture and try to change the way of perceiving intellectual propriety rights from traditional that is

oppressive, limiting the creativity force within culture to facilitating that helps culture to flourish (Lessing, 2004).

Today there are more than dozen of free and open licenses and they address all types of creation software, music, video, art and general (Liang, 2004). Amongst them there are bottom-up initiatives but also top-down like European Union Public License created by European Commission as a free software license. Open licences are forming a law fundament for any act of sharing and using the Internet resources and are effectively reshaping old propriety schemes. The most common are software license GNU Public License (GPL) and general culture licence Creative Commons (CC). As GPL defines one particular type of license the CC is in fact a set of licenses allowing the author to balance his own interest and the interest of public domain. The only thing that author must do is to mark his work with a specific sign informing about the licence. The shift in comprehending the role of intellectual propriety allows education to function in a new manner possible by technology and the sharing ethos of cyberculture. It is the last determinant that builds the top of open ecosystem for education and knowledge.

4. Embodying the idea

Open Education is a series of initiatives behind the facade of sharing knowledge. Let us look closer on them to see what educational needs are they addressing and what spaces are they influencing. To do that I'll differ them in terms of particular goal they want to achieve. By applying that variable a following topology of Open Education initiatives can be build: electronic materials for blended learning, full online courses, open textbooks, sharing and collaboration platforms and OER resource collectors. Supported by open libraries and open science articles these initiatives create a complementary environment for the Open Education idea to function. An environment that allows searching, adapting, modifying and sharing – the whole lifecycle of OER (Gurell, 2008). There are both institutional and more often individual bottom-up activities amongst them.

4.1 Supporting materials

A great range of Open Education initiatives is aimed to share materials for supporting class-lesson. The MIT OCW and its Consortium initiatives are examples of such approach. The MIT's OCW Consortium share 13 000 course support materials which allow finding nearly every subject formulated from many perspective (MIT, 2009). It consists of syllabi, lecture notes, lesson plans, assignments and examination. As this kind of OER exist for the internal purpose of higher education institutions there is no extra effort or founds that are needed to create them. Moreover there is a strong ethical imperative to share knowledge that has been produced using public money.

Beside institutional actions it is common that individual educators share their resources on many different ways for example on their home page. Especially if their *alma mater* doesn't have a general sharing platform. The number of such initiatives is incalculable but it definitely is major.

4.2 Full online courses

Amongst Open Education initiatives there are projects design to deliver a full unit o knowledge. These solutions are dedicated especially for self-learners that want to acquire new competence. Youtube.edu is an initiative that can be placed here. In a special category educational institutions can share their video material. Universities like Stanford University or University of California, Berkeley are present there with a great set o lectures. But as YouTube is more about individuals there are also many separate teachers who put their lectures personally like Prof. Dona Queskada from Santa Monica Collage who uploads her lectures on philosophy.

Apart from multimedia lectures there are also text and image oriented courses situated on an e-learning platforms. OpenLearn is a UK Open University project based on open source platform Moodle, which aim is to teach using an interactive learning environment. Beside the course material there is also a virtual space of play, research and collaboration called LabSpace which allows to create, modify and test the knowledge that's in the pool.

The last example of full course learning initiatives is p2p university. It's an effort to build an online university based on voluntary Internet community in contrary to traditional university that is a hierarchical and physical structure. According to the idea of university - *universitas magistrorum et*

scholarium - a community of teachers and scholars, the peer-to-peer university is fulfilling this idea in a new manner.

4.3 Collaboration platforms

To find, share, remix resources, collaborate at new ones and organise them, a suitable software solution has to be found. Collaborating and sharing platforms are the type of Open Educational initiatives that fill this gap. Projects like Connexions from Rice University and Wikiversity form Wikimedia Foundation are examples of these types of platforms. Connexions which have today nearly 16 000 reusable modules of knowledge is the best known platform in Open Education movement. It makes a rich environment to communicate, find, use, create and recreate learning materials. Wikiversity, a younger project, is based on well-known wiki engine. Near 12 000 of content pages and 500 active users show a great dynamic behind it. These platforms are best places to build teachers and learners communities.

4.4 Open textbooks

The main goal of all initiatives focused on textbooks is creating an internet available, costless and a comparable alternative to expensive textbooks used today. The argument behind it is that high price textbooks lead to inequality in education as it excludes the poorest from fully benefiting it. Therefore open textbooks projects are especially addressed to elementary and secondary education and in a less degree also to higher education. Because it‘s shared costless the only expense is printing it. Thanks to print-on-demand technology the final cost of an open textbook paper version is five times lower that a commercial textbook.

The well known initiative on open textbooks is the California's Digital Textbook Initiative launched by governor Schwarzenegger in May 2009. It was the first-in-the-nation initiative that was simply a reaction to the financial crisis in California. The California Learning Resource Network institution has reviewed textbooks produced in this initiative founding that amongst 16 produced textbooks ten meet California‘s standards in 90 percent and four in 100 percent. That questions the argument about low quality of open materials.

Amongst open textbooks initiatives there is also a commercial example. The Flat World Knowledge is first commercial publisher of open textbooks. In their business model the textbooks are available for free but premium services like host of ancillary, study guides, flash cards, kindle versions, and paper copies of books are to be paid. It also pays authors a 20 percent royalty.

4.5 Resource collectors

As the cycle of working with shared knowledge begins with searching for it, a proper searching tools and databases are being indispensable. Because ordinary web searchers for many reasons are not good in this task a solution has to be found. The resource collectors are filling this gap by allowing easy finding of desired knowledge.

An example of such project is OER Commons and a simple platform OAZE. These two projects allow to search, rate, comment and add an OER. But the last, adding is slightly different. The OER Commons has his own staff that adds and verify the resources. Although a user can send an add request, the decision is up to the staff. The OAZE model for a change is based totally on open community so the added resources are verified by special community members. As the OER Commons is a large, international initiative made by Institute for the Study of Knowledge Management in Education (ISKME) the OAZE is nearly no budget doctoral student project which fits all polish Open Education community needs.

The role of resource collectors is highly important because of the plurality of OER and non effective Web searchers. As the Internet is a deep ocean of information the smaller, individual initiatives don‘t have the chance to reach their goal. This type of tools keeps the knowledge on the surface.

5. Knowledge and the amateurs

As we already know Open Education is not only about education professionals. Present day social Internet allows everybody to participate and produce. But the horizontal model of peer-to-peer

production in case of creating knowledge seems to be problematic. A question arises whether is there a place in education for non-authorised knowledge that is an effect of amateurs' collaboration and what should be its role in our societies? To address this issue I'll first define who is an amateur.

The simplest way to define it will be to use the opposition to professional. Amateur is someone who is not professionally connected to what he/she is doing. Thus amateur can be a for example a professor that like to engage in something new, someone who is still educating and thus not yet a pro or simply, a housewife with a hobby. Theoretically the results of amateurs' collaboration should be worse than the results of professionals. But the comparative studies report between online encyclopaedias, Britannica and Wikipedia, showed a very similar amount or major and minor mistakes (Nature, 2005). Moreover an event in science world called the Sokal hoax' revealed that science journals can be vulnerable for non-credible knowledge. As this example prove that pros also do mistakes what than is wrong with "amateur-made knowledge" that we don't trust it?

As the author's identity is in professional sources known from the beginning the amateur author's identity can only be found after a serious investigation. The anonymity together with the non-moderated possibility to create is making a vulnerable space for fact manipulation, creating fiction and political propaganda. Thus using knowledge sources like Wikipedia is a matter of social trust to unknown personalities of unknown competence unlike professionals that build their trust on Institutions authority.

What then should we do with such knowledge sources? It can be used as functional tool to quick recognizing the subjects frame. But the next step should be its verification in professional sources, especially when the subject is connected with social subjects where a great risk of misused interpretations exists. The education 2.0 should then prepare students to cope with "amateur-made knowledge" and to address it properly. The teacher should be therefore a guide over the knowledge ocean.

6. When local meets global

Open Education with its various examples has a great impact potential on worldwide education in general. The situation when local order meets global, open and collaborative framework leads to a levelled educational perspective. Something that globalisation processes are making from their beginning, creating one global westernised "noosphere". In this case the process is valuated positively because it seems to have no harmful effect. To paraphrase the famous thesis of William Friedman - the world of knowledge is flat. But it's not a simple reverse of vertical order, with old institutional structures, to horizontal based on network communities and distribution. It's a remix of these two perspectives that constitute a more dynamic and flexible education reality. This "globalised" – "localised" interaction has both positive and negative effect.

6.1 Positive interaction

Global community of educators and worldwide accessible OER can implicate many changes for local entities. The most important are removing qualitative and quantitative knowledge differences and blurring the types of education.

The first is derived from the fact that educators are no longer limited to their local perspective. By having access to different approach on the subject, different methodologies, lesson plans or reading selections the educators can enrich their lecture, correct mistakes and update it with new facts. This theoretically leads to more equalised knowledge worldwide.

The second is connected with new education patterns. OECD *Giving Knowledge for free* report states that Open Education accelerates the blurring of learning types and can bridge the gap between non-formal, informal and formal learning (OECD,2007). Lifelong learning is the most that can benefit here. A great number of self-learners have access to thousands of online high quality material and acquire the same knowledge as in formal class-based learning. Therefore the need for a new form of accreditation arises.

6.2 Possible problems

The first problem is connected with interpreting history and ideology. It can reveal itself when a teacher/learner will use some shared resource or collaborate with others. Teachers and learners may

have a different local perspectives connected with the nationality, ethnicity and believed ideology and therefore differently interpret some facts. This „clash of localisation‘ can affect in such events like Californian Hindu textbook controversy where Hindu organization found a misleading facts on their history. But the delicate matter of war history where every nation has its own truths can lead to a far greater controversy than that. Writing one, free from local perspectives history would be a remedy for this problem but it‘s rather impossible to do.

The second problem is connected with a form of digital inequality. It‘s the problem of third level digital divide that is the language competence (Castells, 2003). As the OER are mainly in English the language competence is essential to enter the global community of knowledge. The language skills will determine who can benefit from that situation. The Anglo-Saxons are on a privilege position. From the perspective of non-English countries the language competence will change the local situation of institutions and individuals. Those who can adapt will be the leaders.

7. The way forward

Open education is nowadays a fast materializing idea. Yet it has many obstacles to overcome especially as it functions on many levels: technology, social mentality and law regulations. Thanks to many discussions Open Education movement is today more aware of problematic issues that must be faced and the priorities to achieve.

Between 2005 and 2007 a community of interest of more than 600 members from a great number of UNESCOs member states took part in on-line discussion on Open Educational resources. The essence of this discussions was a report *OER:The way forward*. Amongst the most discussed priorities there were: awareness raising, building communities, capacity development, sustainability, quality assurance, copyright, learning support services and technology tools (UNESCO OER Community, 2007). The report shows that priorities for developed and developing countries are different. As there are now many initiatives running in developed countries the priorities were focused on financial sustainability, quality-assurance mechanisms and rising awareness about intellectual propriety rights and open licences. The developing countries in contrary are still facing the basic problems of digital divide therefore the priorities were oriented on building technological tools, rising computer competence to enable creation and use of OER and creating learning support services to help achieving these priorities.

But for both developed and developing countries awareness raising and building communities emerge as the main priorities for promoting the advancement of the OER movement. If OER is contribute to increasing access to knowledge worldwide, it is crucial that actors on all level decision-makers, teachers and academics – must be aware of its existence and potential. As the strength of OER is based upon community of interest building and supporting such a community is the second crucial priority. The 2007 Cape Town Open Education Declaration was the last undertaking to realise these priorities.

8. Conclusions

Open Education is still a young idea. Nevertheless it has many initiatives addressing all kind of educational needs. Moreover the technology, social mentality and intellectual propriety rights context in which it functions could not been better. As computers and Internet connection are getting cheaper more and more people have access to the prosperity of digital goods. „Social Internet” with easy-to-use software is strengthening the revitalised gift economy which recently has been influencing all culture especially the way of perceiving propriety rights. From an economical point of view Open Education seems to fill the gap between globalised market needs and optimal education patterns. It gives a possibility of more flexible, qualitative and cheaper way of acquiring new competence and improve already possessed. In the time of global financial crisis it seems even more valuable than ever before. Apart from economical advantage there is also an ethical premise behind it. As Koïchiro Matsuura, General Director of UNESCO states „To remain human and liveable, knowledge societies will have to be societies of shared knowledge.” (UNESCO, 2005). Knowledge has the power to shape reality and change life for better so it should be shared for the purpose of all human beings. Supported by organizations, foundations and recently also governments Open Education movement are

overcoming obstacles to let that happen. Summing up all premises Open Knowledge Society seems to be only a matter of time.

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MY UNIVERSITY, MY FACILITIES: EXPLORING STUDENT ATTITUDES TO ETHICAL USAGE

Mary Prior and Mike Leigh

Abstract

The work reported in this paper is part of a co-ordinated study across three countries. A survey instrument was developed and administered to students of IT at a UK university. Structured interviews were subsequently carried out to explore some of the issues in more depth. The paper reports the findings and in particular, the students‘ views about the ethical use of the IT resources available to them at the University.

1. Introduction

Over the past decade there have been several studies into the ethical attitudes of IS professionals (Prior et al, 2002; 2005). Studies have also been undertaken that include the views of university students in the UK (Prior, 2004; Prior et al, 2008) and in the USA (Grodzinsky et al, 2008). Some of survey instruments used in the studies covered a wide range of computer ethics issues, and were originally designed to be administered to IS professionals before subsequently being used with student subjects. Other survey instruments were designed explicitly to be used with students, but covered only a restricted range of ethical issues. A number of studies have also examined ethical aspects of using Virtual Learning Environments (VLEs) in higher education (for example, Brey, 2004; Brook and Gilding, 2002; Jones and Conole, 2006; McRobb et al, 2007).

This paper reports a study using a survey instrument explicitly targeted at university students of IS/IT, covering a range of ethical issues including social networking and VLE use. The work reported is part of a co-ordinated study across three countries: the UK, USA and Canada. The paper first describes the research design. The findings are then presented, followed by discussion of them, with conclusions and recommendations for further work.

2. Research Design

This paper reports the results of a study using a combination of questionnaire and structured interviews. A questionnaire was used as an efficient method of ascertaining the views of a large number of students studying at different levels within the University and also with differing backgrounds; structured interviews were used to follow up particular issues identified by the analysis of the questionnaire results, to probe in more depth the reasons for particular responses (Bryman, 2008; Denscombe, 2007).

The questionnaire was based on a survey instrument used in several previous studies (for example, Prior et al, 2005) which presents a series of statements to which the respondent indicates the strength of their agreement/disagreement using a five-point Likert Scale. Initially, this tool was used to ascertain the attitudes of IT professionals to a range of ethical issues that might be encountered in industry and commerce. Subsequently, the questionnaire was modified and was used to incorporate the views of students at a UK Higher Education Institute. For this particular study, the questionnaire was further refined specifically to elicit the opinions of university students at the three participating institutions. A process of negotiation was used with collaborating partners to arrive at a set of statements contextualised for the study subjects at each of the sites to take into account local cultural and/or institutional differences. However, differences in the wording of statements were focused upon nomenclature within the participants‘ profiles, rather than upon the essence of the questions being asked.

Opinion was sought upon a total of 21 statements which are clustered around use of unauthorised copies of commercial software; the use of the University's computing facilities; abuse of access codes; the use of electronic surveillance by the University to monitor the students‘ use of its facilities; employers‘ use of electronic surveillance; and ethical issues surrounding project development and

codes of ethics within organisations. Additional statements targeting university students were added to the original survey tool, for example, a set of statements concerning the use of social networking sites was introduced.

The profile of the questionnaire respondents differs in some respects among each of the three geographical sites taking part in the collaborative study. This paper reports responses from students at a UK university. Participants were sought from second and final year undergraduate groups and a postgraduate group. Students are studying on a variety of IT courses including technical and business related courses; the majority are under 25 but some mature students are represented, as are both male and female students. They come from a variety of ethnic backgrounds, with the postgraduate group including a larger proportion of students from outside the UK particularly from Saudi Arabia. The questionnaire‘s respondents reflect reasonably well the mix of students‘ backgrounds within the Faculty.

Subsequent to the administration of the questionnaires they were submitted to a collaborating colleague with statistical expertise and processed using a statistical package. The results were analysed and interpreted to identify issues worthy of being followed up in greater depth in the structured interviews. Ethical issues pertinent to the students‘ use of university‘s IT facilities provided the most promising areas for further investigation in the face-to-face sessions. Of particular interest were the attitudes of students towards the University‘s electronic surveillance of their activities when using the University's facilities. Students‘ use of IT resources from learning and teaching areas and from university residences was explored with reference to the students having knowledge, or not, of monitoring taking place and also of whether or not their consent for this monitoring had been given. Student awareness and attitudes to the potential for monitoring their participation in learning activities within the VLE (Blackboard™) were also chosen for discussion. The other areas chosen for further investigation, in the group sessions, were the making of unauthorised copies of commercial software; the use of the University's computing facilities for private use; and the issues surrounding the inappropriate use of access codes.

Qualitative data was collected from three structured interviews which involved a total of 13 students. The profile of these participants is a fair reflection of the nature of the students who responded to the questionnaires, with the exception of the postgraduate overseas students who were not able to take part in these follow-up interviews due to timing constraints.

3. Findings

This section presents the findings of the survey and the structured interviews under each of the key topics that were investigated. As explained in the previous section, the structured interviews did not explore every topic covered by the survey, but concentrated on the issues of most immediate concern to the students.

3.1 Software use

„It is acceptable for me to make unauthorised copies of commercial software to use for my University work.’

Overall nearly half of the students surveyed (47.6%) agree or strongly agree with this statement, with 34.2% disagreeing or strongly disagreeing and 18.2% indifferent. Among the second year undergraduates, as many as 69.5% are in agreement, as compared to 34.4% of the final years.

This issue was explored further in the structured interviews. Students freely admitted to having copied software illegally; they justified it firstly, on the basis that their actions did not harm any individual and secondly, with an economic argument. They do not have much money so when software is considered to be prohibitively expensive (Adobe products were mentioned as examples) they have few qualms about copying it. If the price is what they perceive to be „reasonable‘, they would prefer obtain it legally. But for study use they are quite prepared to use illegally-obtained software as it does not cause harm: „If it‘s not harming anyone, that‘s OK‘. Companies like Adobe make plenty of money, they reasoned. There was general agreement that illegal copying was only „OK‘ for study use; for profit-making use, the appropriate license should be paid.

The different strength of opinion between second and final year undergraduates found in the survey was not obvious in the interviewed students, who were much in agreement with each other. The postgraduate students surveyed show a higher level of indifference than either of the undergraduate groups (28.6%); they have a smaller proportion in agreement (21.4%) and a higher level of disagreement with the statement (exactly 50%).

The survey included two further statements about unauthorised copying of software which we did not pursue in the interviews:

„If an organization has purchased/ developed software for use in the office, it is acceptable for their employees to make unauthorised copies of this software for use at home.'

„It is acceptable for me to make unauthorised copies of commercial software for my own private use.'

For both statements, the overall level of disagreement is around 44%; agreement 35% and indifference 21%. However, once again the responses of second year students are somewhat different from those of final years; they are more likely to agree with both statements, and there is a higher level of indifference.

The postgraduate students responded differently to each of these statements. Their responses to the second one are similar to the overall average. But their responses to the first indicate a much higher level of disagreement (64.3%) and lower levels both of agreement (21.4%) and indifference (14.3%).

Given the different cultural background of the postgraduate students, it would have been instructive to have been able to explore their attitudes in more depth via structured interviews; however, as noted at the end of the previous section, we were unfortunately unable to achieve this with these particular students.

3.2 University IT facilities use

*„It is acceptable to use the University's computing facilities for my own **profit-making** activities if this has no adverse affect on the University.'*

*„It is acceptable to use the University's computing facilities for my own **non-profit-making** activities if this has no adverse affect on the University.'*

Two-thirds of the students surveyed (67%) agree or strongly agree with the second statement, concerning *non*-profit use of University facilities. The figure drops to just under half (46.9%) when it comes to profit-making use. The second year undergraduates are more likely to agree with both statements; 73.7% with non-profit and 52.6% with profit-making use of facilities. The postgraduate students, on the other hand, express more strength of disagreement with profit-making use (53.9%) but are more in line with the average when it comes to *non* profit use (69.3%)

In the structured interviews we asked students about this type of use of the University's IT facilities. A major issue for them was whether non-study use of a PC would make it not available for another student wishing to use it for their University work; this would be clearly unacceptable. One student thought ‗the end justified the means' in that if a student did not have their own PC and carrying out profit-making activity using a University machine was the only way in which they could survive financially, then it would be a justifiable action. However, other students pointed out that the University had probably obtained software through educational licenses that prohibited any other types of use; they recognised that the institution had a responsibility to ensure that license agreements were not breached. They stated that the software does, after all, belong to the University and not to the students, even though the latter do pay fees.

The survey asked students whether the University has a policy (either formal or informal) concerning software, printers and other peripherals, email and the internet. They are most likely to be aware that there is a formal policy for use of the internet and email; even then, this is less than half of them (42.5% for an internet use policy and 36.2% for email). Nearly half ticked the ‗don't know' box for policies on software and printers use; a few indicated that there were no policies for any of the items listed. In fact, there is a link to policies covering all of these items on the students' faculty network log-in page and logging on to use the facilities signifies agreement to abide by them.

3.3 Social networking

The survey included statements about the students‘ use of social networking sites. The level of use provides an interesting contrast between the undergraduate and the postgraduate students:

		No Use	<=1 hr	1-5 hrs	6-10 hr	11-15hr	16-20h	>20 hrs
Each week I access social networking sites for about:	Yr 2	15.4	15.4	35.9	17.9	5.1	0	10.3
	Yr 4	18.8	18.8	40.6	6.2	3.1	3.1	9.4
	MSc	50.0	14.3	21.4	7.1	7.1	0	0
	Total	22.4	16.5	35.3	11.8	4.7	1.2	8.2

Around 10% of the undergraduates surveyed use such sites for more than 20 hours per week. Most of them use the sites for less than 5 hours, although a higher proportion of second, than final, years use them for 6-10 hours. The biggest difference is with the postgraduate group; as can be seen in the table above, half of them make no use of social networking sites and none of them use them for more than 15 hours. This may reflect the different cultural make-up of the masters students, most of whom are from Saudi Arabia.

Another two statements concerned the students‘ use of social networking sites for career advice and job seeking. Despite their regular use of these sites, over 60% of the undergraduates do not use them for career advice, although they are more likely to consider using them to find a job:

		% strongly disagree	% disagree	% agree	% strongly agree	% don‘t know
I use social networking sites for career advice	Yr 2	35.1	27.0	21.6	8.1	8.1
	Yr 4	24.1	37.9	24.1	10.3	3.4
	MSc	0	44.4	0	22.2	33.3
	Total	26.7	33.3	20.0	10.7	9.3
I use/will use social networking sites to look for a job						
	Yr 2	28.6	20.0	28.6	5.7	17.1
	Yr 4	17.2	31.0	27.6	6.9	17.2
	MSc	0	27.3	18.2	36.4	18.2

In the structured interviews, students agreed that they use social networking sites all the time, even during staffed laboratory sessions; they have become a part of the everyday fabric of their lives. „It could be work we‘re discussing‘ one pointed out: just as they might turn to a friend on the next machine to ask how to accomplish a task, so they might ask via an online discussion thread. Nevertheless much of the time it is non-study related social chat they are maintaining alongside their work. One student did note that he had found a job through Facebook.

We suggested that the use of social networking sites could be seen as an example of „non-profit‘ use of University facilities. However, the students appear to make a distinction between the use of a software package such as a programming environment and use of the internet. The former they acknowledged to be provided under an educational license for study purposes; to abuse its use for a student‘s personal gain was considered wrong. Use of the internet, on the other hand, including access to social networking sites, appears to be taken for granted and non-study use of them is not questioned.

3.4 Privacy: password sharing

„It is acceptable for me to use other peoples’ access codes/passwords ***with*** *their permission to access data I am not authorised to see.’*

„It is acceptable for me to use other peoples’ access codes/passwords ***without*** *their permission to access data I am not authorised to see.’*

Among the surveyed students 87% disagree or strongly disagree that it is acceptable to use other peoples‘ access codes *without* their permission; this drops to 70% *with* permission.

In the interviews we asked students whether they would allow another student to have access to their password; they perceived this as an issue of trust. Some stated that they would not trust anyone, ever, with their password; another said he would only trust his partner (another University student). There was general agreement that it depended on the context; for example whether a useful purpose was to be served, such as allowing access to another member of a team to group work held in one member‘s directory. There was also agreement that a person‘s password was their own responsibility, and that they should keep it secure from unauthorised access. This is somewhat inconsistent with the previous comment about allowing access to a trusted group member.

3.5 VLE and monitoring

„Employers are entitled to use electronic surveillance to monitor employees' performance in the workplace ...

„DMU is entitled to use electronic surveillance to monitor:
Students' use of university IT resources from learning and teaching areas (e.g. labs, library)
Students' use of university IT resources from university residences
My learning activities when I log into the VLE (Blackboard)

> *with my consent & with my knowledge*
> *without my consent & with my knowledge*
> *with my consent & without my knowledge*
> *without my consent & without my knowledge.'*

The majority of students surveyed (72.2%) agree that employers are entitled to monitor employees‘ performance with their consent and knowledge; without either, 82.1% disagree that they are entitled to do so. Survey responses indicate that consent is considered more important than knowledge. Some 20% disagree with employers‘ entitlement to monitor even with employees‘ consent and knowledge.

Survey responses indicate that the University is considered to have more right to monitor students than employers have to monitor employees. Without either consent or knowledge, 22.3% agree that the University is entitled to monitor use of IT resources in teaching areas; for employers monitoring performance without either consent or knowledge, agreement was only 6.9%.

Students do perceive a difference when it comes to monitoring use of IT resources from University residences; 19.2% disagree with this even with both the knowledge and consent of students. Only 12.7% agree the University is entitled to do so without students‘ knowledge or consent.

In the structured interviews we explored the University‘s entitlement to monitor students.

The students did not have a clear understanding about the extent to which their use of the University‘s VLE, Blackboard, could be monitored, and by whom; nor were they sure they had given consent for such monitoring. Although they agreed they had probably ‗signed something‘ at enrolment, they questioned whether that consent was ‗freely given‘: had they had a real choice? And to what were they consenting at the time?

There was strong feeling against Blackboard being used to track any individual student‘s actions, and that direct consent ought to be sought for such tracking. They questioned the validity of data such as usage of the VLE based on login records: they could remain logged in for hours without doing any work. A previous group of students had noted the converse: one student could login and download learning materials on behalf of others so the absence of login records could be misleading, too (Leigh and Prior, 2008). They perceived the tracking of individual students‘ use of Blackboard to be an issue of privacy, while having no objection to the use of aggregate data. This, again, was in accord with students taking part in the previous study.

One student commented that being monitored without knowing it could lead to a more accurate picture being gathered, as having knowledge of their VLE use being tracked could cause a student to alter their behaviour to enhance their usage profile.

The unease about VLE monitoring being used to make judgements about individual students‘ study progress was also caused by it being only a partial picture of their activity. The students recognised the tension between taking a particular process (use of the VLE) and using it to judge learning outcomes that could be met in a variety of different ways.

One interesting use of the VLE for learning and teaching which introduced a consequence that would not have previously existed was described by a student. A module required them to keep an online log on a regular basis. Because he had been ill and missed log entries, he subsequently ‗reverse engineered' them but lost marks as the time stamp was not consistent with the content. Staff using such facilities need to do so with care and with provisos to handle such situations.

The students were not aware of who could see their VLE usage, nor any work posted into blogs and wikis. Some said they would not want lecturers to see their work for other modules than those they teach, in case it introduced bias by influencing their opinion of the student's progress. In terms of anyone external to the University such as quality auditors seeing their work, they agreed that they needed to be asked before this happened, and they would want to know to what use such monitoring was to be put.

When asked whether internet use in halls of residence should be monitored, there was initially a strong feeling against this, as it is the students' home environment. However, on reflection, students conceded that there might be a reason to monitor internet traffic, for example to ensure that sites with illegal content were not being visited. Emails, however, should certainly not be monitored. One student commented that ‗there is always a balance between security and freedom'.

3.6 Professional practice

The survey included a number of statements covering aspects of professional practice. These include the acceptability of cutting down on testing:

„If a project is significantly behind schedule or over budget, it is acceptable to cut down on testing effort.'

Although over 70% disagree or strongly disagree with this statement, a worrying 21.9% of final year students agreed: twice as many as second year students. We might have expected final year students' responses to be in line with those of second years, or to be even less willing to cut down on testing when under pressure. More work needs to be undertaken to explore in more depth the students' thinking on this issue.

In terms of stakeholder consultation, 72% agreed that:

„Inan IS development project, ongoing consultation with representatives of all those affected by it should occur throughout the information systems development life cycle.'

Yet more than half agreed that:

„Consultation with all stakeholders in an information systems development project is not always possible; to keep stakeholders informed is sufficient.'

In a questionnaire it is not possible to know how respondents have interpreted a concept such as ‗consultation'. There is an apparent contradiction in agreeing that ‗ongoing consultation' should occur, but also agreeing that consultation is not always possible and that to keep stakeholders ‗informed' is sufficient. Within the scope of this study it was not possible to pursue these issues within the structured interviews; this would be a fruitful area to pursue further.

The survey included the statement:

„So long as a systems development project provides me with an interesting challenge, I do not care about its overall objectives or purpose.'

More than 20% of the responses are ‗indifferent', with over half in disagreement. It is the second year undergraduates who are most likely to agree (26.3%) as against 15.6% of the final years and 7.7% of the postgraduate students.

When considering possible reasons for the difference in response from the two undergraduate student groups, it should be borne in mind that most of the final year students have undertaken a year's industrial placement and so have a greater level of relevant work experience than the second year students, as well as being one or two years older than them. Having worked in an IT-related job, and being nearer to graduation and permanent employment in their chosen career, it is possible that the final year students had in mind a ‗real world' ‗system development project' when responding to this

statement, whereas second year students might have been more likely to think about the projects set them as coursework assignments. The final year students were all studying a Computer ethics module; hopefully this might also have helped encourage them to think beyond the challenge that a given project might pose. As it was beyond the scope of this study to pursue issues of professional practice within the structured interviews, these remain topics to be explored in more depth in future work.

4. Discussion

This study highlights the difference between surveys and structured interviews for gathering data. The survey is an effective way to gather views from a large number of students across different cohorts and the results give rise to some interesting findings. However, there is no way of ascertaining how subjects might have interpreted statements, nor whether they have responded honestly to them. Structured interviews enable the researcher to seek clarification, to explore the rationale for particular responses and generally to gather richer data that puts the views expressed into a context. While, for example, the survey results indicate that nearly half of the students agree that it is acceptable to make unauthorised copies of software for their university work, the structured interviews were able to find out more about the contingent nature of this view. The disadvantage of the interviews is that only a relatively small sample of students could be involved and by the very nature of the process, they tended to be the more committed, involved and articulate students. Thus, although they were a fair reflection of the demographic profile of the students who completed the survey, there is no way of knowing to what extent their expressed views are representative of the study subjects as a whole.

The interviewed students do appear to have a strong ethical code. They are concerned that their actions should not harm any individual, and they also appreciate that the University has responsibilities (for example, to ensure that the conditions for educational licenses for software are not infringed) which they should respect. They also appear to accept that the University has a right to monitor IT facilities' use. They demonstrate consideration for other students (for example, facilities should not be used for personal gain if this prevents other students accessing them for University work). They are able to consider the context in which actions take place in judging whether they are right or wrong.

However, there is evidence that they may not always think beyond the immediate consequences of an action, or beyond their own experiences, which can lead to some inconsistencies in their views. Whether an action causes _harm', for example, is seen in terms of harming an identifiable individual such as another student. Large, _faceless' corporations who are perceived to make excessive charges for their software products are considered fair game when it comes to unauthorised software copying; whether there are other harms caused by this behaviour is not a consideration.

All but one of the interviewed students are in their twenties; they have grown up with the internet and mobile communications technology. The use of these is integral to their lives and they appear to take for granted the use of University IT facilities to use the internet, including social networking sites, on a regular basis, including during staffed laboratory sessions. Indeed, these services are so integrated into their lives that they do not appear to include them when considering the use of University IT facilities for their _own activities'. They are quite simply _what they do'; part of the fabric of their lives; essential tools that enable communication that are taken as much for granted as talking face-to-face. This is a phenomenon that an older generation of academic staff and employers alike need to understand, and need to consider how most effectively to use to enhance students' and employees' performance.

A number of areas covered by the survey could not be pursued in the structured interviews, given the time constraints involved. These were principally aspects of professional practice, as noted in the previous section. Future studies are likely to focus on using the qualitative process of structured interviews to enrich our understanding of students' ethical attitudes in these areas.

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WEB-BASED INFORMATION SYSTEM DEVELOPMENT METHODOLOGIES FOR TODAY'S CRITICAL FACTORS: INTERNET SPEED AND WEB-BASED AESTHETICS

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Abstract

Web-based information system development methodologies are becoming inadequate in meetings today's critical factors, such as, internet speed and web-based aesthetics. This is because the web developer is placed under increased pressure to develop web-based information systems at internet speed with web-based aesthetics. This paper proposes insights from an action research investigation into how the adaptation of methodologies from the information systems domain is insufficient in terms of meeting today's web-based information system demands of continuously changing structures, processes and resources with an organisation.

1. Introduction

The research paper highlights today's critical factors of Internet Speed and Web-based Aesthetics affecting the successful utilisation of existing web-based information systems (WBIS) methodologies. Developing WBIS methodologies in today's changing work place is a problem that needs better emergent analytical development tools to accommodate dynamic organisational change (Ramrattan and Patel, 2009). By investigating the WBIS methodological problem in an organisation, gives the researcher the opportunity to gain insights in overcoming these critical problems of Internet Speed and Web-based Aesthetics within an organisational context.

Baskerville, Pries-Heje and Ramesh (2007) demonstrate that persistent Web-based methodological problems cannot be completely understood from previous IS literature and call for researchers to conduct further studies in this area in order to gain deeper contextual insights. This research paper is set out in that premise (gain deeper contextual insights) and supports these authors in the development of new methodological understandings which are essential for WBIS in order to accommodate the demand for Internet Speed and Web-based Aesthetics. The need for incorporating these aspects may seem obvious on the surface level, but the problems and conditions facing today's changing organisations are different from the challenges previously experienced.

The greater need for Internet Speed and Web-based Aesthetics, from both the manager and the organisation, has placed added responsibility on the Web Developer to develop and incorporate these aspects into the WBIS development process. The literature identifies that this phenomenon being investigated needs greater knowledge and understanding for both theory and practice in the WBIS domain (Howcroft and Carroll 2000; Baskerville et al, 2003; Baskerville et al, 2004; Kautz, Madsen & Nørbjerg, 2007; Baskerville, Pries-Heje and Ramesh, 2007).

These critical aspects as mention above are predominantly implemented by the Web Developer within an organisation. This research paper reports on an AR investigation that is carried out (see section 2) and is centred on the Web Developer in a continuously changing organisation (emergent organisation).

2. The Action Research Project

2.1 The Action Research Execution

The action research (AR) has been conducted from January 2007 to December 2009. Since the start of this period the researcher has continuously been developing AR skills. This is necessary to capture good qualitative data that informs both theory and practice.

The data collection was done in phases with the two main Web-based projects being undertaken. The preliminary projects focus on developing the researcher's AR skills. This has helped to identify problems and weaknesses in the AR framework.

The first study will act as a form of sounding board for the following purposes as are highlighted in Table 1.

Approach	Reason
Practice	Give the researcher experience
Pilot Study	Acts as a test for understanding the critical factors of WBIS for the development of an analytical development tool
Situation Analysis	Elicit some of the issues in developing WBIS in emergent organisations
Data Collection	Gather qualitative data on the success or otherwise of the development process
Analyse and evaluate	Analyse the data, evaluate the findings and generate a resultant list of lessons learned

Table 1: First Study

Conducting the first study will not only act as a pilot study for the initial understandings through patterns and associations generated from the data, but will also afford the opportunity of seeing and analysing first hand, some of the issues that occur in practice in the area of WBIS development.

Approach	Reason
Applied Practice	Apply the lessons learned from the first study
Refinement	Reapply the development of the analytical development tool (Kadar Matrix)
Situation Analysis	Elicit some of the issues in developing WBIS in emergent organisations
Data Collection	Gather qualitative data on the success or otherwise of the development process
Analyse and evaluate	Analyse the data, evaluate the findings and generate a resultant list of lessons learned
Research proposition	Infer some conclusions from the work

Table 2: Second Study

The second study will act as the main study for this research paper. The presentation and evaluation of the findings will be carried out by the researcher. Evidence of the viability of the findings is then sought. The design and execution issue of the AR investigation is to follow below.

2.2 Design and Execution Issues

The design of the AR investigation is initially affected by the methodological problem being investigated. de Vaus (2001) describes the function of a research design as to: „ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible‘. The primary purpose of the research design is to aid the researcher in understanding how the web developer isn‘t adequately able to utilise existing methodologies. The research design of two different studies (Tables 1 and 2) has a significant impact in drawing out themes, patterns and associations which gives added rigor to the understandings being generated.

The execution of the design has had to overcome parallel development of the different projects. This involves accommodating the fast paced and continuous changing structures, processes and resources of the organisation. Over time the researcher has had to develop skills to record the AR data with the emergent nature of the organisation.

An issue surrounding the uncontrollability threat is apparent. This involves the researcher attempting to change the environment being studied when the researcher does not have full control in the environment (Avison et al 1999). In order to overcome this threat more time is needed for the execution of the design, as the relationship between the researcher and subjects needs the development of trust. Avison et al (2001) correctly point out that ―Rarely will an organisation cede ultimate authority for organisational action to an external researcher". Further, the placing the AR data in context is discussed next.

2.3 Placing the AR Data in Context

The AR data is contextual information, wherein it captures different perspectives of the development process from different participants. It focuses on the Web Developer's ability to develop WBIS.

It also comes through engaging with others in the AR cycles. Therefore, any acts which are intended to collect data are themselves interventions. So asking an individual a question or observing an individual within the organisation is not only simply collecting data, but is also generating learning data for both the researcher and individual concerned.

The data collecting template is structured in order to capture both problems and solutions. This is the main basis for generating themes from the data gathered. Having structured the data in this format, helps to generate clear and effective themes which, in turn, helped not only to generate themes, but also to develop methodological understanding through an analytical development tool (Ramrattan and Patel, 2009).

The AR data documents the researcher's reflections, through the participation and observation of: teams at work, problem being solved, decisions together with the interventions which are being made to advance the project.

The AR data is committed to the production of new knowledge through the seeking of solutions or improvements to "real-life" practical problem situations (Elden and Chisholm, 1993; Shanks *et al,* 1993). However, the data generated is more than solving a "real-life" problem, as the action researcher is working within a conceptual framework (Checkland, 1991; Baskerville and Wood-Harper, 1996) and the actions taken to make a situation perceived as problematic. This should form part of and stems from strategies for: developing, testing and refining theories about aspects of the particular methodological problem in context (Avison, 1993; Susman and Evered, 1978). The Information Systems Development Methodologies discussion follows next.

3. Information Systems Development Methodologies

The focus of this section uses the notion of an Information Systems Development Methodology or ISDM as a tool-kit of ideas, approaches, techniques and tools which web developers use to help them to translate actual organisational needs into appropriate Information Systems. An ISDM is a: "recommended collection of philosophies, phases, procedures, rules, techniques, tools, documentation, management and training for developers of Information Systems" (Avison and Fitzgerald, 2003a).

There are a multitude of methodologies associated with Information System Development (ISD) which have been recommended since the 1970s, and development methodologies in the area are still being developed. Both practitioners and researchers continue to create and recommend new methodologies in order to facilitate the development of Information Systems (IS) using new technology with a current shift to support the organisational emergent areas of Web technologies.

Prior to the revolution of Web technology, there are already existing ISD methodologies available to practitioners for Web-based development projects. The major players, during that period of development, are often large enterprises. These enterprises are willing to pay huge sums of money for ISD. The reason for this is quite simple in that there is a need for one enterprise to gain a competitive advantage over its competitors. To achieve this goal, methodologies have been adopted for the efficient development of their computer-based IS. This competitive advantage has changed with the introduction of the Web-based platform, although today's problem of Internet Speed and Web-based Aesthetics makes it more problematic. The revolution of the Web is discussed in the next section.

4. Revolution of Web

When the revolution of Web technology has started, small businesses and individuals could also afford to create their own computer applications, including a Website. Google.com, Yahoo.com, Amazon.com are very good examples. They start as unknown companies to become some of the most renowned companies in the world. In fact, they have taken advantage of the Internet and Web technology to drive their business so that the Web now has become a strategic part of the business.

Therefore, Website and Web-based Information Systems development are placed at the forefront of new business systems development. Many companies have tried to have at least a Website and need it within a small number of weeks (time constrained environment). Although there are many Web

development methodologies available to practitioners, they are not well-known, or are known but many avoid using them.

Undeniably, there are contrary and supporting statements on both sides of the argument on the benefits of adopting a methodology for web-based development. While it is beyond the scope of this research paper to study every available methodology, this research paper will focus on Web-based Information Systems Development Methodologies to establish greater understanding which are relevant to the problem. The following section discusses that Web-based development is specifically different to IS development.

5. Web-based Development Specifically Different to IS

Firstly, the original purpose of Web-based development is to build an alternative type of medium that extends a channel of communication to online publishing purpose for internal and external stakeholders. In addition, the purpose of the IS development is to facilitate business transactions and operation of an organisation.

Secondly, the development life cycle of a general Information System is a long term cycle, while a short term life-cycle of Web-based development is quite common for many Web-based projects.

Thirdly, the Web is content intensive, and is composed of unstructured information use; while structured information and its flow are the major focus of traditional Information Systems.

Finally, Web-based development is a rich graphical approach, although it may be optional to most Information Systems development projects. Consequently, the methodology to develop needs to be discussed separately from the traditional Information System development.

In most cases, Web developers start to create a document on the ‗editor software' without hesitation in order to make a design and analysis; this ‗ad-hoc' approach can be problematic (Linden and Cybulski 2004). Similar to word processing applications, modern HTML editors allow Web developers to easily create, edit, update and publish the documents directly to their online sites. As a result, Web developers, who may have little or no technical background in system development, will nevertheless, be able to have an advantage and seamlessly create their own sites without hiring programmers.

Although some contents may appear functional, they may display the contents inefficiently within acceptable response timing. Misunderstanding of the method of usage may lead to suffering as this technique may not always be appropriate. Since the increasing demand for Web-based content, there have been some very important issues that have arisen regarding Web-based development. Additionally, increasing volume of image usage and the demand for large scale documents are today's primary concerns for most Web developers. Adoption of some kind of techniques (i.e. analytical tool) may help Web developers reduce these kinds of problems.

Although Powell (2000) mentions the needs for Web development methodology and also the adoption of Information System development methodology such as the Waterfall Model, Modified Waterfall and Joint Application Development (JAD) to Web-based Information System Development. There is no clear explanation of a procedure and method for doing so. However, there is recommendation of the site-building methodology for Web design and development guidelines for Web developers.

Web-based Information Systems Development methodology has derived a concept from hypermedia development methodology. Usually, hypermedia is a combination of rich texts, graphics, audio, video, and so forth by using the concept of a hyperlink in order to provide a cross reference and navigation to other pages or sections of the application. Any hypermedia design and development methodology should be able to adopt the development of a Web-based Information Systems (Coda et al 1998).

5.1 Web-based Aesthetics

Aesthetics is originally a termed coined in 1735 by Alexander Baumgarten. This notion is derived from the Greek word aisthanormai, which means the perception of the senses. Aesthetics has since evolved to refer to two interrelated areas: the philosophy of art and the philosophy of aesthetic experience. The philosophy of art grapples with the question of what constitutes art. Answers from theorists differ widely. Some adhere to the impossibility of defining art given varying focuses on art movements, theoretical foundations, and social contexts. Other theorists attend to the creative impulse

that undergirds all human activity. The philosophy of aesthetic experience grapples with the nature encountering the arts, including artefacts and phenomena (e.g., nature) that possess aspects susceptible to aesthetic appreciation. Some theorists attend to appreciation and enjoyment, whereas others find the aesthetic to be a way of knowing and experiencing the world (Given, 2008).

The continuous change of an organisation is a key factor which affects the development process, though the literature illuminates a critical factor that hinders the Web development process which is characterised as ―Web-based Aesthetics"(Ramrattan & Patel, 2009).

Web-based Aesthetics is generated from today's organisations demanding increasingly more multimedia features and tailored WBIS. This increasing demand puts the Web Developer under extreme pressure for multimedia features (video, audio, graphics) which can make Web development methodologies inadequate (Lang 2002).

Further Barry and Lang (2001b) reveal that the graphic design role is a significant process within the development cycle. Although more crucially Web Developers and graphic designers have different perceptions and values. This creates importance of developing a common resolution of cross-cultural paradigms. The other critical factor of Internet Speed is discussed in 5.2.

5.2 Internet Speed

The notion of ‗Internet Speed' is developed alongside the birth of the WWW and the dot com explosion in the 1990s. This paradigm gives new focus to the meaning of time-to-market, customer focus and the ability to respond to changing business needs (Baskerville & Pries-Heje 2002).

There are ten properties of Internet Speed (Baskerville and Pries-Heje 2001). These are:

Time Pressure:	Minimising time to market (Delivering project on time)
Vague Requirements:	Inability to have predefined requirements
Prototyping:	Build the wrong system several times until the right one is achieved
Release Orientation:	Track changes to new features
Parallel Development:	Development must be simultaneous
Fixed Architecture:	Basis for distributing work
Coding your way out:	Invent your own programming language
Quality is negotiable:	Functionality is desired faster
Dependence on good people:	Recruiting high quality developers
Need for new kinds of structure:	As resources grow, quality needs to grow with it

These ten properties characterise the factors that the Web Developer is facing when developing at Internet Speed.

Its initial conception is driven by the fast paced change of the Internet. Atlanta Constitution (Baskerville and Pries-Heje, 2001) identified that it has taken 30 years (1920-1950) for the telephone to reach a 60% penetration in the USA and that it has taken 15 years for computers to reach a 60% penetration. However, it has taken only two years for the Internet to reach 60% penetration. Baskerville and Pries-Heje (2001) described this phenomenon as an exploding bomb and it carries the notion of ―bomb". This is due to the frantic speed that companies are developing application for the Internet. Driven by the risk of becoming obsolete the notion of ―Internet time" is generated. Its origin is coined at Netscape and first publicised by Cusumano and Yoffie (2000).

However, Baskerville and Pries-Heje (2001) find that the discovery of Internet Speed generated a metamorphosis in the migration of the meaning of ―methodology" in certain development sectors. They also identifies that this reformulation is due to the dramatic increase in the influence of time on the WBIS development process. The dominance of ―time to market" has changed not only the definition of methodology for some Web Developers, but has generated a new form of philosophical foundation. As in the last decade the practicality of methodology has been questioned altogether. Fitzgerald (1997b, 1998a, 2000) and Wynekoop and Russo (1997) questioned this tenuous relationship of methodologies to the practice of ISD.

The Web Developer in the AR investigation (Ramrattan and Patel, 2009) has conducted the development process with an analytical tool (Kadar Matrix) and utilises different phases of methodologies for the purpose of meeting the organisations and managers demands. This WBIS

process cannot be developed and then be left un-attended as there is the need to keep information up to date. It is a continuous process (Howell & Croft 2000). This leads to the Web Developer being under colossal pressure to build high quality Web-based projects whilst selecting an appropriate Web development methodology.

Baskeville and Pries-Heje (2002) demonstrate the paradigmatic difference is derived from their study. Firstly, the analysis must be done differently, because the requirements are ‗fluid and ambiguous'. Secondly, that good design and layout is necessary for scalability. Thirdly, that detailed design is different, as it is based on tools and components capability. Fourthly, that the rush to code and implement the development process has been enveloped by the paradigm as a substitute of unambiguous requirements. The attitude towards maintenance is different, because it appeared that maintenance is generally ignored in some of their research findings. Section 6 looks at adopting an appropriate methodology.

6. Adopting an Appropriate Methodology

This research paper does not debate if practitioners should adopt a particular methodology. Conversely, this research strongly supports the idea that an appropriate context based methodology may be applied in the development process.

There is a clear need to define further, what a methodology should encompass. A methodology for constructing WBIS should consist of a set of process models, methods, tools, documentation aids and guidelines that help the Web Developer build quality Web projects, whilst at the same time, adhering to the constraints imposed by time and resources (Avgeriou and Retalis, 2005). Such a methodology, of course, is not a mere collection of elements but advocates specific development philosophy and offers specific benefits, such as: risk mitigation, quality assurance and the ability to manage change. Therefore, the development of a Web-based project within specific times and financial resources demands effective development methodologies.

It is more than evident that WBIS cannot be designed and implemented on the notion that organisations are static. Instead trial-and-error approaches must be abandoned so as to accommodate more methodical and systematic engineering approaches for WBIS development (Lang 2002). Therefore, the construction of high quality Web-based projects, within specific time frame and resource allocation, demands effective development methodologies.

There are many case studies, empirical research and methodologies which are developed in WBIS. When these are used in actuality, they are formulated on static characteristics and are essentially not addressed in the literature. Avison et al (1999) argues that academics should go beyond developing methodologies, case studies and theories by trying them out in actuality:

> In action research the researcher wants to try out a theory with practitioners in real situations, gain feedback from this experience, modify the theory as a result of this feedback, and try it again. The iteration of this action research process adds to the theory so that it is more likely to be appropriate for a variety of situations.

Thus it is essential to not only document what is occurring in the real world, but test its relevancy in actuality. The AR reported in this paper uses this as the basis for further knowledge. Section 7 discusses the concluding part of this research paper.

7. Conclusion

Many methodologies exist for ISD since the 1970s and new ones are being produced. Both practitioners and researchers continue to create and recommend new methodologies to facilitate the development of the Information Systems application using new technology with a current shift to support the emerging areas of Web technologies and applications.

Prior to the revolution of Web technology, there are already existing Information Systems development methodologies available to practitioners for web-based development projects. The major players during that period are often large enterprises, which are willing to pay huge sums of money for Information Systems development. The reason is quite simple; this is in order for them to gain a competitive advantage. To achieve this goal, methodologies have been adopted for the efficient development of Information Systems. The competitive advantage has changed with the introduction of

the web-based platform, though today‘s problem of Internet Speed and Web based Aesthetics makes it more problematic.

Developers may already realise that a single development methodology may not fit all situations that occurs in IS and Web-based development. This section has reviewed the issues from the AR investigation, which have already been well-accepted within the area of traditional IS and WBIS development. Although the characteristics of them are somewhat different, their major objectives are considered the same as when they are both trying to assist the Developer in development process.

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BIOINFORMATICS AND PRIVACY

Wade L. Robison

Abstract

To understand the moral harms invasion of privacy can produce, it is helpful to look at tort law where four different kinds of privacy harms have arisen over the past 110 years in response to particular cases of claims of invasion: intrusion, disclosure, false light, and appropriation. These four privacy torts parallel four different moral harms that can occur through invasion of privacy, and of these four, intrusion and disclosure are of particular concern to bioinformatics and, in particular, to the creation of databases of biological information.

We can think of the creation of these four different harms as sort of an open source development. The development of these four torts took place slowly, in various jurisdictions, as individuals sued and courts responded, their decisions serving as an open source for further suits and further responses. Whether the creation of databases of biological information will produce further suits and an expansion of the number of privacy torts, or of the scope of existing torts, is an empirical question, but one worth considering. Understanding how the creation of biological databases may run afoul of current privacy torts is no assurance, that is, that some further privacy considerations may not be implicated.

At issue is whether creating databases of biological information is an invasion of privacy or will lead to invasions of privacy. We will need to have a clear understanding of what an invasion of privacy is to pursue this query. In American law, four privacy torts have arisen over the past 110 years, the concept of privacy having been introduced in 1890 and given legal standing in the early 1900's by New York State, which passed a law against one kind of harm that arises from invading someone's privacy. These four torts have developed in various state jurisdictions as individuals sued for perceived harms and courts responding, their decisions creating an open source for further suits and judicial responses. So the current situation in privacy law in the United States is that the four privacy torts so far in the law -- intrusion, disclosure, false light, and appropriation -- have developed over time and been subject to critique after critique in various jurisdictions. They have been vetted, as it were, by sustained critique and thus provide a good basis for a preliminary assessment of how the creation of biological databases may invade our privacy.

1. Privacy

The concept of privacy entered the law in the United States in 1890 when "The Right to Privacy" by Samuel Warren and Louis Brandeis was published in the *Harvard Law Review* (Warren, 1890). It was not that issues of privacy had not been raised before 1890, but that they were not identified as having to do with privacy. Warren and Brandeis showed how some previously decided cases could be better understood as invoking a concept of privacy and so laid the foundations for its use in the law. Their interest in the issue of privacy came because when Warren's daughter was married, yellow journalists -- the 1890s equivalent of paparazzi -- were hanging over the fences intruding on the festivities. Warren was incensed, but found that he had no legal recourse. The article was the result, and it set off a history of development of the concept

The concept developed, as I have said, as different judges in different states responded to particular cases with differing particularities. One case might involve photographing a vaudeville dancer surreptitiously; another might involve printing an entry from someone's diary without their permission. The effect of this extensive history is that the concept is honed by a great many minds with a real interest in getting clear on what the concept means and what it entails. A decision in a case depends upon it.

We might think of this as open source development by practitioners with great skill in discerning, and creating, distinctions that make a difference to the rights of individuals and corporations. These

practitioners have a real interest in honing their skill on the concept of privacy because they get paid, sometimes with a great deal of money, to make, or find, distinctions that will allow their clients to win a claim to a right.

Out of this open source development have come four different privacy torts, four different ways, that is, in which we can harm each other by invading privacy. The concept has developed through ordinary individuals going to the law to rectify harms they perceive to their privacy. The four privacy torts will all find resonance in our ordinary understanding of what an invasion of privacy is -- in part because our understanding of privacy is now dependent upon this history of development, in part because the harms the torts articulate are common ones with which we are all familiar. Rather obviously, the creation of privacy rights in the law has fed back into our culture clarity about how our privacy can be invaded so that those with a concern are now better able to identify the nature of the privacy interest being harmed.

The four privacy torts are intrusion, disclosure, false light, and appropriation (Prosser, 1960). The former two will be obvious to all; the latter may need some explanation, but should also resonate with our current understanding of how our privacy may be invaded. The legal development has clarified existing concepts, not created wholly new ones.

Intrusion? The clearest sorts of examples of intrusion occur when, without your permission, someone comes into your room uninvited, or rifles through your desk, or reads your diary, or accesses your e-mail. You need not know about these things in order for intrusion to occur: someone can intrude on your privacy by peeping in your bedroom window without your knowledge.

The details of a particular case may make it somewhat unclear whether your privacy has been invaded through intrusion. If you leave open your blinds in front of a busy street, you can hardly complain if someone glances in and can complain even less if you dress, or not, as though you were in complete privacy.

Yet, for all the complications of judgment the details of a particular case may produce, it is clear enough that taking a biological sample from you without your permission is an intrusion, and, rather obviously, so is taking a sample without your permission in order to ferret out features of your DNA. It is not the use to which the sample is put that matters, but the taking of the sample. We would surely think it intrusive if someone were to walk up to us at a restaurant and, grabbing us, force open our mouths to check to see if we were masticating our food properly -- or, poking a finger in one of our ears, turning it and looking at it to see if we had wax build-up. The issue whether our privacy has been invaded in such cases does not turn on what motivation or reasons the person had for such behaviour, but on what was done to us by that person, without our permission.

We cannot complain of an invasion of our privacy if we give someone permission to watch us undress or to read our email. So one condition we would need to ensure for the gathering of biological data is that those providing the data know they are providing the data and give their permission for the data to be gathered. Otherwise their privacy will be invaded.

The second sort of privacy harm is disclosure. We can intrude on someone‘s privacy without disclosing anything about what we discover. I can read your e-mail and not tell anyone or reproduce it for distribution. I can watch you undress without disclosing what I have observed to anyone. But if I do make what I have seen available to others, I have disclosed private information, and that is a different kind of harm than intrusion, with different implications. Giving permission to someone to gather biological data from you is not to give permission for that data to be shared. So permission needs to be obtained as well if information about individuals is to be put in databases and so, thereby, made available for others to see.

I should add here that it is arguable that putting information on databases invades privacy because it constitutes disclosure. The intention may be only to store the information for one‘s private use, but we know too much about how databases can be shared, willingly or not, to take seriously the claim that a database is inherently private. We all have heard stories of the records of doctors and dentists being found on discarded computers, with all the private information of medical histories of patients available for view. I work at an Institute where entering students are already so adept at computers that I suspect many could readily tap into the databases the Institute keeps on its employees. The working assumption ought to be that if a database is on a computer, it is prone to disclosure.

In addition, and rather obviously, building databases of biological information is of no use to anyone unless the databases are made available, but keying the data with those who supply it, without their

permission, is an invasion of their privacy: the databases would disclose information about them to others. It is disclosure that thus seems to present the most pressing privacy issue regarding bioinformatics. The other privacy torts are not unimportant to the issue, however.

The third is false light. This is an odd kind of invasion of privacy. We are said to invade someone's privacy when we say something false about their private life and so put them in a false light. That seems odd because we are not in any way invading their privacy: how could we if we are purposefully saying something about their privacy that we know to be false? But the point of the tort is that someone who has been put in a false light by any such statement is put into a terrible dilemma: either the person must reveal what is true about the private aspect of their life that has been ―reported," or the person must live with the public thinking the report true or at least wondering it is true.

Woodward and Bernstein said of Nixon that he never slept with his wife, Pat, after he lost the gubernatorial election in California in 1972. True or false? Only he and Pat know for sure, we should assume, but if it is false, then the only way either can provide evidence that it is false is to say, publicly, that indeed they did have sex with each other after the gubernatorial defeat. Of course, their claiming that they had sex would not be proof that they did. Their being put in a false light puts them into a dilemma. It is a more powerful one because, we think, that would be just like Nixon: the statement about his sex life makes sense to us, that is. The more plausible the false light, the harder it is for someone to let it pass and not reveal the truth about their private lives--not that anyone need believe what they reveal. And that is the worst harm about being put in a false light. The matter becomes an ―issue" for public discussion, and it will always be a question. In any thorough biography of Nixon, it will at least be in a footnote that it was never settled whether he and Pat had sexual relations with each other after he lost the gubernatorial election. False light can be quite a perverse privacy tort (Robison, 1997).

The fourth privacy tort is appropriation. Our privacy is invaded if our identity or some feature of our identity is appropriated without our permission. This seems an odd privacy tort, but it was the first to develop, and it came about because of commercial use of people's images. The first case involved a debutante in New York in the early 1900's who found her photograph on a flour sack with the words ―The Flower of Flours!" (Prosser, 1960). Our images and all that captures our identity are all treated as property rights. We can sell them or give them away, but if others do that, then, among other consequences, our freedom of choice is limited. The young woman could no longer sell her image to a manufacturer of flour sacks to put on sacks. In addition, others might think her the kind of person who would permit--or sell--her image to be put on a sack of flour. So there is a touch of false light about appropriation. Appropriation becomes part of our history, as it were, limiting our freedom of action and limning our character. In the worst cases, an appropriation turns us publicly into someone different--as those who have had their identity stolen and had to suffer the consequences of bad credit know all too well. What we do is perceived differently because it is perceived as coming from someone different than who we are, and so our freedom of action is limited in that way.

We need not delve too deeply into appropriation to see what it shares fundamentally with the other privacy torts. All of the privacy torts share the following features:

1. They are harms, that is, they set back our interests, commercial or otherwise.
2. They involve individuals, either singly or as groups of identifiable persons.
3. They have remedies, or, at the least, those who are harmed can be compensated.

The last feature is obvious if we remember that these are legal torts: if our privacy is invaded in any of these ways, we can sue and so get compensation, if nothing else, for the invasion of privacy.

The second feature may need some explanation. We can appropriate a particular person's identity, and we can appropriate the identity of more than one individual. But it does not seem that we can appropriate the identity of, say, the French: we cannot appropriate the characteristics of what it is that makes someone a member of a larger group. We can be French, we can become French, we can pass for French, but we cannot simply take that identifying feature and make it our own and, in so doing, cause any harm at all to any particular person. The French may not want someone to become French or pass for French, but it does not seem that it would not harm the French, as the French, if someone were to discover, say, that Hitler was really French--although I say this with at least a touch of hesitation.

These three characteristics of privacy torts are important in coming to grips with the question whether the creation of databases with biological information is, or can be, an invasion of privacy.

2. Creating databases of biological information

In Iceland, DNA is being gathered from all citizens with the idea of creating a database of information. The project seems doable: there are not that many Icelandic citizens, and they are an island, separated by significant bodies of water from neighbours, so that the class to be sampled is more easily isolated. Those gathering the data do not need to concern themselves as much with strangers wandering in from outside to contaminate the sample, and citizens not in Iceland can be readily identified because there are few ways off the island that do not require passing through passport control.

The mode of gathering the data is meant to safeguard those being sampled from having any of their identifying references linked to the samples taken. Mikael Karlsson is an Icelandic friend of mine, and no DNA sample will be labelled ―Mikael Karlsson's" or marked in any way that will allow anyone to know that it came from Mikael Karlsson.

Not taking any identifying references makes the information gathered somewhat less useful than it might otherwise be. Mikael was originally Mike Morley, an American, who got a position as a philosopher at the University of Iceland in the 1960's while on his way to Europe to bum around when few universities in the United States were hiring philosophers. To get tenure he had to become Icelandic, and so he did. But when his DNA is taken and put into a database with the DNA from other Icelandic citizens, his DNA may well skew the results. If Icelandic citizens are descended from a very few individuals--Eric the Red, for instance, or an ancient Icelandic mother of all Iceland--then Mikael's DNA will make it seem as though some citizens, at least, have a different set of Icelandic ancestors. The only way to prevent that inference is to mark Mikael's DNA so that it is clear that Mikael is not a native, but a naturalised citizen. And suddenly Mikael's DNA becomes part of a much smaller set of individuals.

And there is the rub. It is one thing to gather data into large databases where information about any single individual is one part in millions, but when the data is in a database where it is one part in hundreds or a few thousand, then it may be significantly easier to make telling inferences with a fairly high degree of probability regarding at least some other characteristics of those so delineated. If the set happens to include generally individuals who came to Iceland as adults, and if some feature of growing up in Iceland makes a difference to one's general well-being, then we can predict, with some high degree of probability, that Mikael will lack whatever characteristic or characteristics generally mark those reared in Iceland. We will know that Mikael is not X, or is X, where X is some characteristic relevant to determining his health, say, or some other feature he has--such as longevity.

Such information, as we all know, has commercial value. If Mikael is not to live as long as Icelandic citizens generally do, for instance, that gives an insurance company some very helpful information it may use in deciding whether to insure him, or not, and if it does, what to charge him. It will provide information, in other words, that will justify the insurance company treating Mikael differently from other Icelandic citizens. He may be better off because of that treatment or worse off. In either case, someone will be harmed. He will be harmed if he is worse off because, for instance, he must pay more for life insurance. His fellow citizens will be worse off if they must pay more than he because the insurance company has skimmed off the cream of the crop, as it were, in deciding whom to ensure and what to charge for life insurance. Either way, that is, someone will be harmed.

The aim is not to show that harm will occur, but to show how it could occur if identifying references are left off the DNA being collected. We know that blacks are more likely to get sickle cell anaemia than whites, for instance, and that information is itself enough to alert us to the possibility of other features we would miss if all identifying references were removed. One effect of information about health becoming public is that insurance companies, physicians, and others may use that information to treat individuals differently depending upon information about their health. Some differential treatment may be justified: treating differently those who smoke may be justifiable, for instance. That would need to be argued, but it does not seem wrong on it face. But treating someone differently than others because of skin colour does not seem justifiable on its face--even if those of a certain skin

colour are more prone than others to diseases of a certain sort. In any event, there is a potential for great harm in how such information would be used.

Just so, harm could occur if references are *not* left off. The more detailed the identifying information, the more likely it is that someone will succeed in identifying the person profiled through DNA or other biological features. You know that Mikael Karlsson is an American who has taken Icelandic citizenship, but if you did not know that, you could succeed in identifying him with almost 100% accuracy by my giving you only the following identifying characteristics: male, less than 5‘6” tall, Caucasian, with health insurance through the University of Iceland. So we do not necessarily need much information to be able to zero in on individuals: what matters is what identifying information we have. A social security number for an American citizen will generally do nicely.

In any event, if identifying information is attached, we run the risk of providing enough for someone to make an identification. The harm that comes from that sort of information should be obvious. With an identification, one has access to all the biological data assembled in a database: the larger the scope of the database, the more sources of information put on it, the more information someone else has about that person. They need not disclose that information or make use of it in any way to invade that person‘s privacy: we have intrusion. We have someone else knowing information that the person may well want to keep private--an early pregnancy a woman terminated that she has never revealed to her husband, a cancer that he may wish to keep under wraps, as it were, until it becomes clear whether it is operative or not, and so on. Even with only gross features of individuals being in the database--height, weight, sex, race, and other such features--we can learn enough about an individual to draw a profile that is fairly accurate and to use it to deny insurance coverage, for instance.

So choosing whether to attach identifying references to information in a database is not morally neutral. Harm can occur in either case, whether one attaches such information or leaves it off. All that is at issue in such a choice are the following: to whom is the harm to occur, what is its extent, that is, how many different harms are there, and what are their magnitudes? I suspect that no general answer can be given to these queries. The answers will depend upon what information is being put into a database and what identifying references are added.

3. Other sources of problems

There is another problem, however, that makes it clear that we must have some identifying information whenever we create a database. We could assume that if we get the same biological details, for instance, we have the same person and so strike out one of the supposed duplicates. But that is an assumption that may itself skew the database. If two or more individuals do have the same biological details for some particular biological feature--even DNA, for instance--the assumption will ensure that we do not come to know that. If we are to create a database with no such assumptions, it will not be possible to remove all identifying characteristics if we are to ensure that we do not put information about the same person in the database twice. Some marker is necessary to ensure that every Icelandic citizen is counted once, and only once, in the collection of DNA for instance. But a marker for the data requires a code that tells us what the marker means. We need to know, that is, how the markers are connected to individuals to ensure that we have some way of determining if we are counting someone twice or not at all. So it is not possible to remove all identifying characteristics from the original material used to create a database. We might randomise the data after collection and so scramble it in relation to the markers that no connection can be drawn, but somewhere there has to be a code that connects the original data to the original samples. Yet we read all too often of hackers penetrating supposedly secure databases of financial information, in particular, to be sure that if the material is on a computer somewhere, it will not become available to someone not authorised to see it. So we should assume that every code can be hacked--not that they can be, and not that safeguards cannot be put in place to make it difficult, but that even with the best safeguards, someone, somewhere will figure out how to get past any safeguard. It ought to be a regulative ideal that any code can be hacked: that will encourage us to do everything we can to prevent such an eventuality.

Unfortunately, even if we do what we can to make such codes immune to being hacked, we read all too often of discarded computers with medical records intact to think that we can be dead sure that the linkages between biological information and individuals will never get out. We read all too often of

individuals leaking information or mistakenly letting information go that should be private to be sanguine about trusting those doing the collecting to keep the information private.

Optimism that information will not be disclosed comes, I suspect, from not understanding how easily things can go wrong from unsuspected problems that it would never occur to one to guard against until after the fact. A student of mine once told a story in class about her sister, who had as a part-time job transcribing the notes of physicians. One note regarded a transmittable sexual disease of a patient, whose name was on the note, and who happened to be dating a friend of the student's sister. She told her sister, who told her friend. The boyfriend was dropped, and he was as clueless about the cause, it seems, as was the physician that his private notes were being spread about. Or there is the woman who came back from her noon hour doctor's appointment to find the rest of her office mates standing, some opening crying, and then hugging her and telling her how sorry they were. She asked, "For what?" She then found out that her physician's office assistant had filled out the form for billing from the insurance company by writing in for the disease "Terminal cancer." That form was transmitted via fax to her employer because the insurance came through the employer. Someone in her office received the fax, read it to determine where it should go, told the rest of the office, and the woman was stunned to discover, from her office mates, that she had terminal cancer. Much is wrong with what happened to her, but the only point I want to make is that things can go wrong in ways that we may well not anticipate--even though we can understand, after the fact, how easily they can happen.

So I think we ought to view with scepticism any claims made that records being taken are thoroughly "protected" and "confidential." Even without someone trying to obtain access to such information, it gets out--through carelessness or indifference or failing to think through the consequences of one's actions. We can hardly blame the physician's office assistant for filing the form needed to obtain compensation from the employer's health-insurance provider; we can blame the physician for not telling the woman the diagnosis; and we can blame the office assistant for not thinking about how the information on the form would affect the patient once it was received at the patient's employer.

4. Privacy and bioinformatics

I began by laying out the four privacy torts: intrusion, disclosure, false light, and appropriation. These have their parallels in ethics: it is *prima facie* wrong to intrude upon someone's privacy, to disclose private information without permission of the person or persons involved, to put someone in a false light, and to appropriate their identity or image or anything else "belonging" to them without their permission. These are *prima facie* wrongs because some occasions may arise where, for good ethical reasons, we are required to invade someone's privacy. Reaching beneath the shirt of an injured person to retrieve a tag with identifying information that may contain the person's blood type is an invasion of privacy, but permitted, even required, to do right by the injured person. We are permitted to invade the privacy of someone's bedroom, even if that interrupts a couple having sex, if their lives depend upon getting out of the room before fire envelops them, and the only way to inform them is to go into the bedroom. Saving their lives provides a sufficiently weighty ethical reason for invading their privacy.

The presumption is always that no one's privacy ought to be invaded--without compelling moral reasons for invasion. The presumption is thus that without prior permission from those individuals from whom biological data is being gathered, biological databases ought to be kept in such a way as to preclude identification of the individuals whose data it is--unless there is a compelling moral reason for such identification.

Yet, as I have argued, it is not useful to preclude from the data all identifying information: Mikael Karlsson is a living example of why it is not. And we can readily imagine other reasons for keeping a master list matching data with individuals. Someone could well discover that a particular marker puts a person at great risk and also puts others at great risk--the potential children of such a person, for instance--and that steps can be taken by those individuals to minimise the potential harm. Such a discovery, after collecting data from all in Iceland, would make it a moral imperative to inform the individuals in the database with such a marker. But if there is no master list, there is no way to inform them: we would need to perform another test to determine who had the marker and who did not. So there are good reasons for keeping a master list.

In addition, we know that databases can be hacked, and we also know that information in databases can be made public--through carelessness or indifference as well as through the intentional release of such information for some other purpose. Information gathered in a grand jury investigation is to remain private, but in less than 24 hours, newspapers had headlines about the previous day's testimony in the grand jury investigation into whether former President Clinton had lied, or been less than fully truthful, in regard to a civil proceeding against him. Political considerations presumably trumped, for someone, any legal or moral obligation they had to keep private the information gathered through the grand jury proceedings.

Where does this leave us? It leaves us, I think, with the following:

1. We ought to presume that the information in databases will be come public.
2. We ought to do whatever we can to make it as difficult as possible for that to occur.
3. We ought to guard ourselves against the effects of that happening.
4. We ought to presume that at some point correlating the information on databases with individuals will be morally necessary to prevent harm to them.

How we are to put into place these four desiderata is not obvious, however, especially because we have good reasons both to keep information on biological databases private and to ensure the information can be correlated with individuals when necessary.

What we ought to do regarding such biological databases should be the focus of much discussion and consideration by citizens in general, those whose information is likely to be disclosed, and by those who would be presumed to have an interest in the information, insurance companies, physicians, and so on. I will not here anticipate the results of such a discussion except to say that I would hope, first, that any resolution is the result of considered discussion and does not just come about through the invisible (and uncaring) hand of market forces and, second, that in that considered discussion, moral principles trump such other considerations as monetary gain.

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VOTING AND MIX-AND-MATCH SOFTWARE

Wade L. Robison

Abstract

The most important concern with the integrity of voting machines which use software is the integrity of the software itself -- the assurance that it is correctly recording votes and, at the end, tallying them up correctly. We in the United States have had a number of situations in which problems traceable to the software in voting machines has tainted the voting process.

Yet concentration on this problem should not obscure the importance of another that can equally taint the voting process. The design of the Palm Beach paper ballot is now famous, or infamous, for misdirecting voters so that even the most intelligent, well-trained and most highly motivated would make mistakes -- like voting for Pat Buchanan instead of Al Gore, a mistake apparently made by upwards to 23,000 voters, more than enough to have changed the outcome of the election -- and our subsequent history. That ballot illustrates well what I call an error-provocative design.

One serious set of problems with electronic voting machines concerns the software. It should be presumed that any software can be hacked, for one thing, and so relying on software alone for voting means trusting that no one has hacked into the system. It also means trusting that the software was properly designed to register and count and maintain votes, that it has no coding mistakes, either unintentionally or intentionally introduced. This set of problems should not obscure another. In some electoral precincts, the software for voting is on a screen, set within a frame that has the buttons to record votes. It would be easy enough for the screen and the frame to be misaligned -- again, either unintentionally or intentionally -- so that a voter's choice was not properly registered.

The setting of the mechanism within the screen might seem to fall outside the purview of the software engineer or whoever programs the voting software, but it does not: whoever designs the software is obligated to ensure that it works *in situ*. Otherwise we shall have what I call an error-provocative design, a design solution that provokes mistakes on the part of even the most intelligent, well-trained, and most highly motivated users. It is not enough for a programmer to say, ―How they use the stuff is not my business," if, in fact, the program will be set up in such a way as to make its use problematic.

1. Error-provocative designs

We have all had the experience of something's not working the way it appears it ought to work. One way to solve the problem we have in figuring out which knob on a stove controls which burner is to offset the burners, with the ones in the back to the left, say, and the ones in the front to the right. The knobs are then positioned across the front of the stove in the order of the burners. From the left, we would have left back, left front, right back, and right front. My parents' stove has that off-set configuration, but I always mixed up the burners on the left when I visited. I would think I was turning on the left back burner, but would end up turning on the front left burner instead. I thought myself a dunce, and my mother always give me that look only mothers can give wayward children who will not amount to much. After that had happened many times, I took the time to try to figure out what I was doing wrong. I realised that the knobs on the left side had been reversed. The knob controlling the back burner had been placed in front of the front burner, and the knob for the front burner was in front of the back burner. No wonder I kept messing it up! I was not the one at fault: the stove was misleading me.

Such designs are error-provocative: they provoke errors on the part of those who use the artefacts realizing the designs. The worst of the error-provocative designs are those that provoke errors on the part of the most intelligent, most highly trained, and most motivated of operators. We take into account three variables when trying to understand what has gone wrong in an accident: we investigate the circumstances, wondering if there is something awry about the conditions at the time of the accident, black ice, for instance, for an auto crash; we investigate the training of the operator, wondering if better training would have helped the operator avoid the accident; and we investigate

whether the operator could have been trained better, whether, that is, the operator is bright enough to handle the artefact in question.

We can see how someone on the low side of the bell curve of intelligence might have difficulty with complex machinery. We can understand how distracted someone might become while engaged in something that requires constant attention (like flying a plane to Minneapolis from Los Angeles), and we can understand how someone without sufficient training could be at a loss to know what to do in an emergency situation or do something harmful that seemed the obvious thing to do for someone untrained, but just the wrong thing to do.

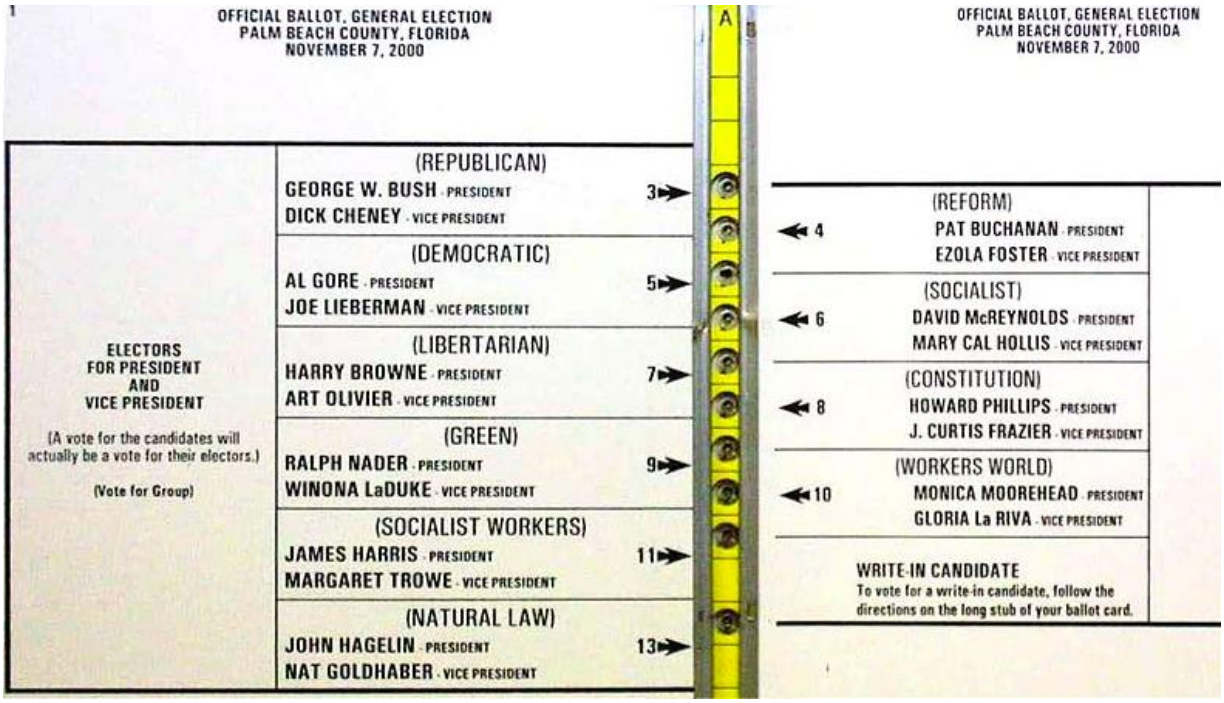
The worst of error-provocative designs are those which produce errors for someone on the high side of the bell curve of intelligence who is as highly trained and as highly motivated as anyone can be. Such designs are to be avoided, obviously, but avoiding them can be more difficult than we might imagine.

Software can itself be error-provocative. The software in the autopilot in the Columbia airliner that flew into a mountain side in 1996 was error-provocative. The pilot's job was to key in the initial letter of the beacon for the airport where the plane was to land. The autopilot would then pick the top of the listed five options that would appear and land the plane. The default was that the closest beacon was at the top of the list -- unless the pilot keyed in "R", in which case the software selected Bogota. The plane was to land at Cali. Its beacon began with the letter "R", and so when the pilot keyed in "R," the plane turned towards Bogota. The pilots did not figure out that there was a problem until it was too late. 159 people were killed when the plane flew straight into a mountain side near Cali (*New York Times*, 1996).

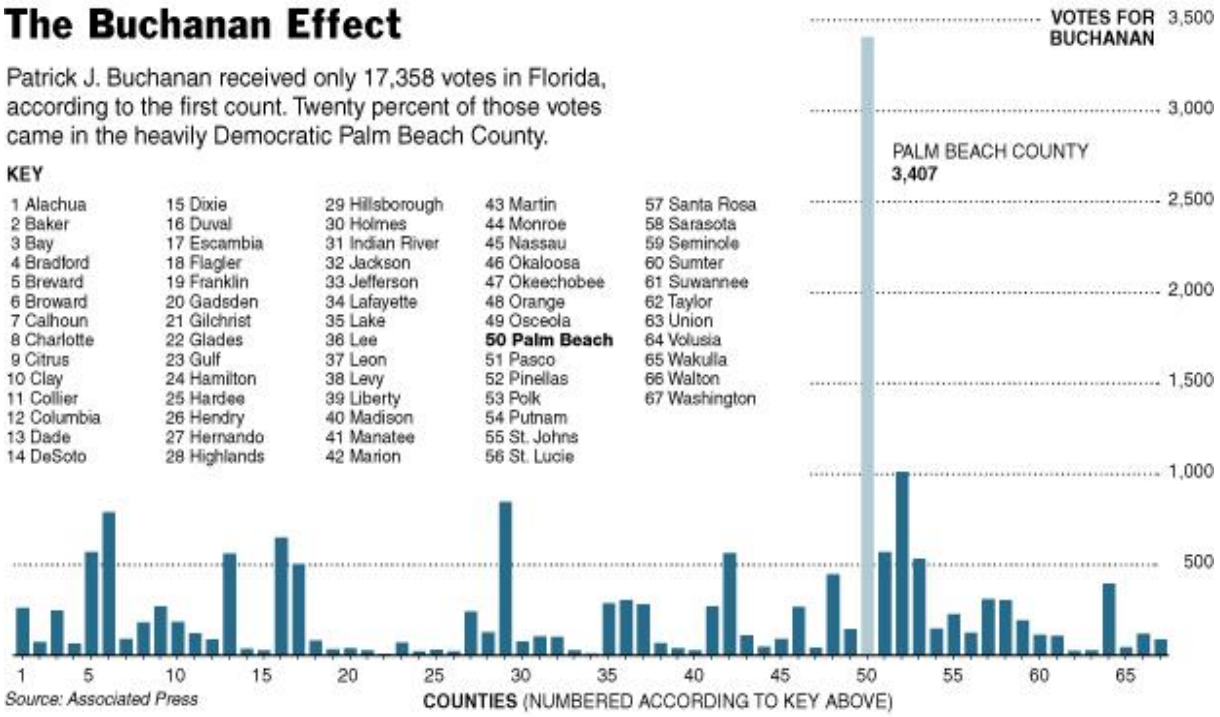
Not even the most intelligent, well-trained, and high motivated of pilots is likely always to avoid the error that led to that disaster. Putting two defaults in the autopilot software was a recipe for disaster. But it was a self-contained recipe. Everything occurred on a screen. We often have the same kind of error-provocative design when an image is produced on a screen set within a frame. The frame has buttons to push, for instance, that trigger the next item on the menu. ATMs often work this way, with the software producing choices -- "Checking" or "Savings" -- for the operator to choose between by pushing a button to the right of the arrows following "Checking" and "Savings." All too often, the arrows on the screen do not match up directly with the buttons. The software works fine; the buttons on the frame work fine; the two together, however, are error-provocative. One way in which software engineers can produce error-provocative designs, in other words, is to have their software encased in a housing which, in combination with the software, misleads. As the ATM example illustrates, this problem of matching the software to the frame in which it appears is a problem that can occur whenever software is married to an artefact, but we will concentrate upon software for voting.

2. The Palm Beach Ballot

Among the problems of the 2000 election in the United States (E. J. Dionne Jr. & William Kristol 2001; Cass R. Sunstein & Richard A. Epstein, 2001), few were more significant for the outcome than the ballot design for Palm Beach County in Florida (AIGA.1, 2000):



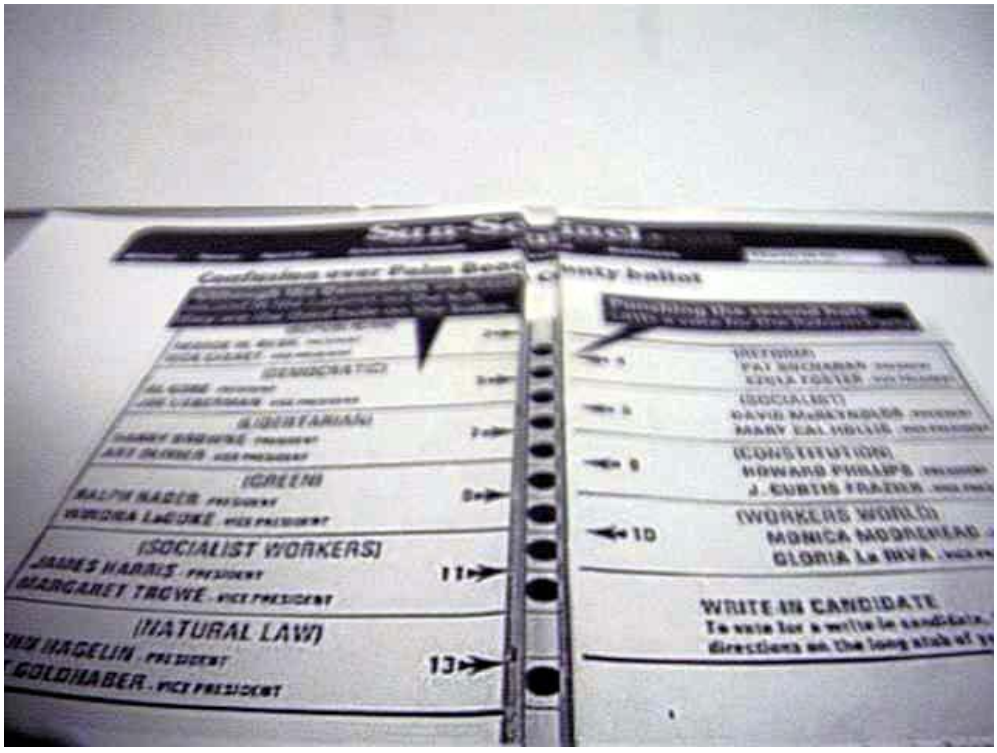
This ballot has numerous problems. The most obvious is that to vote for the second candidate, Al Gore, a voter punches out the third hole, not the second one. Palm County is heavily Democratic, with many Jewish voters, but Pat Buchanan took 3407 votes there, more than he received in any other county in Florida and twenty percent of the total received in Florida (Laurel Elms & Henry E. Brady, 2001). The following chart shows the anomaly well (STCSIG, 2000):



For those unfamiliar with American politics, this outcome is noteworthy because Buchanan is probably the last candidate any Jewish voter would vote for. Among other things, he has argued that Hitler invaded Poland only because Poland gave him no choice, having refused to negotiate over Danzig. He is also the last candidate any female voter would choose, having claimed, among other

things, that women are not suited for politics and that ―the rise of feminism spells the death of the nation and end of the West" (Pat Buchanan, 2002). For Buchanan to obtain so many votes in a county so heavily Democratic and Jewish defies explanation unless, somehow, some mistakenly voted for him. The layout of the ballot provides a plausible explanation for how they could have made that mistake.

The image of the ballot is how it would look if it were viewed directly from above. But that is not the image a voter would have seen. When the ballot was loaded into the voting machine, it would look different because the center row of holes were ―in a different plane from the two columns of printed names, and the ballot (was) being viewed at an oblique angle" (wikipedia, 2000). What a voter would have seen is more accurately represented by this view (wikipedia, Voters View):



If you look at the second hole from the top, it appears next to Al Gore's name. Voting for Gore would mean punching that hole. As it turns out, it is the third hole from the top you need to punch to vote for Al Gore. Punching the second hole is a vote for Pat Buchanan. What is surprising is thus how few voters mistakenly voted for Buchanan.

We should add that this ballot also produced significantly more double votes than usual. One reason is that when viewed head-on and not at the angle seen above, the second hole is next to the Vice Presidential candidate for the Republican Party. Some apparently thought that they should also vote for that candidate and so punched a vote for Bush and a vote for Cheney. That invalidated some votes for Bush. Some Democratic supporters apparently had second thoughts about punching the second hole and punched the third as well. That invalided some votes for Gore. ―A later review of discarded ballots in Palm Beach County by the The Palm Beach Post showed that 5,330 votes were cast for the presumably rare cross-party combination of Gore and Buchanan, compared with only 1,631 for the equivalent cross-party combination of Bush and Buchanan. The number of votes that may have been mistakenly cast for Buchanan was well in excess of George W. Bush's certified margin of victory" (wikipedia, 2010).

One other source of double votes for the Palm Beach ballot was that the last item on the right-hand side asks for voters to write in a candidate. Some voters apparently thought this was a request for them to verify that they had voted and so wrote in the name of the candidate they had already voted for. They thus voted twice, and their votes were thrown out.

There were other problems elsewhere in Florida. For instance, in Duval County there were 27,000 double votes, all of which had to be rejected under Florida law. There the ballot had candidates spread over two pages with instructions to "vote on every page" at the bottom of each page (Wikipedia, 2010).

In any event, it is certainly arguable that design flaws in the ballots used in Florida cost Gore Florida and so cost him the election, the 25 electoral votes of Florida being decisive. Without Florida, Gore had 267 electoral votes and Bush 246, with 270 needed for election.

We have found two problems with the Palm Beach County ballot: it was badly designed, and when placed in the voting machine, it was distorted and its crucial fault -- the failure of the names to line up with the proper punch holes -- was aggravated. So we have learned that

> we should design the ballot well, keeping in mind guidelines for good design; and
> we should ensure that the ballot works *in situ*, works, that is, in the machine in which it is to be placed.

We will consider in §3 some guidelines for designing a ballot well. In §4 we will look at some of the problems we run into when we have a ballot within a framework -- like a machine through which the ballot looks distorted.

3. Design matters

The Palm Beach County ballot illustrates well the point that it can make a significant difference how we view something. Seen from above, the ballot can mislead, but we can also figure it out. Seen from the perspective of our using a voting machine, with the ballot at an angle to our vision, we can readily see how we could make a mistake. That ballot design is going to provoke errors even for the most highly motivated of voters at the high end of the bell curve for intelligence. If they had been trained regarding the use of this particular ballot, they may have been trained out of the error the ballot makes natural, but they were not.

Designing a ballot is not easy, and as the Palm Beach County design shows, even with the best of intentions, things can easily go wrong. The person who designed the ballot changed the previous format to make the ballot easier to read for the predominantly older population in Palm Beach County. What are needed are guidelines to ensure that ballot designs are easy to read and will produce accurate results. This is particularly so in the United States where there is no uniform national ballot, elections being run locally and often with local election boards creating the ballots and selecting the voting machines. Just as all politics are local, so all elections are local.

The AIGA is the professional association for design, and it has recommended ten guidelines for those designing ballots. As will be seen from some of the details of these guidelines, they are as relevant for software engineers designing interfaces for ballot machines as they are for those designing paper ballots:

- **Use lowercase letters**
  Mixed-case letters are more legible than ALL CAPITAL LETTERS because they are easier to recognise.
- **Avoid centred type**
  Left-aligned type is more legible than centred type, which forces the eye to stop reading in order to find the start of the next line.
- **Use big enough type**
  "Fine print" is hard to read and may intimidate or alienate voters. Use minimum type sises: 12-point for optical scan; 25-point for touchscreens. (Following this principle for optical scan ballots may impact printing costs but will be a worthwhile investment in election accuracy.)
- **Pick one sans-serif font**
  Avoid introducing new fonts, which require the eye to stop reading and adjust. Sans-serif fonts with clean strokes (Arial, Univers, Verdana) are recommended for screen and for the quantity and variation of text found on paper ballots. For dual-language materials, use bold text for the primary language, regular text for the secondary language.
- **Support process and navigation**
  For optical-scan ballots, offer comprehensive instructions and page numbering. For touchscreen ballots, offer language and mode options, continuous access to instructions,

consistent and flexible navigation and clear feedback about selections. Post notable wayfinding and instructional materials in and around the polling place.

- **Use clear, simple language**
  State instructions and options as simply as possible. Summarise referenda in simple language alongside required formats. Do not include more than two languages on any one material.
- **Use accurate instructional illustrations**
  Visual instructions help low-literacy and general-population voters. Photo images, which are difficult to shoot and reproduce well, are not recommended. Illustrations must be accurate in their details to avoid misleading voters.
- **Use informational icons (only)**
  Avoid political party icons. Icons that call attention to key information and support navigation are recommended in limited use.
- **Use contrast and colour functionally**
  Use colour and shading consistently: on optical scan ballots, to differentiate instructions from contents and contests from each other; and on touchscreen ballots, to support navigation, call special attention and provide user feedback. Colour cannot be relied on as the only way to communicate important information.
- **Decide what's most important**
  Page and screen layout and text sises should support information hierarchy. For instance, the ballot title should be more prominent than any one contest, a contest header should be more prominent than its candidates' names and a candidate's name should be bolder than his/her party affiliation. Candidates' names and options should be presented with equal importance (AIGA.2, 2007).

Another source of guidelines for designing ballots is the Brennan Center for Justice at New York University School of Law. The list is thorough with the aim of ensuring that each citizen's vote is to count (Norden, 2008). Had these guidelines been followed in Palm Beach County, the ballot would obviously have looked far different: the candidates would all have been in the same column; the ballot would have stated that candidates are not to write in the name of a named candidate; the punch holes would have been consistently placed in front of at the end of the candidate's name; the text would not have been centred, but flush-left; and so on.

Making the ballot clear in those ways may have prevented the problem that occurred when the ballot was placed in the voting machine, but even with a clear ballot, the design choice needs to be examined in the situation in which it is to be used just to be sure that the situation does not change how it is interpreted.

4. Software *in situ*

My bank's ATM is a wonderful example of how to design software and its frame so that those who use it constantly make mistakes. It works the way most ATMs work. You put in a card and punch in your pin number. Then it asks you a series of questions, the first of which is whether you wish to withdraw or deposit money. Arrows go from the ends of the questions to the right where, outside the window of the display, four buttons are set on the frame for the display. You are to push the button the appropriate arrow points to. But just as in the Palm Beach County ballot, the arrows do not line up exactly with the buttons.

The first question is compound, and so only two buttons are relevant. The arrow for the first question points to a spot just above the top button and the arrow for the second question points to a spot just above the second button from the top. So it is clear enough, we think, what button to push. We can ignore the bottom two buttons for this compound question.

Suppose I push the button for a withdrawal. I then get a second compound question: "Do you want to withdraw your money from your checking account or your savings account?" Again there are arrows pointing to the right, one after "checking account" and another after "savings account." I will have the same situation as before except now the arrow for the first compound points to a spot just above the second button from the top, and the arrow for the second question points to a spot just above the third button from the top. The questions and arrows seem to have moved down one notch. So,

being now a little uncertain what to do, I push the second button from the top -- for my checking account, I hope. And that works. So I have just learned something about how the system operates: the arrows point to a spot just above the relevant button.

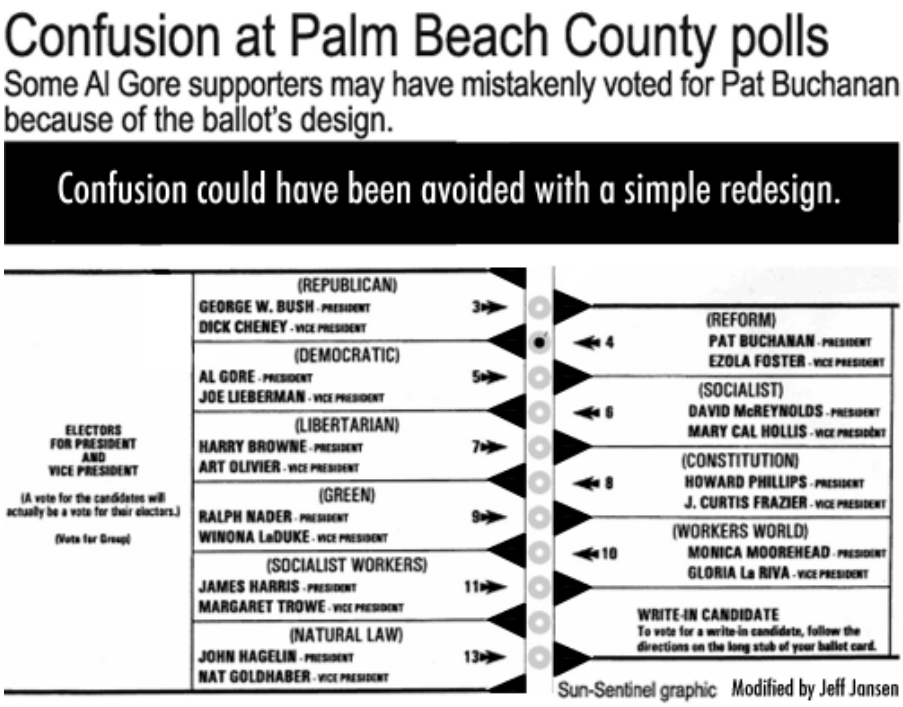
I now get a third set of questions about how much money I want to take from your account. Having learned my lesson about how the system operates, and wanting to withdraw the maximum permitted, I follow the arrow for that amount over to the buttons and see that, like the others, it points to a spot just above a button. So I push that button.

The screen then goes blank, and a new message appears informing me that no transaction has occurred and then, oddly enough, thanking me for completing my transaction and asking, ―Doyou have any more transactions?" At that point, my spouse tells me what I now know, ―Youpushed the wrong button." I get a receipt with nothing on it except the date and time and name of the bank.

The correct button is the one *above* where the arrow points -- even though the arrow points to a spot much closer to the lower button. Pushing the lower button cancels the transaction.

People must be able to learn how to operate the ATM: I see vehicles going through on a regular basis. But I find using the ATM maddening. No warning is given when the ATM requires a different response than what I have just been trained into, and because I do not use the machine very often, I cannot recall, from one time to the next, where in the menu the change in response is necessary. Just as in the Palm Beach County ballot, a person must guess whether the arrow points above or below what it ought to be pointing at directly.

There are no doubt a variety of fixes for this problem. The Palm Beach County ballot could have been made much clearer with a simple redesign (Tidwell, 2000):



Just so, people would be far less prone to make mistakes at my bank's ATM were the system redesigned.

But note that it is the system that needs to be redesigned -- not just the software and not just the frame with its four buttons. It is the combination of the two that causes the difficulty. There is a set of oddities in the software that could be removed so the instructions would be easier to follow. There is no reason for the arrows to jump down a notch in the second set of questions. It is disconcerting when that first occurs: we do not know if it means anything and can only experiment to determine its irrelevance. There is no reason for the arrows in the third set of questions to point to a spot just above the supposedly parallel buttons when they should be pointing higher, to the buttons above that spot. Straighten up the software -- make things consistent -- and many of the problems will disappear.

One will not. The arrows do not line up with the buttons, and a software programmer will not know that without looking at how the software interacts with those buttons. That requires looking at the software *in situ* -- at how it is going to look to someone using the software, set in the frame with the buttons placed as they are. Then the programmer will see that the questions and arrows are offset from the buttons and that they all need to be moved down enough so that the arrows point to the center of the correct buttons.

This example illustrates a general truth for software engineers and those using software in such framed settings -- on voting machines, for instance, as well as airport kiosks for checking in, to give another example. Software engineers are morally obligated, at a minimum, to avoid error-provocative designs. Such a design would be the weapon of choice for an evil genius of an engineer, determined to create engineering artefacts that would cause great harm. Just imagine such an error-provocative design in the software that runs a nuclear plant, or a subway system, the air traffic control system, or electronic voting machines. Engineers are morally obligated to avoid such designs just because they can cause great harm.

Yet as with my bank's ATM illustrates, software engineers might not think too much about how their software is going to be displayed, particularly when the screen is framed. A design that would not cause undue harm were the menu self-contained on a screen could cause great harm once framed. It is not sufficient for a software engineer to say, "That's not my problem. I just do software." Software engineers are responsible for ensuring that their software works *when in place*. That means ensuring it works with other software that may already be there, but also means ensuring that it works if the screen is framed.

5. Summary

Error-provocative designs are at one end of a spectrum of design solutions, with foolproof designs at the other. Aiming for a foolproof design may be a fool's dream. There seem to be too many different kinds of fools in the world to anticipate how someone might misinterpret or misuse an artefact. But it is an ideal worth striving for, and it is certainly worth avoiding error-provocative designs -- those whose essential features are going to provoke errors on the part of the most intelligent, well-trained, and most highly motivated of individuals.

Part of what an engineer needs to consider in avoiding error-provocative design solutions is how a solution will work *in situ*: how is it going to work in practice? This is certainly not a new point, but it seems to be a point that needs to be emphasised again and again, in a variety of different contexts. The Guidant defibrillator that failed and so caused the death of a number of patients was not tested for whether the bodily juices in which it was to be embedded would cause the polymide coating on the wires to deteriorate (Meier, 2005). With electronic voting on the rise, software engineers need to pay particular attention to how the screens on which the voting options are to be displayed are framed, if they are, by the voting machines.

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THE TWITTER REVOLUTION

Wade L. Robison

Abstract

Alexander Hamilton wrote in the Federalist Papers against adding a Bill of Rights to the American Constitution. Besides sending the misleading signal that we need protection from a government to which we have granted only limited powers, some features of a Bill of Rights would be useless, he argued. In particular, regarding freedom of the press, he said in Paper No. 84 that "its security, whatever fine declarations may be inserted in any constitution respecting it, must altogether depend on public opinion, and on the general spirit of the people and of the government" (Carey and McClellan, 2001, 446).

We can find no better example of Hamilton's general point than the way new forms of communication have been used by protestors in Moldavia and Iran, to mention just two nations. In Iran in particular, where protests against the Presidential election in June 2009 were suppressed, "the general spirit of the people" was displayed in the twitters, cell phone photos and videos, emails, and blogs that spread throughout the world. These communications had two important political effects:

- Those who were protesting were able to see that they were part of a larger movement; and
- the protests went viral, as the jargon has it, with the world becoming a witness to the protests and the government's response.

Hamilton argued regarding the writ of *habeas corpus,* a guarantee within the body of the American Constitution, that "confinement of (a) person, by secretly hurrying him to jail, where his sufferings are unknown or forgotten, is a less public, a less stricking, and therefore a more dangerous engine of arbitrary government" (Carey and McClellan, 2001, 444). Hamilton's point is that secrecy is the enemy of freedom and that an arbitrary government can maintain its power, and cow the public and thus damp their spirit and so damp freedom of the press, only if the public has no way of knowing what it is that their fellow citizens and the government are doing. New forms of communication have altered the geography of dissent and protest and so altered the relationship between a government and its citizens.

We shall first look briefly at what we all know, how new forms of communication have altered our capacities to communicate, and then at the two effects of that expansion and thus at the political implications of those new forms of communication.

1. Forms of communication

With the technological revolution of the last several decades we have moved far beyond concern about what we now can see is of very limited value. It is not freedom of the press that should be our concern, but freedom of communication, in all its forms, the press being the most prominent when our constitution was created and far less prominent, in its printed form at least, in this era. Technology has produced new ways of communicating that would beggar Hamilton's imagination. The printed press is such a very small part of our technologically enhanced forms of communication that the phrase "freedom of the press" seems almost quaint if taken to refer to how citizens are now to obtain information relevant to their role as citizens and to communicate with one another about matters of common concern.

What is perhaps even more quaint is that less than twenty years ago, one could be stuck in the south of Portugal, for instance, as I was, without any telephone communication at all and, indeed, without any sure way of communicating except by walking and talking to my neighbours. Even snail mail was problematic: the village postmistress apparently earned extra money by steaming off the stamps of the letters she received to send on. The south of Portugal had always been neglected by the central government, and so it had very few phone lines to begin with. The previous fall the telephone company had taken all the old lines, added new lines, and strung them all on new poles -- right down the middle of a riverbed running from north to south. The winter storms tore out the poles, as anyone could have anticipated, and so the south lost what few operating lines. I discovered all this when a

check from the National Endowment for the Humanities did not make it to my bank in a timely manner, by January 1st, and I called NEH to find out the problem. I was staying in a small village called Praia da Luz (Beach of Light), and the British expatriates there were amazed that I got through. None had been able to call out for some time. Indeed, even getting a phone line was almost impossible. Some told me of their luck in purchasing a house that had a telephone line and of being able to make a deal on the side with the previous owner to retain the line in the house. They had to use the previous owner's name, of course, and so you would never find their names in any of the few telephone books. But giving up a telephone line meant at least a three-year wait for a new one, and no realtor would long survive the knowledge that a house had changed hands and the phone line lost.

All this is almost unimaginable to the new world order of email, iPhones, text messaging, and twittering. "How could you not call out?!" I am reminded of the hero of *Back to the Future*, Marty McFly, trying to unscrew the cap of a soft drink bottle and finding it impossible to budge. He is so used to unscrewing bottle caps that he is amazed to discover that, at one time, not all that long ago, caps had to be snapped off with a bottle opener. We get used to technological newbies so quickly that it is difficult to imagine a world without them, but, rather obviously, the only way to understand the effects of a new technology is to see how things have changed because of its introduction.

2. Privacy and publicity

One of the standard complaints about the new technologies is that they open up what used to be private to us to outside scrutiny -- our purchases, from groceries to books; our friends, from those we communicate with regularly via email or cell phone to those who "friend" us on Facebook; our medical information, from the dental records now on computer and so available to any with access to the computer, including those who purchase it after it is sold unless it is scrubbed clean, to our insurance records, now on computer and often on email and available to any decent hacker and to all with access to the computer network.

The flip side of the loss of privacy is a gain in publicity. As the old saw has it, "An informed citizenry is the bulwark of a democracy." These new forms of communication give us the potential for far more informed citizens and, as the protests in Moldova best illustrate, the potential as well for new ways to mobilise and organise citizens -- and get a sense of public opinion.

April 5th, 2009 brought parliamentary elections to Moldova. The Communists were able to gain control of parliament, and the next day several hundred people gathered to protest peacefully. They agreed to meet the next day to protest again. "A crowd of more than 10,000 young Moldovans materialised seemingly out of nowhere on Tuesday to protest against Moldova's Communist leadership, ransacking government buildings and clashing with the police." What had happened was that some at the peaceful protest on Monday "began spreading the word through Facebook and Twitter, inventing a searchable tag for the stream of comments: #pman, which stands for Piata Marii Adunari Nationale, Chisinau's central square" (Barry, 2009). The next day brought out a huge number of protestors, over 10,000 at least, and 15,000 if we accept the number provided by the protesters.

What had been a small gathering, easily ignored by the government, became a major event, not to be ignored, whether it had become violent or not. The crucial factor in turning a minor protest into a major political test of the new government was the number of individuals involved. There is a tipping point in public protests as there is for any norm.

When too many individuals take a free ride on others stopping at four way stops, the system collapses. It is irritating in the extreme for the drivers who stop at all four corners of an intersection and take their turns going through for someone to drive up, see that others are all stopped, and drive right through. It turns out that it does not take many free riders for the system simply to break down. We can see this phenomenon when too many people break into a line or simply fail to follow parking restrictions. A visit to Italy is recommended for those unfamiliar with this problem.

The tipping point for a citizenry bringing about change in a government is dependent on a variety of factors -- the dependence of the government on elections not within its control, its willingness to respond to dissent outside the normal processes for change, and so on. But numbers matter in any event. A small group of protesters standing on a corner waving signs against a war is not something a government need concern itself about. A half million protesters meeting day-after-day in the nation's capital cannot be ignored.

So what the protesters in Moldova did that Monday, April 6th, was to turn a minor event that could be ignored into a major confrontation that put the government on notice, and the crucial piece in that transformation was the capacity the new technologies gave them to spread the word that there would be a protest the next day. They discovered that they were not just a few hundred upset at the parliamentary elections and concerned that the elections had been rigged, but that with very little organization, they could bring out a great many more citizens. They discovered they were not alone.

We do not need to dissect the anatomy of revolutions to know that numbers matter, that the tipping point for governmental change depends to a large extent on the number of its citizenry who are willing to protest for change. How small groups of citizens become large groups and how those groups can best be marshalled to undercut a government's claims to legitimacy are questions worth exploring, but however that happens, communication between citizens is essential, and it is in permitting communication between citizens (and, as we shall see, between them and the outside world) that the new technologies have made the difference.

It is difficult to imagine how there could be any revolutionary activity in the south of Portugal twenty years ago that was not wholly self-contained, initiated and sustained by only a few individuals. Gossip somehow spreads quickly in small communities, and so we should not short-change the capacity of individuals in such communities to spread the word about their political discontent. But turning such discontent into a movement massive enough to bother the central government means getting the word out, and if I were the leader of such a movement in the south of Portugal twenty years ago, I would be driven to distraction by my inability to communicate beyond the community in which I lived. What a difference less than twenty years have brought.

One other effect of the new technologies was brought out more clearly in the protests after the election in Iran in June 2009. Iranian authorities responded to the protests by shutting down internet servers, but Twitter "allowed younger protesters, particularly those affiliated with universities in Tehran, to organise and to follow updates by Mir Hossein Mousavi; by spreading the word about the location of government crackdowns and the threat of machine-gun-wielding soldiers, it probably saved the lives of any number of would-be revolutionaries" (Ambinder, 2009). In short, the new technologies not only allow those protesting to organise further protests, but to respond on short notice, in the streets, to the counter-moves of the authorities.

3. International public opinion

The dissent in Moldova has not led to significant changes in its government, and, indeed, it is arguable that the events in Iran after the election of June 2009 have not led to significant changes either -- although the protests continue and the government's willingness to kill protesters, and especially to kill them on "the holiday commemorating the death of Imam Hussein, Shi'ite Islam's holiest martyr," has escalated the confrontation and served to legitimise the protest movement:

The authorities' decision to use deadly force on the Ashura holiday infuriated many Iranians, and some said the violence appeared to galvanise more traditional religious people who had not been part of the protests until then. Historically, Iranian rulers have honoured Ashura's prohibition of violence, even during wartime (Worth & Fathi, 2009).

How this will play out is not known, but what is new is that the world is a witness. As one commentator, Ari Berman, put it,

I'm not sure what the Iranian regime expected when they fixed the election, but the outpouring of texts, tweets and video from Tehran has sparked a worldwide solidarity movement. Whatever the outcome, there is no going back (Berman, 2009)

Alexander Hamilton's concern was parochial: the citizens of a nation are best protected from an arbitrary government by ensuring that the government is unable secretly to imprison its citizens, for instance. What the new forms of technology have created is a world-wide community of citizens. Whatever the Iranian regime does will be played out on an international stage.

As Berman put it,

Some absolutely riveting and thrilling reporting has been done over Twitter by a university student in Tehran who goes by the moniker Tehran Bureau. The Iranian authorities shut his website down over the weekend and he was attacked by hard-line militias but he's been able to send short posts around the world over Twitter (Berman, 2009).

Just as the twitters from Tehran and elsewhere in Iran went viral, YouTube videos of the Iranian protests went viral as well, with hundreds of thousands witnessing individuals being killed and beaten by Iranian militia.

How effective such videos can be is illustrated for Americans by the aftermath of the surfacing of the Rodney King video (King, 1991). Los Angeles rioted, significant changes were made in the conduct of its police (though, arguably, not enough), police officers were arrested and convicted, and a nation was saddened that one of its citizens could be treated in that way by those entrusted with upholding the law. It would have been politically impossible for the government in Los Angeles or the California state government not to do something to change the way police officers respond to such problems. The glare of national publicity has political effect.

Just so, the glare of international publicity has made it clear to all that Iran is, or borders on, a tyrannical state. We do not have videos of the alleged rapes of prisoners from the protests; we do not have sustained videos of how officials responded to the protesters or of what the protesters did; we do not have sustained videos of what led up to some of the more egregious acts of the militia and police or of the aftermath of those acts. We have bits and pieces, single photos and single segments, all grainy, blurred, jumpy. But what we have is enough -- coming through a variety of different modes of communication, coming at different times during a single protest and from different locations within the areas of protest, coming from different individuals with different email, twitter, and cellphone monikers, coming over a period of weeks and months.

We know that we cannot verify much of what is sent and seen, and we know, of course, that bits and pieces of a sustained event can at best give us bits and pieces. We know as well that, as Roland Hedley in Doonesbury puts it, "Twitter is the first rough draft of gossip" (Doonesbury, 2008). So much of what we get is false or planted or both. Yet because the bits and pieces come from so many different sources through so many different modes at so many different locations, and at different times, and, perhaps more important, because the bits and pieces can readily be stitched together into a coherent story, we have enough to justify a judgment about the Iranian state. The world has become a witness because new forms of communication have given us access to day-to-day events, street-level views and descriptions of ongoing events.

Some of the political consequences of the world's awareness of events within Iran are straightforward. It becomes easier for those who want to impose sanctions to make their case. It becomes far harder to argue that such a government should have atomic weapons. It becomes easier to see the fissures within the government and between those within the government and those without and so easier to see how to exploit those fissures. But a witness is only a witness, able to see, but not necessarily able to do anything about what is seen. So we do not know the consequences of the world's awareness of the protests and the governments' response.

What we do know is that such publicity changes the form of political calculation for those within the Iranian regime. Whatever they do, they now must take into account how what they do will play out internationally. Whether they do a good job of taking those effects into account is another question. Firing on and killing protesters on the Ashura holiday indicates that the Iranian government is inept, having gratuitously angered Muslims both within and without Iran by breaking a centuries old tradition, followed even in war, of observing peace on that day. Or perhaps the government responded as it did because it felt the pressure of those international witnesses and wanted to end the protests by telling the protesters it would kill them even on one of Muslim's most holy days. We cannot now know.

In any event, Hamilton's point that secrecy is the enemy of freedom remains. The government of Iran will well be able to act with impunity within Iranian borders, though that seems far less likely now than it did last spring, say, but it cannot act with impunity regarding the international community. Whatever we may have thought about Iran's nuclear policy, its now public response to those protesting the election in June and continuing to protest the government's legitimacy have made it far less reasonable to argue that Iran ought to have nuclear weapons.

4. Political inferences

David Hume argued in his essay "That Politics May Be Reduced to a Science" that we can find axioms of politics that are as certain as the axioms of physics (Hume, 1987). Different forms of

government, he claims, have different implications for citizens and for those in positions of power within the government -- whoever may be in those positions of power. Poland was always subject to dismemberment because its principalities were quasi-independent fiefdoms: an invasion from the east, for example, was met with relative indifference by those princes in the west because they had no reason to help their fellow principles except the possibility that the invasion would succeed. Venice lasted so long because the self-interest of each prince was bound to Venice, and any attack on Venice was met with the self-interested response of every prince within Venice.

The bottom line for politics is that some inferences can be made with a high degree of certainty while others, as we well know, cannot: who could have predicted that the Republican nominee for President in the United States would pick as his Vice-Presidential running mate someone who, among other failings, did not know the difference between North and South Korea?

One variable that should make us uneasy in making any inferences is the intense pace of technological development. The change in twenty years has been phenomenal: how I would have loved an iPhone in Praia da Luz and how unlikely such a possibility would have been at the time! Twitter came into existence only in 2006, and new forms of communication or extensions of previous forms are to be expected.

In addition, developments in nanotechnology are rushing along and will bring new and minute forms of observation, recording, and communication. It is not beyond the realm of foreseeable possibilities that someone will have an implant so minute as to be undetectable except by special equipment that can record and transmit whatever is within the person's visual and aural fields. Indeed, such devices may now be possible, their military applications being of enormous value and so the research to create them no doubt being heavily funded.

So what we cannot know is just what the world will look like for someone like me, in Praia da Luz, who wants to contact someone far away or, more importantly, what the world will look like for those who, like the Iranians of this past summer and the end of December, during the Ashura holiday, protest against their government -- what new forms of communication will be available, what governments will be able to do to stifle them, and what new forms of countermeasures protesters will have to continue to communicate with others within their country and to the outside world.

How such new developments will change the quantity and quality of information we would receive from such places as Iran is not clear, but what is clear is that we are in a period of continual transformation of the landscape of political relationships. Hamilton was right: a paper guarantee is nothing but paper without the backing of —public opinion, and...the general spirit of the people and...the government." But public opinion is shaped by information and by the stories we are able to piece together from the bits and pieces that come our way.

It is obviously not true that the more that comes our way, the better and more accurate the stories we can piece together. There is a great deal of debris in what we get, with no sure way of separating what is true from what is not, and as governments become more adept at countering the new modes of communication, we can expect ferreting out the truth, or a close approximation, to become even more difficult (New York Times, 2010). But though we cannot tell, just by looking, whether any one transmission is true or false, a sincere response, a truthful report by a protester, or a piece of misinformation planted by authorities, the mass of information available, and the variety of sources from which it comes, allows us some measure of objectivity. A relatively coherent story from many different individuals, video footage of the same event from a variety of perspectives, a sustained barrage of messages over a wide area from a wide variety of people -- all these provide us with some sense of what is happening even though we cannot verify the details and know full well how much can be faked both in video and in digital media. Coherence has its value for determining the truth even though it has its limits too, and we can expect from what we get no more, but no less, than we expect from history -- with its understanding of what has happened drawn from innumerable sources, few of which, if any, can now be independently verified.

We can also expect -- and here we approach the level of general truths Hume thinks possible in politics -- that what we have already seen happen will continue, barring significant countermeasures by the governments:

- As in Moldova and Teheran, protestors will use the new forms of communication to arrange the details for protests, marshal their forces, warn each other of impending responses, and so on. The new technology has changed and will continue to change the impact and power of

protests -- if only because it allows, as in Moldova, for a group to discover that it has a great deal of support from others. Protests will be able to build far faster than before.

- As in Iran especially, the world will be a witness to the protests and the government's response. No doubt the video will become better, the segments longer, the details less blurry, the audio significantly easier to pick up: all these will give a immediacy to the protests and the government's response that will make it far more difficult for the government to act with impunity.

These effects can throw a wrench into the ―engine of arbitrary government" by ensuring publicity for a government's responses to legitimate dissent and by creating and sustaining a level of dissent that the government can no longer function effectively, either internally, in retaining order, or externally, in having orderly relations with other nations, commercial and otherwise.

In short, the new forms of communication that have arisen over the last twenty years or so have altered the geography of dissent and protest and thus the relationship between a government and its citizens, making it far harder for the ―general spirit...of the government" to run, or remain, counter to the ―general spirit of the people."

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AN EXAMINATION OF THE IMPACT OF ICT, PARTICULARLY SOCIAL NETWORKING, ON THE EDUCATION AND EXPERIENCES OF YOUNG PEOPLE OF SECONDARY STATUTORY SCHOOL AGE

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Abstract

ICT has revolutionised learning opportunities and the tools available to teachers and schools to enable them to deliver knowledge, develop skills and more especially to engender a love of learning, amongst the young people with whom they work. Such factors make personalised learning a reality and provide the path to realisation of individual potential. An initial examination of the current climate and the changes which have occurred in schools' use of ICT over the past two decades may therefore lead to the conclusion that they fall into the category of "forward changes".

Other forward changes could include the opportunities to communicate, via social networking sites, with young people of similar age in other countries and from other cultures, so breaking down barriers which so often are the foundation of prejudice based on ignorance. Does this mean then that social networking, per se, represents a forward change in the use of ICT, particularly as it affects young people? (For the purpose of this paper young people are defined as pupils aged 11-16 years who, in England, would be at the secondary stage of statutory education. Year 7 pupils are aged 11-12 years with year 11 pupils being 15-16 years of age). In order to draw any meaningful conclusions on the impact of these changes on young people, it is necessary to seek their views and examine their practices and experiences, the results of which exploration underpin this paper.

1. Introduction Why do young people use computers?

There can be no disputing the increased breadth and depth of information available through the internet and sources such as Wikipedia The web has revolutionised the way pupils can access information. There are possibilities of drilling down to find statistical data, maps and plans which would have been generally inaccessible at local level, much less available within the school or home, for the average adolescent prior to the web. This would suggest that the use of a computer would facilitate the completion of school work. The first question on the survey was broken into 3 parts shown below

- Do you use a computer for the following?
    - To find information/research for school work
    - To produce/present school/coursework
    - To research information for personal/social use e.g. concert dates, fan club information

Without exception every pupil used a computer for one or all of the specified reasons. (A question on games usage was deliberately not included as this was not a focus of this particular paper.) It is not surprising that computers were used by all pupils since, in England, government directives specify computer/pupil ratios which ensure that all pupils should have access to a machine for some part of a school week. It was, however, interesting to note the increased use of the technology to present, rather than simply research, school work as pupils increased in age. Amongst the year7 pupils 91% used the computer as a means of researching topics, but less than 50% of them used it for presentation. By year11 those using it for presentation had risen significantly so that all of them used a computer for presentation in one or more subjects.

In discussion this was explained in terms of the volume of the coursework demands of public examinations, usually completed in Key Stage 4 (Years 10 and 11). The need to redraft and "polish" work before final submission was felt to be much easier using computer technology, rather than needing to hand write various versions. A further reason given was overall appearance of the finished piece. It was felt to be advantageous to present printed rather than handwritten coursework, along with

the bonus of an automatic spell check. There was, however, consensus that it was important to remember to use the English version of this rather than the American one!

There appeared to be a well developed awareness of the usefulness of the web as a source of information for social as well as academic information from even the youngest respondents. At year 7, 65% of them accessed information for social purposes, a figure which increased with age.

In terms of conducting research on the web, one issue which does manifest itself though not a new one, but is perhaps magnified as a result of the broader range of material available, is that of plagiarism. Pupils need to be taught how to conduct effective searches and to be made aware of the need to attribute source material. The issue of being overwhelmed by the sheer volume of information and the need to be able to edit and use it effectively was at one end of the pupil perception spectrum, whilst at the other end were those, often less able, pupils whose simple solution to research was to find any connected article, press the print button and submit as their own! This technique does fail rather miserably when there is no correlation between the standard of writing, vocabulary and sentence construction of the article and that of the pupil. This does raise issues for schools though, since I believe there is clearly a moral imperative to instil ethical behaviour patterns amongst young people when conducting research and producing their own work. Perhaps the volume of available information constitutes a forwards change in ICT as it impacts on the education of young people, but if the access to this information is not set in a framework which develops moral responsibility and basic honesty then society will surely be the poorer and so the impact of those changes may well be seen as a sideways change, at best, if not a backwards change.

2. Social networking sites Who? Why? Where? When?

Having established that all respondents did use computers, to a greater or lesser extent, the focus of the questions shifted to social networking sites and their use. Simple questions were asked to establish basic information about preferred providers, reasons for and patterns of usage:

- Do you ever use social networking sites?
- Which of the following do you use? (examples of providers were given, along with the opportunity to name others)
- Do you use your site to keep in touch with
    - People seen regularly e.g. school friends or others living very close
    - People seen occasionally who live further away
- Where do you access your site?
- How much time do you spend on your site?
- Do you chat to people whom you do not know in the real world i.e. virtual friends?

With very few exceptions the respondents had at least one social networking site, illustration indeed that these young people are definitely of the digital age. Year 7 pupils were the group with the largest number who did not have such a site, but even they represented only 10.3% of the Year 7 cohort. All pupils in years 8 and 9 engaged in social networking, whilst in year 10 some 4.6% had no site, unlike their year11 counterparts where all were registered users. Facebook was undoubtedly the provider of choice, with 96.2% having an active Facebook account. This is somewhat surprising and raises interesting issues considering that in order to join Facebook one should be 13 years of age. That base level would immediately exclude all pupils in year 7 and some 88 % of year 8 who would have been under the age of entry at the time the survey was conducted. (It should perhaps be acknowledged that of the 3.8% who were not registered with Facebook from the overall sample, 6.2% of them were in Year7.) Some were more forthcoming than others as to how they had managed to register. Some claimed not to know they were "underage", surprising given that it is necessary to submit a date of birth on the registration site, which will reject any which fall below the specified parameters. Perhaps the duplicitous behaviour for them on line is simply an extension and repetition of the standards they apply in the real world. Others were rather more "honest" in confronting their behaviour, admitting they knew that it was wrong, but that they wanted to be on Facebook "because all my friends are".

It would appear then that for some of these young people having a profile on a social networking site, perceived as adult, was seen almost as a rite of passage, it was a measure of being "grown up". Such flouting of the rules, they believed, enabled them to be perceived as adults, possibly their registration meant that for them they were accessing the adult world and its "forbidden fruits" in much the same

way as they do by buying cigarettes and/or consuming alcohol underage. This would be corroborated by the fact that less than 1.5% of those surveyed admitted to using Habbo Hotel, a site geared to younger children, and when that was used it was in addition to other sites rather than as a sole provider. This also appears to represent a shift in usage behaviour over the past two years, although there could be other explanations for this perception. Certainly on the very limited evidence of observations in one school, the provider of choice for Key Stage 3 pupils (years 7, 8 and 9) in 2007/8 was Bebo, rather than Facebook with the latter being the choice of the older Key Stage 4 (Years 10 and 11) pupils. This shift in choice may represent a desire to move more quickly into the adult world (Bebo was seen as a ―junior player" although it also has an official registration age of13) or it may simply be a reflection of geographical location that Facebook proved more popular in this survey, given that much of the usage was contact with others living locally it would be necessary to join the same social networking site to maintain that contact.

It was interesting to note how many young people used their sites as a means of keeping in touch with people whom they knew and saw regularly. In terms of those who had virtual friends outwith the United Kingdom, the vast majority were from the USA with relatively few of them using the sites to interact with people from countries in Asia or Africa. The idea of such sites being used as a means of breaking down prejudice through interaction with those from different cultural backgrounds is not borne out by this survey. This may be a reflection of the aspirations of the respondents and a possible tendency to adopt an insular view of life or it may reflect a lack of opportunity for young people in countries on those continents i.e. Africa and Asia to be able to access such social networking sites easily. The reasons for these results must remain speculative unless and until further research is conducted.

It does, however, present some interesting issues with regard to whether use for social networking, as demonstrated by this admittedly small study, constitutes a backwards, forwards or sideways change of ICT. One positive advantage which cross cultural interaction could produce is a possible breakdown of potential barriers so that views based on prejudice may be modified, thus leading to greater understanding and ultimately greater harmony within global society. There can be little doubt that such a shift would represent a forward change in ICT application. However, there was little evidence from this survey and subsequent discussions that this was a major focus of social networking for these young people. The main driver appeared to be to maintain a virtual continuum of communication with those known to them in the real world or with those who shared a common cultural heritage in the virtual world. This raises some fascinating issues.

Are young people who use social networking principally for contacts within their own geographical area more at risk of abuse? There are a host of examples to be culled from news reports of the potential, and in some cases the actual, abuse of young people by contacts made on the internet. Does this then mean that ICT has produced a ―backwards change" in terms of social impact, providing a broader platform and a vehicle for those who would do children harm? Are young people significantly more at risk, through social networking, of being ―groomed" by potential paedophiles?

Sexual abuse is but one aspect of abuse and is usually, not always accurately, perceived as being perpetrated by adults on minors. It can of course sometimes be a dominant minor involved in perpetrating such abuse. However, arguably, a more common form of abuse is that of bullying. This can take the form of one on one, or one on many, in the on-line world, just as in the real world. Is the risk of being bullied greater on-line, via social networking sites, than it is off-line? Is on- line bullying different from off-line bullying? Are the effects different? What are the remedies and, more crucially, what are the attitudes of young people, born in the digital age, themselves to these issues?

Cyberbullying is defined thus on the website of CyberMentors :

―Cyberbullying is when someone uses technology, like the internet or a mobile phone, to deliberately hurt, humiliate, harass, intimidate or threaten someone else.

Cyberbullying includes things like:

- Sending nasty or threatening texts or emails
- Posting abusive messages online - on a social networking site, in a chatroom, or using IM
- Posting humiliating videos or pictures online, or sending them on to other people
- Taking on someone else's identity online in order to upset them
- Bad mouthing and spreading rumours

- Setting up a hate site or a hate group on a SNS site
- Prank calling, prank texts and messages"

Cyberbullying is pervasive and invasive in a way that "traditional" bullying behaviour is not. It can be perpetrated 24 hours per day, 7 days per week and enters the home, even the inner most sanctum of the victim's own room if that is where the computer is located, so it seems there is no escape. Some bullying is calculated and deliberate, with victims being specifically targeted by one or more perpetrators. However some cyberbullying is allegedly "done for a laugh". A study of 6000 children conducted in the USA (Patchin & Hinduja, 2009) found 17% of those questioned admitted to bullying on line, citing their reasons variously as considering it fun or instructive and a way to strengthen their victims. One suggested explanation of this is that many young people hide behind anonymous profiles on line and think that they are not able to be traced or tracked. Nonetheless, many do still engage in bullying behaviour using their own identity. They have clearly failed to think through their postings and fail to grasp the enormity of their actions until it is too late, everyone can see it and it cannot be taken back, it is indeed like Pandora's Box. What impact then if, as sometimes happens, the victim does feel there is no escape and so tragically resorts to taking his/her own life as the sole solution to the problem?

3. Responses to the questions on bullying

Two simple questions were asked

- Have you ever been bullied
  - In the real world?
  - In the on-line world?
- Did you report your concerns
  - In the real world?
  - In the on- line world?

	Year 7		Year 8		Year 9		Year 10		Year 11	
	% claimed to have been bullied	% reported bullying	% claimed to have been bullied	% reported bullying	% claimed to have been bullied	% reported bullying	% claimed to have been bullied	% reported bullying	% claimed to have been bullied	% reported bullying
Real World	50	61	55	81	23	90	29	68	31	66
On-line	23	69	35	100	2	100	6	75	10	16

Table 1 Pupils' responses to the questions about bullying

For each year group the first vertical column in Table 1 shows the % who felt they had been bullied, whilst the second shows the % of them who chose to report the bullying. The first row deals with real world bullying with on-line behaviour being shown on the second row.

It is interesting that across all year groups bullying is seen as more of a problem in the real world, if percentages effected are taken as an indicator, than in the online community. It is also noteworthy that many pupils, more than half in both years 7 and 8, a figure which falls to less than a third for older pupils, feel they have been bullied in the real world. Without exception less young people from every year group felt they had been the victims of bullying on-line. It was also the case that report rates from those who felt they had been bullied were higher for on-line incidents than real world ones in every year group except the eldest. In discussion a possible explanation emerged that pupils could see a simple solution to the on-line bullying situation, particularly if the person responsible is unknown in the real world. That solution is to arrange the removal of the perpetrator from contact, which is not so easy in the real world.

What then should be the societal response to safeguarding children on line? Do the adults in society have a duty of care to these young users and if so, who should exercise that duty of care and what form should the expression of that care take? Is it an issue of control through statute and policing, or will that simply serve to stifle the creative, beneficial uses of social networking sites by the young? Should the care come from the providers of social networking sites (the conduits) such as Facebook, My

Space and Bebo? How can they assist in the protection of young people, or indeed is it their role to do so? What is the role of the ultimate child carers, namely the parents? Last but not least of these adults with a duty of care, what is the role of schools and education professionals in this safeguarding debate, which must surely aim at achieving a balance between protecting the young from abuse, whilst enabling them to develop through harnessing the benefits of this very powerful medium of ICT. The obverse of this –duty of care –coin is should adults be the instigators of safeguarding or should they simply be the channel empowering young people themselves to develop their own safeguarding techniques?

Some of these questions were tackled head on in the UK by the Byron Review (Byron, 2008), the outcome of which, Safer children in a digital world, was published in March 2008. In the summary document Professor Tanya Byron states:

—Everyone has a role to play in empowering children to stay safe while they enjoy these new technologies, just as it is everyone's responsibility to keep children safe in the non-digital world. This new culture of responsibility spans parents, children and young people supported by Government, industry, the public sector and third sector."

In response to this report the UK government published the Byron Review Action Plan in June 2008. A cornerstone of this plan was to implement the establishment of the United Kingdom Council on Child Internet safety (UKCCIS) which brings together organisations from industry, charities and the public sector to work with the government on delivering the recommendations of the Byron Report. Crucially, there is the opportunity for young people to feed into the process too. This is clearly in response to the comment in the Children's Call for Evidence to the Review and reported in its summary document:

—Kids don't need protection we need guidance. If you protect us you are making us weaker we don't go through all the trial and error necessary to learn what we need to survive on our own.....don't fight our battles for us just give us assistance when we need it"

If we genuinely care about making the most of ICT opportunities and ensuring that the ever changing possibilities represent forward, rather than backward, changes for our young people we would do well to be mindful of that heartfelt plea. The challenge, and potential point of conflict between young users and those who would try to ensure their safety, is to judge at what point assistance does become necessary.

One organisation which is committed to empowering young people is Cyber Mentors, established in March 2009 as a project under the auspices of Beatbullying, the leading bullying prevention charity in the UK. Only minors (less than 18 years of age) are allowed to register on the site, but parents/ professionals can be given a tour of the site by a member of staff. Concerns can be logged by users of the site who will be able to —chat" with a cyber mentor. There are currently 2,300 trained mentors, aged between 11 and 16 years of age. In addition to these there are Senior Mentors, one group aged 16 to 19 who are often in the sixth form or at college, with a slightly older group aged 19 to25 years, many of whom are at university. There is always a counsellor on duty who steps in to deal with issues which are felt to be beyond the capacity of the mentors, usually if it involves safeguarding issues (in the legal sense of the word). The site is operational from 8am to 2am with a flag to indicate that cyber mentors are on line. Although relatively new, being in its first year of operation at the time of writing, it is a genuine attempt to provide that assistance so eloquently appealed for in the Byron review.

There are other aspects of social networking which merit examination in terms of use by minors. Does the use of social networking enhance or stilt the development of more conventional means of social intercourse? Is there a danger that increased use of the web will lead to a reduction in face to face meetings, increasing isolation and a risk of losing what are currently regarded as commonly accepted inter-personal skills? Such skills may include the ability to respect and acknowledge personal space, read visual cues such as facial expressions alongside auditory stimuli such as tone, volume and pace of voice. Furthermore, is this group of young people more vulnerable than adult users and so should there be controls/strictures in place aimed at their protection?

Opinions, even amongst professionals differ. In July 2008 Dr. Himanshu Tyagi said sites such as Facebook and MySpace may be harmful. He told the annual meeting of the Royal College of Psychiatrists that:

—Children growing up alongside the rise of social networking websites may have a "potentially dangerous" view of the world. It's a world where everything moves fast and changes all the time,

where relationships are quickly disposed at the click of a mouse, where you can delete your profile if you don't like it, and swap an unacceptable identity in the blink of an eye for one that is more acceptable."

Whilst accepting that social networking sites offered benefits he warned there were pitfalls.

"People used to the quick pace of online social networking may soon find the real world boring and unstimulating. It may be possible that young people who have no experience of a world without online societies put less value on their real world identities and can therefore be at risk in their real lives, perhaps more vulnerable to impulsive behaviour or even suicide."

He called for more investigation and research into the issue. (BBC, 2008)

In contrast however, Graham Jones, a psychologist with an interest in the impact of the internet, said that while over-use of social networking sites could lead to problems, the risks posed by them had been overplayed. He said:

"For every new generation, the experience they have of the world is a different one. When the printing press was first invented, I am sure there were crowds of people saying it was a bad thing." (BBC, 2008)

The debate continues apace, fuelled by individual examples of tragedy. In August 2009 Vincent Nichols, Archbishop of Westminster was moved to express his concerns following the suicide of a 15 year old girl who had apparently taken her own life following derogatory postings on a Bebo networking site. In an interview he stated

"I think there's a worry that an excessive use or an almost exclusive use of text and emails means that as a society we're losing some of the ability to build interpersonal communication that's necessary for living together and building a community. Too much exclusive use of electronic information dehumanises what is a very, very important part of community life and living together. Among young people often a key factor in them committing suicide is the trauma of transient relationships." (Wynne-Jones, 2009)

The archbishop blamed social network sites for leaving children with impoverished friendships.

Perhaps the key to moving this debate forward and deciding whether social networking is a force for advancement or regression lies in the amount of time spent using this medium of communication and the impact that on line activities have on the user's life. Clearly the impact of bullying will be felt whatever the length of time actively engaged on the networking site, although the impact of the unkind comment may, arguably, be less if the individual has an otherwise robust social life with multiple positive interactions.

Addiction to the internet may well lead to a failure to develop or practise the commonly acknowledged inter-personal and social skills specified earlier and required in the real world, which, it could be argued would represent a backwards change for ICT.

A recent study conducted by Leeds University researchers, published in the Psychopathology journal and reported at guardian.co.uk, on Wednesday 3 February 2010 claimed that a small proportion of internet users were classed as internet addicts and that people in this group were more likely to be depressed than non-addicted users. The article on the relationship between excessive internet use and depression, a questionnaire-based study of 1,319 young people and adults, used data compiled from respondents to links placed on UK-based social networking sites. The respondents answered questions about how much time they spent on the internet and what they used it for; they also completed the Beck Depression Inventory – a series of questions designed to measure the severity of depression. The report, by the university's Institute of Psychological Sciences, said 18 of the people who completed the questionnaire – 1.4% of the total – were internet addicts. The lead author, Dr Catriona Morrison, said

"Our research indicates that excessive internet use is associated with depression, but what we don't know is which comes first – are depressed people drawn to the internet or does the internet cause depression? What is clear is that, for a small subset of people, excessive use of the internet could be a warning signal for depressive tendencies. This study reinforces the public speculation that over-engaging in websites that serve to replace normal social function might be linked to psychological disorders like depression and addiction. We now need to consider the wider societal implications of this relationship and establish clearly the effects of excessive internet use on mental health." (Gabbatt, 2010)

Much of the previous research into the subject has been carried out in Asia. On 26 August 2009 an article in The Times reported (Macartney, 2009) on The Juvenile Psychological Base which is China's first clinical centre for the treatment of internet addicts, where they are treated on a 3 month programme designed to wean them off their obsession with cyberspace. This is in contrast to the 400 or so improperly licensed "boot camps" which it would appear used a variety of methods to tackle the addictive behaviour. Many allegedly used physical violence as a means of control, resulting in 2 reported deaths with a third youngster in hospital with kidney failure as a result of severe beatings. These camps were apparently run as for-profit institutions and mushroomed in a country where The Times quoted 10 million children from among the 340 million internet population are deemed to be addicts. Such social impact is clearly worthy of serious consideration when debating the question of whether ICT development has produced backwards, forwards or sideways changes.

The data collected in the survey underpinning this paper showed very few pupils who admitted to spending vast amounts of time on-line. There were some 8% of year 11 who said their average session on-line would be about 4 hours, but they did not go on-line every day. Conversely there were several pupils who were on- line in some cases twice a day but for short periods. There is possibly a good case for further research into this particular issue, since it could have a serious impact on an individual if s/he did spend long hours on-line.

4. Conclusions

ICT is clearly an indispensable tool of the educator and its use can bring immense benefits to the learner. The technology progresses at an amazing pace and the challenge for those of us involved in education, particularly of young people, is to ensure that they are encouraged to reap the benefits of technological advances whilst ensuring that those same developments do not put them at significant risk. In a recently published OFSTED (2010) report it was said that "locked down systems" that barred access to websites were less effective in keeping children safe on-line overall. The implication then is that children should be taught to use the technology responsibly and exercise their judgement when engaging in on-line interactions. As the Byron Review asserted we all have a duty to care for the young in our society. However, I believe that duty of care should be exercised by empowering the youngsters themselves through education. We would not expect to allow a toddler to cross a busy main road unaided, for that would be to fail in our duty of care. Equally well we would be failing if we were still tightly holding on to the hand of our 20 year old as they needed to cross the street. The way in which the toddler learns to complete such a potentially dangerous task is in stages. First the guidance is provided by the accompanying responsible adult, the basic rules of road safety are explained and eventually, as the child matures then s/he is allowed to cross unaided by the adult.

In much the same way we must give our young people the tools and guidance to enable them to navigate safely, being there to support when problems arise. I believe that the changes in approach encapsulated in the establishment of the UK Council for Child Internet Safety definitely represents a forward change in attitude to ICT and its use by young people. The collegiate approach that it brings, embracing the conduits of social networking sites, such as Bebo and Facebook, Government departments and the voluntary sector along with professionals, parents and the young people themselves provides a unique vehicle for maximising the good and minimising the potential harm of this ever developing medium. The challenge to us all for the future is to ensure that we continue to develop our awareness of the issues surrounding the technology so that it does indeed prove to produce a forwards, rather than a backwards or sideways change for our global community.

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FROM ELECTRONIC MEDICAL RECORDS TO THE PERSONAL HEALTH SPACE: HOW ICTS WILL TRANSFORM HEALTHCARE IN THE NEXT DECADE

Manuel Sanromà and Joan M. Adserà

Abstract

We introduce an evolutionary model that allows us to understand the evolution of E-Health. Following this model we claim that a new step of this evolution is ready to appear: the Personal Health Space. This is a virtual 3-dimensional space where all the recent and new developments of ICTs applied to healthcare provision will become integrated and that will include the real space of healthcare centres where health professionals and patient used to (and still do) interact. We discuss the direction towards which ICTs, combined with the cultural assimilation of these technologies, will be leading healthcare in the next years/decades.

1. Introduction

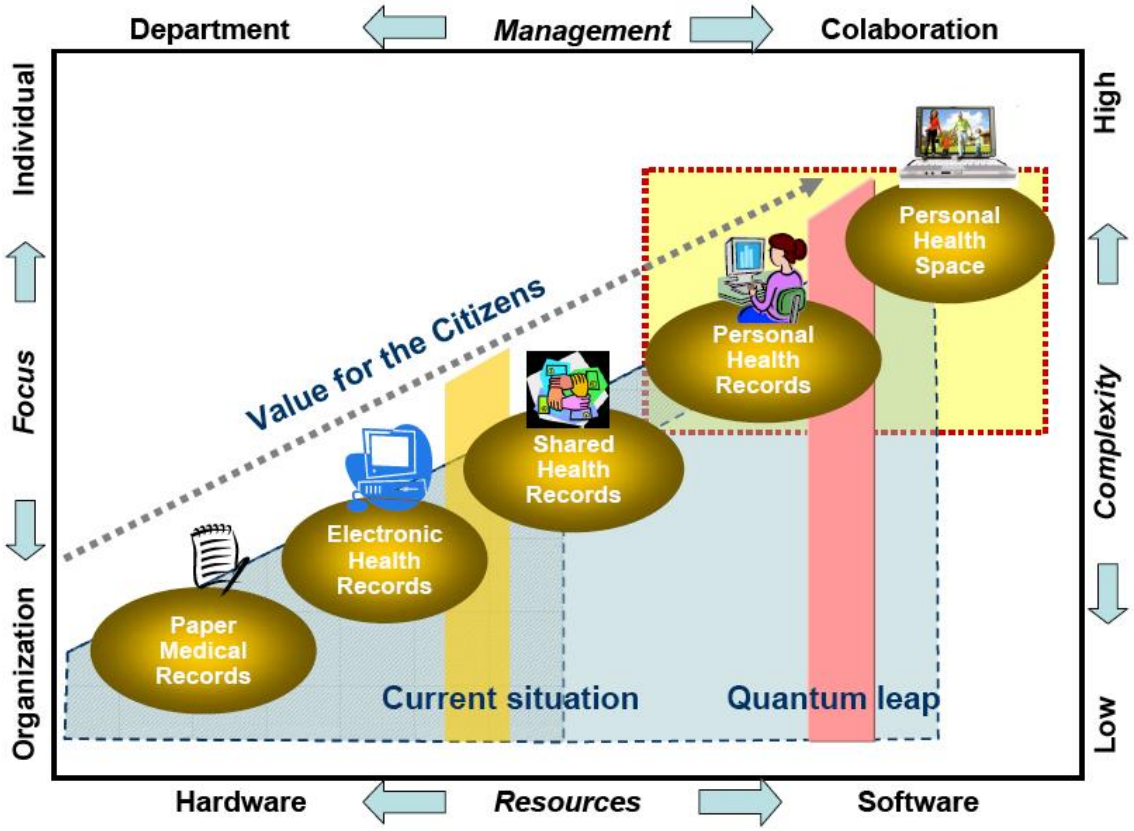
The Internet, and Information and Communications Technologies (ICT hereafter) in general, have brought profound changes to many economical and social activities, but their impact on healthcare provision lags far behind what we can see in banking, commerce, entertainment or even education to name a few examples. And this fact is somewhat paradoxical, given the information intensive nature of healthcare interactions. Patients communicate to doctors and nurses his/her health status, symptoms and worries and health professionals use this, along with all the information they can gather from additional tests and their previous experiences, knowledge and abilities, to diagnose and generate further interactions with their patients which, again, will generate more information. An ever growing amount of this information is originated, transmitted and managed digitally, but the Net is still used in patient/healthcare system interaction more as a simple tool than as a real new change of paradigm, as is the case in many other cases.

To take a simple example, extended surveys (Soto, 2006) show that up to 75% of patients would either like or willing to be able to communicate with their physicians and healthcare organizations through e-mail, while only 24% of physicians declare to have used at least once e-mail for this purpose (Liebhaber, 2006). And if we pay a visit to the web pages of many important hospitals and healthcare organizations, at least in Europe, it is difficult to find interactive services for patients other than some administrative tasks, not to say to be able to access doctors and/or nurses. This digital divide, as compared to other fields of human activity, is highly significant when we take into account the intense use of technology in healthcare provision and the long tradition of use of ICTs in the field. E-Health is a term which was coined more than a decade ago (Eysenbach, 2001) and a recent study by Forbes magazine shows that two out of seven technologies which are to change future medicine are directly related to E-Health (Farrell, 2008).

In this paper we suggest that the adoption of Electronic Health Records (EHR hereafter) by physicians and healthcare organizations will be the driving force that will change the paradigm of E-Health from a professional oriented field to a citizen centred reality, which in its turn will give birth to what we call the Personal Health Space (PHS). This new paradigm includes all aspects and past, present and future developments of healthcare provision, from a patient centred point of view. In what follows we describe an evolutionary model of patient health records which allows us to understand where we stand in the process of digitizing these records and how this evolution will transform healthcare in the next decade.

2. An Evolutionary Model

An image is worth a thousand words. In the following picture we present an evolutionary model that helps us to understand how things have changed from the original paper based archive (which still are common and are heavily used in the majority of hospitals and healthcare centres) to a future PHS.



This model is inspired in the academic literature (Siau and Long, 2005) on E-Governance where there is much theoretical work on the evolution of the Administration as far as provision of e-services is concerned. In the picture we can grasp the evolution of EHRs from their inception as a digitalization of paper based Medical Records, to a situation where different organizations share these EHRs, making up what has become known as Shared Health Records (SHR hereafter). Once the information is digitised, whether as EHRs or SHRs, patients can be given access to it. In fact in every legislation that we know of, patients are considered to be owners of their health information and thus they have rights to have access to it; but this access is obviously hindered by the practical difficulties of doing this on archived paper records.

Personal Health Records (PHR hereafter) make sense as long as any citizen can have an always-on access (i.e. Internet) to them. They are a first step in a real quantum leap that is bound to happen: if it can be done, it will be done. The only questions that remain to be answered are when and how it will be done; and, most significantly, who will do it. Because, as we will discuss later on, PHRs are at the base of a whole new world of health care related developments when combined with other possibilities opened up by the Internet, like Telemedicine and the Web 2.0 (or N..0, should we say). But before entering this new space, several significant points in the picture should be emphasised.

First of all, the model we have introduced is, as any other model, an approach to the real world. Paper based records are as old as the practice of Medicine itself, but in its current concept as the accumulation of all the documents concerning the health of a given patient, they date back to 1907, when Dr. Henry Plummer inaugurated Mayo Clinic's system of patient registration and medical record keeping. The first EHRs appeared in the late sixties but even today they are not at all routinely used even in the most advanced countries (Kleinke, 2005). The current situation in a typical healthcare centre (if such a thing exists) is a mixture of both worlds: even in the most advanced centres, as far as digitalization is concerned, paper records have not completely disappeared, if only because patients coming from other centres will often bring along their health information in paper based form. On the other hand, only few examples in a handful of advanced countries can be found of SHRs which involve cooperation between different centres and information systems. Therefore we face a current situation where a combination of paper and electronic records, with some sharing of information with

other organizations, is the rule rather than the exception. In any case, the evolutionary model, one of increasing value for Citizens and Professionals alike, helps us to grasp a trend which seems irreversible: one of progressive digitalization of all the information.

The model also allows us to see other trends of E-Health. From an organization-centred focus to the patient as the centre of all the information; from a vertical (department) to a horizontal hierarchy, where collaboration among different departments/organizations is the rule; from technologies where the hardware is king to the increasing value of software. And, of course, in an increasingly complex and interrelated environment.

3. Personal Health Records: a quantum leap

3.1 From paper records to EHRs: a SWOT analysis

As we mentioned above, digitalization of Medical Records is an ongoing process which is taking place in most countries. We are not interested here in analyzing all the aspects of this process but since EHRs are a necessary condition for the implementation of PHRs we outline a SWOT analysis:

WEAKNESSES	STRENGTHS
• Lack of ICT culture inside organizations may see them as alien • It requires a complex change management • There is a lack of EHR standards	• There is a worldwide consensus on the irreversibility of the process • Healthcare professionals are well aware of the advantages of EHRs
THREATS	**OPPORTUNITIES**
• Technical failures may spread a negative vision of EHRs • Data protection and privacy is a necessary condition for success • Professionals and patients alike may see it as a dehumanizing process • Digital divide may prevent the process from spreading to all • Who pays for the process?	• It paves the way for PHRs • Reduces medical errors • Facilitates cooperation among organizations • A powerful tool for clinical research • May help to cost reduction • It opens up new technological possibilities (i.e. Telemedicine) • Diminishes costs associated to conservation and dissemination of information

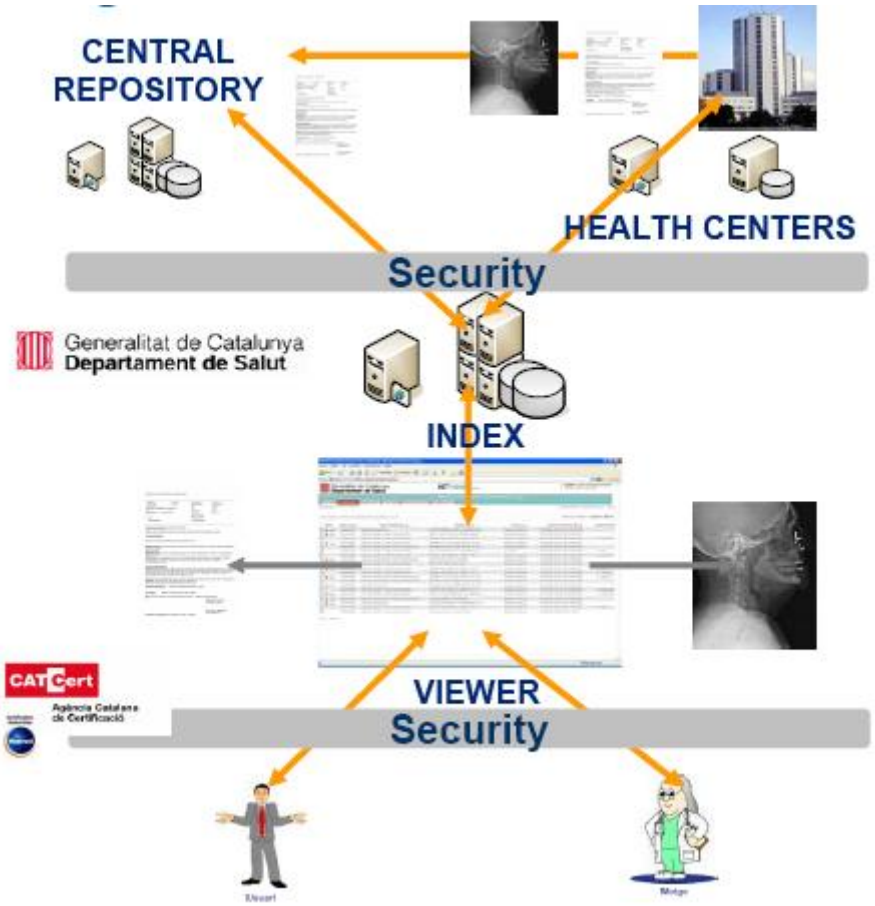
3.2 From EHRs to SHRs: the Catalan case

There are at least two dozen countries where there are ongoing projects (in general with public funding) aimed ad constructing a national (sometimes regional) infrastructure for sharing EHRs among different organizations. There are even examples at a supranational level: the European Union is funding a pilot project, under the name of epSOS (Smart Open Services) which should allow 12 European countries to share the health information of their citizens. The project is a first step in addressing problems faced by doctors treating patients who seek health treatment when abroad. These problems include re-supplying essential medication that a patient has lost or forgot, communicating medical situations to foreign-language doctors, diagnosing illness and prescribing proper medication with little knowledge of patient history.

Catalonia, an autonomous region in Spain with some seven million inhabitants, has developed in recent years one of the most advanced projects of SHR. The services provision in the public Catalan Health System has historically been made through different institutions, most of them public but also some of them private, each one with its own Information System and different EHRs. In this context, the use of ICTs happens to be one of the strategic components to face properly the challenge of improving the quality services of the Health Sector in Catalonia, both public and private, and this is being accomplished under the Health Department Leadership.

The Catalan Shared Electronic Medical Record (hereafter HC3 for its Catalan acronym) intends to use all the available information of patients from the Catalonian care centers. Their contents are

structured in two big blocks. On one hand, the care centers information, with the primary and specialised healthcare as well as the diagnosis procedures and, on the other hand, the information provided by the Health Department, which contains the Hospital Minimum Data Set from the Discharge report, the dispensed medical treatment and the medical evaluations. All of this information is accessible through the high security Catalan Health network. The basic principle of the initiative allows information exchange among different health organizations, being the Health Department the responsible for the normalization, the network and enrolment and implementation of the different healthcare organizations. The basic features of HC3 can be seen in the following picture:



The access system, the selection and visualization of the information is carried on by a Browser. The Browser contains an index system of contents with: a) a model and security infrastructure, b) identification of the patient, c) identification of type of information and origin and d) tracking system for access to the informative contents (URL). It is thus a decentralised system where every participant organization can supply and maintain its own information, while at the same time it offers the possibility to add some integrated information and to backup all or part of the different center's information. The HC^3 implementation was launched in September 2008 in several piloting organizations (like our organization, Xarxa Santa Tecla). It is a dissemination process across the territory, both in primary and specialised care. It has currently been implemented in 25% of the hospitals and 80% of primary care centers of the Catalan public healthcare system, with expectations to cover 100% of centers and information by the end of present year. In this way HC3 will constitute one of the first working models of an integrated SHR at a national level.

3.3 From SHRs to PHRs

A commonly accepted PHR definition is the one established by a Working Group specially chartered by the Markle Foundation for that purpose: *–The Personal Health Record (PHR) is an Internet-based set of tools that allows people to access and coordinate their lifelong health information and make appropriate parts of it available to those who need it. PHRs offer an integrated and comprehensive*

view of health information, including information people generate themselves such as symptoms and medication use, information from doctors such as diagnoses and test results, and information from their pharmacies and insurance companies. (...) People can use their PHR as a ***communications hub****: to send email to doctors, transfer information to specialists, receive test results and access online self-help tools".* There are other definitions in the literature but this one, coming out from consensus of the community, stresses the central role of PHR in the Internet based new health space that we define below.

Both digitalization and sharing of information allows something that was a right of citizens but which was almost impossible to implement: their ownership of the information contained in their Medical Records and thus the ability to build its own PHR. Though there is much literature about it, PHRs are still much an American paradigm: indeed 90% of the references have this origin (Eysenbach, 2008). The fact of the matter is that while many efforts have been put on SHR in Europe, and also in Australia and Canada, the basically privately owned and managed American Health System is driving the race towards PHR. To simplify, we would say that we are witnessing two different approaches: the European "top-down", with administrations coordinating different EHRs and the American "bottom-up" with private organizations creating different PHRs and waiting for other private initiatives to coordinate them into an integrated PHR.

As we mentioned above the PHR is a quantum leap in the evolution of Medical Records, which can be synthesised in the following table:

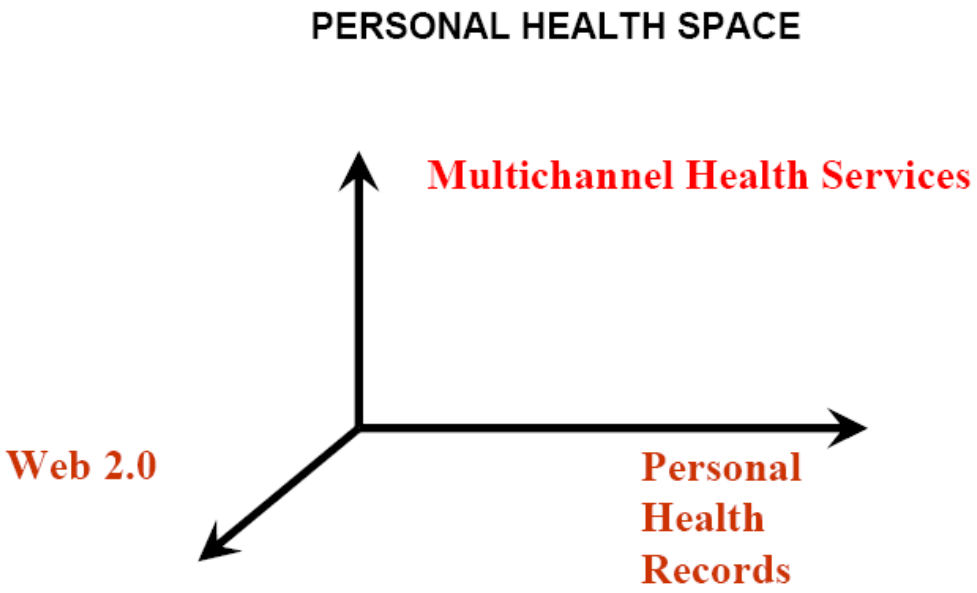
	EHR or SHR	**PHR**
Control of the information	Healthcare organization and/or professionals	The patient
Who may access the information	Any legally authorised professional	Any person authorised by the patient
Origin of the information	Healthcare provider	Multiple sources
Frequency of access by the patient	Rarely	Often
Accessibility	As determined by the organization	Always-on
Sharing of the information	As determined by the provider	As determined by the patient

It is not clear whether the citizens will adopt any of the approaches stated above, but the fact of the matter is that two big companies of the Net, Google and Microsoft, have already created initiatives that allow American patients to manage their health information: Google Health (www.google.com/health) and MSHealthVault (www.healthvault.com). Other big companies (AT&T, BP and Intel among them) have built a consortium that offers a PHR tool to their employees: Dossia (www.dossia.com). These are indeed "tectonic effects" (the words used in a recent New England Journal of Medicine issue: (Mandl and Kohane, 2009)) that will no doubt affect E-Health in years to come.

4. The Personal Health Space

The PHR opens up new possibilities which are driven by the change of paradigm: once the patient owns and controls its personal health data, new services and possibilities can be offered to a worldwide market which is not fragmented into organizations, nations or cultures. A brand new virtual space around healthcare can be created, this time centred on the patient and not on the healthcare organization anymore. This is what we call Personal Health Space (PHS).

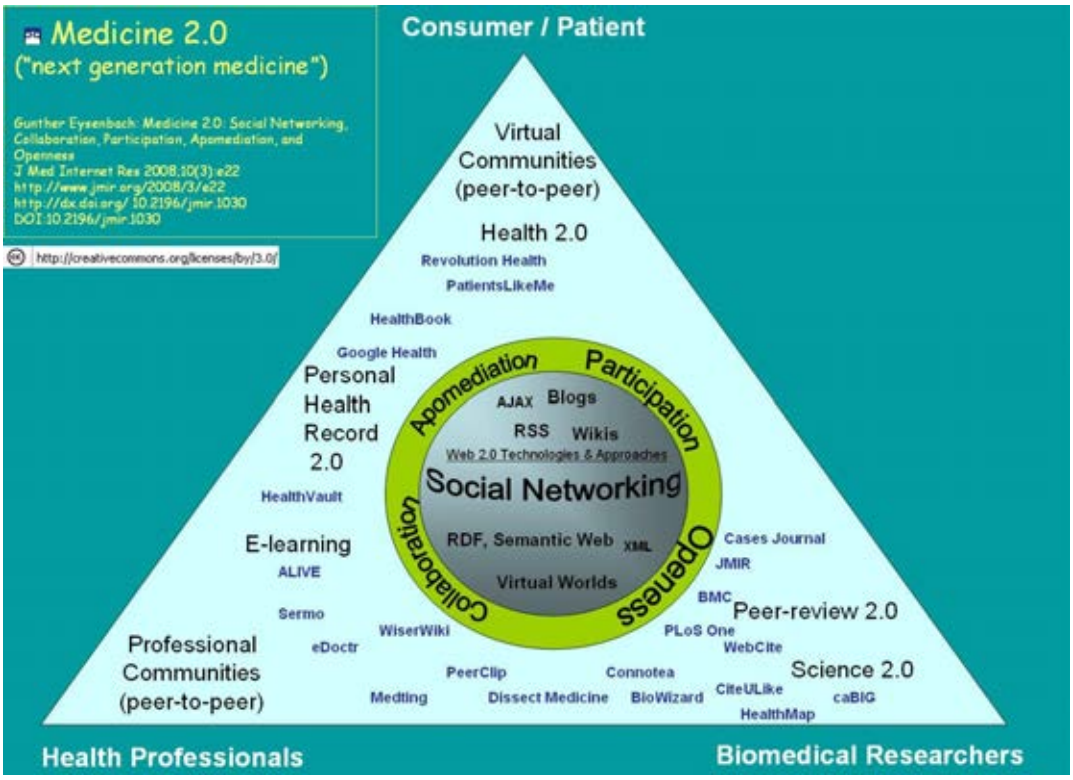
From our point of view, this space has three main dimensions which we summarise in the following picture:



We have already talked about PHR; let‘s briefly discuss the other two dimensions.

Healthcare activities are, an will continue for a long time to be, essentially performed in actual face to face encounters between patients and doctors and/or nurses. But the Internet, along with the overall accessibility of PHR, will make Telemedicine more widespread. The new possibilities of Telemedicine, along with classical face to face interactions, constitute what we call Multichannel Health Services (hereafter MHS), i.e. all the possibilities of healthcare opened up by ICTs. Currently operational variations of Telemedicine (Brown, 1996) include Telediagnosis, Teleradiology, Teleconsulting, Telecontrol and Telechirurgics. Today most of them are still much dependant of complex and expensive infrastructures which, no doubt, will tend to become easier to access and less expensive. In this sense it is not difficult to foresee a near future where the digital TV set or even the smartphone will be used as terminals for Telemedicine. The traditional face to face channel of healthcare provision (hospital or healthcare center) will be only the top of the iceberg of MHS.

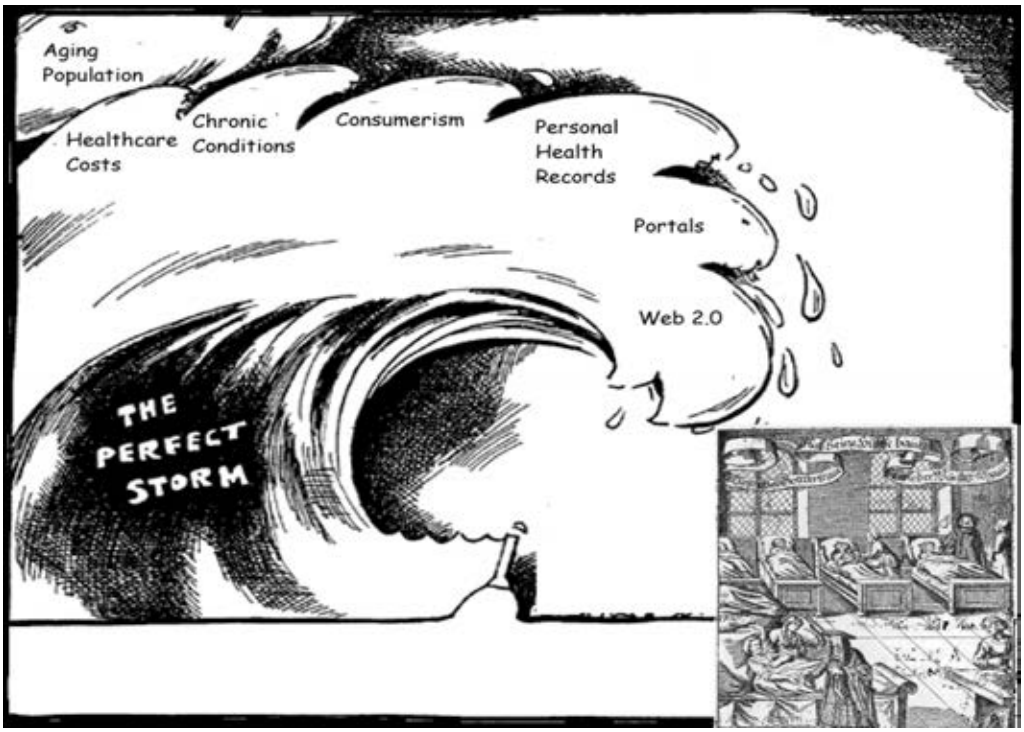
On the other hand, health is a social value since we humans are social beings. Leaving a healthy life involves many components, some of which (family, friends, environment) are social. The Internet opens up new possibilities also in this respect. First it was the web, e-mail, chatting and the like: it was the Web 1.0. Then it came the Web 2.0 with things like social networking, blogs, wikis, podcasts; all of them with simple tools which open new possibilities of communicating among friends or simply people with common interests. Both professionals and patients have already started to use these new tools and will no doubt continue to do it in new and possibly unforeseen ways. Sites like PeoplesMD (www.peoplsmd.com), PatientsLikeMe (www.patientslikeme.com), MedTrackAlert (www.medtrackalert.com) or RateMDs.com (www.ratemds.com) are but a few of the many Medicine 2.0 sites which can be summarised in the following picture:



PHR, MHS and Web 2.0 define the brand new world of healthcare for the new decade and the value they add to the traditional way of providing health services will no doubt be adopted by the citizens worldwide. The PHS fulfils the quantum leap envisioned by many pioneers in the area of E-Health. Indeed, Lawrence Weed, one of the first physicians to use EHRs published in 1997 (Weed, 2007):—*Patients would have their own medical records, they would use knowledge coupling tools in conjunction with providers to support medical decision making, and they would be taught from childhood on how to interact with the system, just as they now learn how to interact with transport systems. As patients assume decision making power, their demands will reshape the healthcare marketplace in these directions*."

5. Discussion: Healthcare in the Information Era

We are at the beginning of a new Era in the history of Humankind: the Information Era (Castells, 2002). Revolutionary changes are taking place, not only in the field of ICTs, but also on may social, economic and cultural aspects which directly affect the living of people. As a first approach we can pinpoint the following: a new demography, with a systematic lengthening of life expectancy; big changes in prevalent diseases with chronicity asking for a major interaction with the healthcare system; a globalised and more informed society; a more information intense labour market. Again an image is worth a thousand words, and the —Perfect Storm" is approaching our good old healthcare system (taken from (Eysenbach, 2008)):



All these changes ask for a reaction of the different stakeholders involved in the system:

A new role for healthcare professionals. Doctors and nurses must adopt a new role which by no means is alien to the tradition of the practitioners of Medicine. To lifelong learning, research activity and the knowledge intense traditional activities, new aptitudes will be added. These will include being proactively participants, along with their patients, and real managers of their healthy lifestyle. Politicians and actors, to name a few examples, are using the new tools of the Web 2.0 to weave networks with their objective publics. Citizens are in the web 2.0; healthcare professionals are anxiously expected.

What must (should) organizations do? Healthcare organizations have a tradition of routinely collaborate among them, if only for their sharing of patients and/or their health information. We could say that they are operationally patient-oriented, but not informationaly, since many times patients come and go bringing their information with them in the form of paper records and results of image tests and the like. Sharing EHRs, or better building real SHRs is something that they must face in the near future, whether by their own initiative or under the coordination efforts of governments and administrations. They must emphasise their value as connected nodes of a network of both health services and information sharing.

A safer space? Safety and privacy is a main concern of politicians, professionals and patients alike, when asked about the risks of using the Interned for health related information management. The Net is becoming a strategically vital infrastructure. The PHS is an intersection between real and virtual spaces; access and availability must be a shared characteristic of both. The Internet has in itself the problem and the solution: it was conceived as a freely and easily accessible space and therefore accessibility (congestion) and security (hacking) are potential problems. But new developments, most particularly the new and rapidly spreading IPv6 protocol will introduce new possibilities that were not available in the current IPv4 protocol (Warfield, 2003) and that will convert the Net in a much safer and accessible world; more than the real one, to say the very least.

Public versus private. This is a classic dilemma or discussion in healthcare provision. It is easily projected in the new PHS. As far as MHS is concerned, public and private services will continue to coexist with clear new business possibilities popping up. The Web 2.0 seems clearly a private territory with public initiatives searching its ~~"p~~place under the Sun" with more difficulties. In PHR public-private collaboration will be badly needed. As we have seen there is no lack of both types of initiatives and citizens will take profit from them all. Topics like privacy, safety and in general preservation of personal and social rights will make this cooperation unavoidable. New organizations like Connecting

for Health (www.connectingforhealth.org) where more that one hundred organizations from public and private sectors cooperate to improve health and the healthcare system for patients and consumers through connectivity and information sharing (Connecting…), will be needed to foster this cooperation.

A new Digital Divide? Digital divide in this case means much more than a separation between have's and have not's. When healthcare is concerned, access to the PHS is a question of live or die. In this sense governments have the responsibility of ensuring access as a new human right in the Information Era. In this case commercial and private interests as well as an overall good perception of ICTs by people (Observatorio…) will no doubt help to socialise the use of these technologies for building the PHS worldwide.

6. Conclusion

We have presented an Evolutionary Model of Medical Records which allows us to understand many of the changes which are and will be taking place in E-Health. From this Model it is hypothesised that we are moving towards a Personal Health Space that will integrate all physical and informational resources needed in healthcare. This overall vision also allows us to foresee the characteristics of this PHR:

With citizens adopting a proactive attitude, rather than the current reactive one, as far as managing his/her health and that of their families and communities is concerned.

With doctors and nurses adopting a leading role on cooperating with citizens in their healthcare.

With more flexible, connected and cooperative organizations.

In an accessible and safe space, where the rights to health and information invigorate each other.

With public and private initiatives collaborating, opening up new business opportunities and with subsidiarity (problems are solved by those in a better position to solve them) in the provision of healthcare services.

With governments ensuring the rights of less favoured people to health and to information, thus avoiding any digital divide.

The PHS is but the projection onto E-Health of a new space (cyberspace, third environment) which has already been theorised by several scholars (Echevarria, 1999). Daily life and healthcare provision of people will happen inside and it will no doubt give rise to new developments that will facilitate healthcare and, in the end, people's happiness and prosperity.

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A DIALOGICAL APPROACH WHEN LEARNING ENGINEERING ETHICS IN A VIRTUAL EDUCATION FRAME

Montse Serra and Josep M. Basart

Abstract

Classroom analysis of ethically relevant professional engineering dilemmas (cases) is one of the most useful strategies to explore this kind of professional ethics in engineering schools. And, dialogue and debate are two quite different approaches to the analysis and evaluation of these cases. The aim of this paper is to introduce a set of distinctive features that show why dialogue instead of debate should be promoted among students, especially when the learning process appears in a virtual education context.

Hermeneutic perspective (Gadamer) and dialogical ethics (Socrates, Habermas) appear here as very suitable approaches to students learning engineering ethics. From a hermeneutic perspective, understanding is based upon cases and takes the form of a dialogue. And, from dialogical ethics, through dialogue students are invited to develop new, shared ways of seeing and acting. Therefore, dialogue plays an important role helping students to feel the essential empathy involved within a conversation on values, norms and virtues in order to make ―good" choices in solving cases that arise in their daily personal and professional development.

1. Introduction

A traditional approach to teaching engineering ethics aims to provide knowledge about ethics. This is in line with an epistemological view on ethics in which moral expertise is assumed to be located in theoretical knowledge and not in the moral experience of the engineer's profession. Yet this traditional way of teaching engineering ethics has some limitations. The theoretical contents of the ethics' textbooks make engineers feel removed from their own values and moral experiences (Basart J.M., 2008). Learning ethical concepts and principles are needed, but engineers are not adequately trained when they have to face real moral dilemmas and make moral decisions about them. There is not correspondence between theoretical knowledge and practical application of them. For this reason, it becomes necessary to pay attention to the training of moral competences, virtues and to dialogue and have deliberation among engineers in order to develop analytical skills to solve real cases. Thus, contextual approach to teaching ethics, which can be grounded in a hermeneutic and dialogical ethics, is required as an alternative. In this alternative, from one hand hermeneutics implies: investigate what is the situation, who are involved in it, the solutions to envisage and the problems to encounter. In this way, engineers are obligated to be open to the context and unforeseen happening, driving them to find new solutions and possibilities. On the other hand, dialogical ethics focuses on extending one's perspective through a dialogue. In other words, being open to what the other has to say, being prepared to accept it as relevant and valid for oneself.

This alternative allows us to describe the meaning and development of the moral competence of engineering students in practical experiences, it means, how moral competence works in practice, and consistently, in their daily professional engineering dilemmas (cases). Therefore, real (or realistic) case analysis where serious ethical dilemmas appear allow the teachers to show to the students: concrete situations where several values are confronted, what personal interests are in opposition to professional duties or responsibilities, who and how could be damaged or threatened, who and how could be benefited, and finally, what different outcomes are possible. All of this, makes feasible the decision-making in their daily professional practice. In these cases, it is possible to show through the main character‘s behaviour what attitudes and decisions are ethically preferable and why.

In order to gain a good understanding of moral issues embedded in professional ethics (for instance, engineering ethics), a hermeneutic ethics dialogue is useful as a vehicle for moral learning, helping students to find answers to the cases and to develop moral competencies. A dialogue assumes that the participants already have some interest in and insight into the matter at hand. It also presupposes that the participants can elaborate their interest and knowledge through an exchange of perspectives. So,

dialogue requires openness towards the views of others. Therefore, dialogue can be seen as a way of making sense of cases and coming to joint interpretations of these cases.

Debate could be the other tool to take into account when it is necessary to analyse and evaluate these cases. From our view point, this possibility is rejected because its connotations don't invite the respect for other people's opinion, not addressing each other within a conversation. Thus, debate didn't seem to have the adequate features to arrive at comprehension taking into account the different point of view inserted within a conversation. In fact, debate promotes confrontation and divisions between ideas instead of reconciling them and constructing new ones. In accordance with the preceding handicaps, debate is not the appropriate strategy to treat the cases when professional engineering dilemmas arise. The cases require the dialogue as a learning tool promoting: understanding (paying attention to other arguments, ideas or proposals); flexibility (integrate cultural diversity); equality (all voices have the same weight); empathy and sensitivity (emotional awareness with regard to each other).

The use of Information and Communication Technologies (ICT) in education has widened the range of learning possibilities and, probably, the most relevant is the feasibility of distance learning, in the form of e-learning (Sangrà, A. and Duart J.M., 2001). It means, the ICT gives us a new educational space in which is possible to learn and to construct educational frames where people join in it as such, with their feelings, beliefs and personal goals. In this sense, an additional issue to take into account here is the virtual educational context as a place where the moral process learning is developed.

This new scenario has new rules and demands new roles because of the absence of presence shapes the potential of communication, and interaction. This interaction consists of people, and people exchange information, interact, and communicate. In this relational frame, the habits, the ways of doing and the ways of communicating are different, because among the interlocutors of a conversation there is a clear distance, non-existent presence and, very often, asynchronous communication. However, the communicating tool par excellence is the written and spoken dialogue through diverse technology's platforms (e-mail, chat, video conference, cell-phone, etc.). In a virtual context the values and the moral exist, as within a face-to-face context, because they are a part of people, but the way of expressing them and the way of declaring them change. This new educational virtual context shapes new communicative possibilities, challenges and relationships.

The dialogue becomes the main interaction tool among people within a virtual space. It is the way of expressing our experiences and emotions; furthermore, the dialogue is the declaration of the values within the new virtual context. The learning process is achieved through inquiry and the content is actually the vehicle for sharing in creative ways using technology. It means students create questions and topics of inquiry to explore the contents to learn. In this way, they feel actively involved as they learn from multiple resources such as print, electronic, media, plus student responses and reflections. As they develop computer and critical thinking skills, they are empowered to share their discoveries with others. Through empowerment, students can achieve their potential not only in the cognitive domain but also through feelings of self-worth and values shaped along their professional and private life (Kohlberg, L., 1976).

In sum, dialogue occurs through technology (email, video conference, chat, group discussion and bulletin boards) and provides the opportunity for active construction of ideas, reflection and participation among students. This new vision of learning based on inquiry through dialogue, where the students‘ questions take the most important role within the virtual learning process, have to be implemented to improve the ethical behaviour.

Finally, the aim of the present paper is to show how the scaffolds of the learning process in engineering ethics within a virtual education frame is a combination of hermeneutic and dialogical ethics. Both approaches stress the importance of practical processes such as: improving the moral competencies of the engineering profession, increasing the skills of decision-making processes, fostering a culture of a constructive dialogue among multi-disciplinary professionals, and enhancing the quality of the profession development, related to moral dilemmas of concrete professional situations.

The rest of the paper is structured as follows. The next section presents the hermeneutic and dialogical ethics background in which dialogue is founded. On one hand, hermeneutics urges participants in a practice to be open to the context and contingency of the cases. And, on the other hand, dialogue appears as a facilitator tool when moral dilemmas arise within the cases. Then, in section 3, we present the dialogue to promote among the engineering professionals helping them to

solve engineering professional dilemmas (cases). Moreover, we present a table comparing the existing differences between two different approaches: dialogue and debate. Lastly, section 4 presents some conclusions.

2. Hermeneutic and dialogical ethics background

Engineering profession is an inherently moral profession. The professional good exercise of an engineer involves choosing a moral position when the moral dilemmas arise in their daily professional practice. Defining morally good exercise of the profession is an ongoing contextual process, based on concrete experiences with different stakeholders (engineer, manager, customer, organization, etc.). In this process, all of them are, and will be, confronted with moral issues. Although all the participants implied in a situation are facing with moral issues every day, normally the opportunity for dealing with moral issues is lacking. For this reason, specific moral deliberation methods are needed in order to support participants taking on these moral issues in a more reflective, dialogical and understandable way.

Hermeneutic and dialogical ethics appear as a very suitable approach to students learning engineering ethics. By combining these two approaches helping to solve moral dilemmas, stakeholders are involved in the process of reflection and analysis, which takes place in a dialogue between participants. To begin such reflection and analysis we take, as a starting point, the works of: Socrates (Socratic dialogue), Gadamer (Hermeneutics) and Habermas (Dialogical Ethics).

Socrates

Dialogue promotes for the identification and examination of our assumptions and tacit beliefs and, at the same time, allows us to prepare and evaluate our arguments. These elements are important in the practice of professional ethics (for instance, engineering ethics).

Dialogical ethics are explicitly modelled on Socratic dialogue which consists primarily of critical discussion. A Socratic dialogue is an exchange of thoughts with the goal of finding an answer to a particular question. According to it, the central feature is Socrate's way of asking questions (question matters, provoke participants, search for tensions and conflicts between the stakeholders, and so on), frequently referred to beliefs, where sustained cross-examination and the use of counter-examples reveal contradictions that would otherwise go unrecognised. Socratic dialogue is characterised by an incessant inquiry to seek the truth. Thus, Socratic dialogue is a mechanism for identifying incoherence and inconsistency in our own and other‘s sets of beliefs.

Through the questions, the Socratic dialogue allows us to get a state of moral confusion in the people implied in a conversation, giving the opportunity to develop the skills of argumentation. Therefore, it is possible to learn something from the experience, as this confusion may be the precursor to a profound change in one‘s conversational attitude from which a dialogical attitude may follow, or in other words, an attitude of open mindedness towards what others have to say to us. Without this open conversational attitude it is difficult to deal with ethical issues well. In fact, this attitude is the basis of every morally behaviour or action.

The evidence of our understanding is to be found in our actions because according to Socratic dialogue, true understanding leads to right behaviour. For this reason, the engineers' students, having finished their degree and while learning it, are responsible to define their professional goals taking into account the interests of their colleagues and an appropriate ethical action. Then, they need to explore, for example, the boundaries of their responsibilities and it implies the development of personal and professional skills related to all kinds of ethical questions raised; questions concerning integrity, responsibility, flexibility, success, motivation, effectiveness, mutuality, leadership, empowerment, openness, autonomy etc. In this way, students are encouraged to take responsibility for their own thinking and at the same time stimulates them to think together, with their colleagues. The Socratic dialogue constitutes an ethical practice searching the fair actions for: to think about ethical issues and try to behave in accordance with the way one thinks and lives.

In this light, Socratic questions are fundamental and closely related to ethical issues. The stakeholders involved not only need to come to grips with these questions, but they are also forced to practice the insights gained during the inquiry and learn from them. Thus, they should take the opportunity to learn from the whole experiences in dealing with ethical dilemmas while working and living together in the everyday life. Besides, the way to use the Socratic dialogue in engineer ethics

helps and indeed forces people to clarify their own aims and goals (their true interests). They are asked to think critically about the foundations of their profession.

In practice, all kinds of tensions appear. People working and living together, inevitably develop all kinds of interdependencies. The actions of everyone depends on the way they deal with their own interests (as engineer, as client or as manager). The use of the Socratic Dialogue can help to learn from the failures and successes of ones and others through the genuine inquiry in order to settle: problem solving, conflict mediation or policy making. To carry out with the Socratic dialogue, it is necessary to feed it by the new participants' questions and experiences. And, instead of excluding people's voices, it is an important fact to form a group to exchange perspectives, work and live together and account for all attempts. Dialogue let's show the way of sharing experiences, develop a common communicative rules, maintain manners of doing and including newcomers.

Gadamer

Dialogue is crucial in order to find solutions to moral problems for developing shared understandings and improving social praxis. This idea is present in hermeneutic ethics which is grounded in the hermeneutic philosophy of Gadamer (Gadamer, H.G., 1998).

Hermeneutic ethics aims to articulate and explore the various, sometimes conflicting, perspectives and interpretations in a morally complex situation. Consistently, hermeneutic can help the students' engineering to develop new and richer ways of dealing with actual moral dilemmas.

In accordance with Gadamer understanding a tradition is a similar process to understand a person in a dialogue or conversation (Gadamer, H.G., 1998). Thus, hermeneutics can be seen in dialogical sense, in which we open ourselves, not only to receive the message of other, but in a sense of transforming our consciousness after the contact with him or her. In other words, being open to what the other has to say, instead of ignoring the response, and being prepared to accept it as potentially relevant and valid for oneself. Because of it, language becomes the means of communication and transmission in which concepts and ideas are related to each other's view point throughout of time, life, experiences, etc. From what, a dialogical approach emphasises that ethics is concrete and contextual and human beings interpret their situation and try to make sense of it.

A dialogue belongs to the interlocutors and makes possible the comprehension of the meaning which we must clear up. According to Gadamer, dialogue results in learning processes. It means one learns to address the situation in a different way, and to find solutions which one did not have in mind before. One does not learn by taking things over mechanically, but by investigating the validity sense, meaning of the other‘s perspective.

In addition, hermeneutic ethics implies a set of elements as the notion of perspective, dialogue as a learning process, and practical rationality. Hermeneutics starts from the idea that human life is a process of interpretation. Human actions are not caused by the environment; they embody a specific understanding of the situation. One sees the situation from a certain perspective, which is the result of both prior experiences and actual horizon. From a hermeneutic view point, perspectives on a situation at hand are not rigid and closed. They can change through dialogue.

Dialogue is not seen as an instrument or technique to reach better decisions; it is rather understood as an ongoing, social learning process in which people develop new and richer understandings of their practices. This process of developing more enriched practical understandings is grounded in concrete experiences. Hermeneutic ethics assists various stakeholders to understand their practice from multiple perspectives. In dialogical interactions these multiple perspectives may evolve into new horizons, in terms of Gadamer. The communication as horizon fusion is possible because of the language. In this case, language reveals itself as a way of opening up the meaning of being and without it nothing can be understood (Gadamer, H.G., 1998).

As we said, previously, the meaning of a dialogue emerges from the interactions between people involved in real problems and their willingness to engage. According to Gadamer, through non-adversarial dialogue it is possible to get the ability to create meaning, but there is never the possibility to arrive at a final, conclusive meaning. Therefore, meaning is always temporal, situational, progressive and shared through interactions, and open to interpretation and reinterpretation. Meaning, to Gadamer, is not static.

Habermas

According to Habermas, the nature of the language as communication means is that the listener and the speaker of the speech must have a common interest a priori to get a mutual understanding

(Habermas, J., 1997). This understanding means that participants of a conversation get to an agreement or consensus because there is a predisposition for a real understanding from both sides. This agreement is the central value of Habermas' theory: the "intersubjectivity agreement" (rational, negotiated assent, responsible individuals). Intersubjectivity invokes the German hermeneutic tradition which Habermas sees not only as a set of rules for interpreting difficult texts (its historical origin), but also as an alternative for understanding human behaviour and society. For Habermas hermeneutics allows us to understand the motives, values, emotions, and thoughts of others. Intersubjectivity is a medium of communicable knowledge, created and maintained through the interaction of many people within a conversation. As such, intersubjectivity is entered through socialization especially language acquisition. (Habermas, J., 1984).

Habermas recognises that people may reach an agreement or consensus satisfying to themselves, but others would judge it as non valid. This consensus must be supported by rational argumentation, open to questioning of assumptions, addressed by speakers free from inequality, coercion, and domination. This raises the possibility that people need not choose at all between the value of consensus and that of diversity, between the need to harmonise their actions through dialogue aimed at consensus and the value of dissenting voices. For Habermas, the speech must constitute an unconstrained exchange of opinions in which all speakers enjoy equal rights of participation. Participants are involved not only in a continuing search of ideas and opinions but in a comprehensive process of mutual agreement or consensus through common deliberation on shared goals.

3. The leading role of the dialogue

As we mention above, case studies are the staple of ethics education and ethics training. Many of these cases are guaranteed to perplex engineering students enough to stimulate lengthy conversation and are substantial enough to create complex conversations about what is ethically correct. In fact, we pursue a dialogic interaction between engineering students to find out a response when the ethical dilemmas arise within the cases.

In this section dialogue is shown as the tool that helps students to answer the challenge provided by ethical dilemmas within the training process (cases). Furthermore, we will characterise what dialogue is comparing it with debate and which are the features of the dialogue promoted.

Why dialogue instead of debate? There many differences between a dialogue and a debate. Conversations that begin well (balanced exchange of ideas among people) often produce nothing, ending either with reproaches or the conversation evaporating into a non-committal conclusion. It seems to be that people are not naturally capable of having an effective good moral conversation, as we are not born with the skills needed for it. Instead we have to acquire and cultivate them through practice and for acquiring these skills we propose the dialogue instead of the debate. The main reason is that through the dialogue we will be able to avoid the aforementioned pitfalls. The dialogue increases the likelihood that people will acquire the skills that promote a manner of doing (and living) in which ethical matters (and others) can be successfully discussed.

On the contrary, debate pushes people to discuss within a rigid set of principles (preconceptions, beliefs), imposing a fixed position because one is not sympathetic with other positions and to resist the idea of new possibilities. The following table summarises the main differences between dialogue and debate:

	DIALOGUE	DEBATE
(1)	Etymologically refers to: "talk" or "meaning": construction and comprehension	Etymologically refers to: "beating" or "flowing": confrontation and division
(2)	Openness to change	Closed mind
(3)	Agreement, consensus, better understanding, new findings	Convincing desire
(4)	Neither winners nor losers	A single winner
(5)	Tolerance and respect	Inflexibility and rudeness
(6)	Appreciate silence and pauses	Interruptions and impoliteness
(7)	A way of living in harmony as a goal	A way to flatten as a medium

To begin with, these set of seven distinctive features show why dialogue instead of debate should be promoted among engineering students, especially in the learning process solving ethical matters and, concretely, when this learning appears in a virtual education context. In this case, cultural diversity calls for flexibility, tolerance and an open minded way of thinking.

In addition, it is necessary to emphasise that this set of features are supported by the works, previously, mentioned (Socrates, Gadamer and Habermas) giving the solidity and truthfulness to the dialogue pursued.

(1) The fundamental desire of partners in a dialogue is investigating a matter to comprehend it through a constructive conversation. We are engaged in dialogue when we speak with one another on the assumption that there is something we have to say to each other. And this fact implies a clear understanding and a very special listening between the interlocutors. In relation to Gadamer's principles, in a dialogue is very important to take into account the reception, the attention and the realization of the other because the dialogue has an ontological dimension. The dialogue constitutes the human being. Therefore, in a dialogue certain moral principles are implied because we demand a responsive and understanding attitude from each other.

On the contrary, in a debate, the fundamental desire is to convince, in an immediate way, getting my opinion accepted. And, everyone involved in a debate do the same, thus, the confrontation appears because each one of the participants try to impose their opinion. In practice, the final consequence is that participants are chiefly engaged in trying to prove each other to be wrong, it means, to destruct the others opinions that are not compatible with mine.

(2) According to Socrates, in a dialogue, there is an increasing enrichment, or clarity, through the constant inquiries between ones to each others. This means that I can gain not only insight into the questions, ideas and beliefs of the other, but also into my own questions, reflections and convictions because in a dialogue I can find out what it is that I want to explore with regard to a problem. For Socrates the problem dispels the human beings' ignorance. So, dialogue creates an openness to change because of the acceptance of each other‘s viewpoints and alternatives.

In a debate, arguments divergent from mine appear as obstacles or nuisances to be removed provoking that the conversation goes off track. It has become fairly unclear what the subject of conversation is because, quite often, everyone talks about their own subject and not about the subject under discussion.

(3) In a dialogue participants strive for mutual understanding because what is looked for is an agreement, a consensus, a new finding. However, in relation to Habermas, to get this mutual understanding, participants must show a real interest (predisposition) when they establish a conversation through a dialogue.

In a debate participants seek to convince each other that they are right, demanding, constantly, speaking time. In other words, participants undermine each other‘s standpoints and look upon each other‘s speaking time as lost time because the interest to understand one to each other is null.

(4) In a dialogue, there are neither winners nor losers. Participants don't just accept each other‘s beliefs and persuasions, but will explore these. Listening, probing and questioning the arguments, ideas that characterise the dialogue, rather than imposing a proposal as in a debate. Following, Socrates' method, dialogue generates the best available atmosphere to persuade and dissuade and looking for a mutual exchange of reasons in which participants gain a better understanding of both, the problem or subject under discussion and themselves.

(5) Dialogue promotes tolerance actively towards what is different as one of the main ways of showing respect to others. Participants are attentive to each other inquiries and explanations because all the voices have the same weight, all of them count. Everybody involved are to have an opportunity to express and argue for their opinions. A fruitful dialogue consists of empathy and of a critical and reflexive attitude to self and to others making a rich understanding taking into account all different viewpoints. Because of it, the interplay of partners in a dialogue has the potential to generate shared meaning through what Gadamer calls the –fusing horizons” (Gadamer, H.G., 1998).

However, debate refuses a willingness to listen to each other trying to defeat the other participant. The fruit of this circumstance is a constant interruption of participants' contributions in a disrespectful manner of speaking. Debate promotes aggressiveness and high-handedness because the rest of viewpoints have to be overpowered.

(6) Dialogue valuates pauses and silence. Habermas recognises that more is involved in communication than the grammatical comprehensibility of a sentence. Necessary there is another feature to take into account in a speech, the social structure of it (Habermas, J., 1984). For him there are qualities of speech directed at understanding. For instance, such breaks mustn't be, necessarily, empty moments, they can allow to the interlocutors to: *think* about the different opinions set out in the conversation, achieve shared appreciation, recognition of differences, construct new arguments and ideas, or simply, *leave* that dialogue flows in a calm way promoting an appropriate atmosphere for the reflection and understanding.

Debate tries to take advantage of these breaks. In this case, such breaks are useful to leave astounded the opponent because the speech from her is like an ear-splitting noise. The opponent has no time to react or response to the huge set of arguments received in a few moments because the main goal of the rival is to get his or her opinion accepted or imposed, not to get a mutual understanding.

(7) According to Socrates, a dialogue is a way of living in harmony as a goal. It is an end in itself. He is always looking for a constant argue, because without it to find out what is fair, good and virtuous would be impossible. Through a dialogue we don't only analyse other people, but rather understand them and ourselves. In this way interlocutors are able to arrange misunderstanding, blame, gestures, etc. promoting the understanding to each other, re-evaluating themselves persistently and cultivating well-balanced environment. Thus, personal improvement is guaranteed and, consistently, the cohabitation is better.

On the contrary, debate appears as a technique that requires some skills. It is just a means. When debating one persists in trying to get all the speaking time to get all the credit. In a debate the interlocutor is thinking against the other instead thinking with, imposing restraints instead looking for alternatives, acting in line with disagreements because her opinion is over the rest ones, avoiding depth and nuances of other viewpoints, and so on. In sum, in a debate there is no place for an open, straight, constructive communication and the moral sensitivity is null and void. With this set of ingredients living in harmony seems to be not a goal, a utopia.

The features of dialogue considered above help the students to feel the essential empathy required during negotiation and critical discussion choices, necessities and consequences. To carry out with this pursued dialogue which is characterised by this set of features, first, the participants must have some predisposition to respect and accept them in order to establish common communicative rules. And, second, the starting point of the participants, involved in a dialogue, must be a neutral stance, without any fixed ethical position. From here and through the dialogue, participants will get to put values into practice.

What is more, it is necessary to emphasise that dialogue, as a learning tool, reinforces each element that we have enhanced within the set of features because of their importance i.e.: in order to establish a fruitful and respectful dialogue. The elements improved, by the dialogue, are: equal opportunities (inclusion and diversity of other perspectives and opinions), empathy, affection (balanced and rich cohabitation within different kind of relationships) and comprehension (to be more aware of the rest of people). All of these elements connote a mutual relationship within a dialogue, in the sense that all participants construct and give great solidity to it (Bach, E. and Darder, P., 2007).

This construction of the dialogue, and concretely, in a virtual context created by the introduction of the ICT, makes possible to show individual emotions and feelings. Thus, if we can feel in and through this new space, without doubt, we can say that it is possible to learn in it the ethical values. Nevertheless, it is important don't leave behind that, in this new space, the distance and the asynchrony between students and teacher influence in the attitudes and behaviour developed by them. In other words, which is the effectiveness of the learning process, when students are learning engineering ethics in this virtual scenario? Really, is there coherence between what the students learn and, after, what they will apply in their future professional world? The coherence is a very eloquent value to take into account in this new space, because shows the capacity or not of real compatibility between what we say and what we do. And this affects the emotions, from what it educates. For this reason the learning process of ethical issues, in a virtual context, is possible if we keep in mind this coherence in order to evaluate in an appropriate way the acquisition of them. Coherence is a very important element when engineers analyse cases and the ethical dilemmas arise. Consistently, dialogue, as a learning tool, will allow them to carry out with this coherence in order to solve, appropriately, theses cases within the virtual scenario. Thus, coherence as an ethical value will be an important ingredient when ethical

issues are assessed in a virtual context and when it is necessary to ensure the effectiveness of the learning process in this new scenario.

In conclusion, using this dialogical frame it is possible to generate meaning around the beliefs and values embedded in professional ethics, i.e., engineering ethics. And, concretely, how the practice of this meaning within a critical virtual educational context, develops a greater understanding of the contradictions, ambiguities and distortions hidden within everyday interactions.

4. Conclusions

In this paper we have presented a dialogical approach to engineering ethics, based upon hermeneutic ethics. In this approach, engineers not only articulate issues and moral dilemmas emerging in their daily professional practice, but also actually foster dialogues between engineering's students and colleagues in order to develop shared understanding to improve the moral quality of the engineering profession. In these dialogues the perspectives of all relevant stakeholders are included to gain understanding of the complexities of engineering profession, and to increase the mutual understanding between participants.

Dialogue is a learning tool within engineering ethics and, as such, it has as decisive role when the evaluation of ethics issues is required. Dialogue is based upon shared meanings and is oriented towards reaching agreement, but also implies disagreement and difference. It means, the engineering's students, as interlocutors within a conversation, must try to understand the values endorsed in a practice (cases) and to be prepared to listen to the experiences, opinions and perspectives of all parties involved. Only then can the practice be changed in such a way that its values are adapted to the present situation rather than giving up a theoretical answer when ethical dilemmas arise in their daily professional exercise.

Ethical theory is necessary and plays a role, but the study of ethical issues should focus on the relation between theory (concepts and principles) and practice (cases). This requires training practical moral sensitivity and a dialogical approach which aims to learn from the experiences showed by the cases and from the real work of professionals. The process of learning is regarded as moral and interactive, and is organised in a dialogical way.

Also, from a hermeneutic view point, perspectives found on a case at hand are not closed and rigid. They can change through the dialogue. Hermeneutic ethics aims to articulate and explore the various perspectives on a case under consideration. Dialogue helps to the engineering students and professionals to develop a social learning process in which participants develop new understandings and skills of their professional practice. In other words, hermeneutic ethics assists various stakeholders to understand their practice from multiple perspectives rather than to define theoretical principles.

Finally, within a virtual context education which possess its own characteristics (for instance, distance and asynchronous), to carry out with teaching engineering ethics, without face-to-face contact, is not a trivial work. First a supporting technology infrastructure is needed and it must be easy to use, otherwise the technology could detract from the content being presented. Secondly, such content should be imparted to students through appropriates methodologies, such as hermeneutic and dialogical ethics, in order to enhance the learning process outcomes and assessment.

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USING ICT TO IMPROVE EMPLOYABILITY SKILLS OPPORTUNITIES FOR WOMEN WITHIN ETHNIC MINORITY GROUP: A STUDY ON WORKING FOR FAMILIES PROJECT FOR WOMEN IN SCOTLAND

Nidhi Sharma and Shalini Kesar

Abstract

This paper highlights findings of Phase II of an on-going research. Phase II centres around when Working for Families Projects (WfFP) began providing provisions to train and improve women's' ICT skills. It was hoped that such provisions will help in increasing their confidence and motivate them to seek employment. This is important as it will not only help WfFP in acquiring further funding from the Scottish Executive but also will have a direct impact on increasing employment rate.

1. Introduction

In 2005, the Equal Opportunities Commission (EOC) launched ‗Moving on up-Minority Ethnic Women at Work', as part of a major investigation into the participation, pay and progression of ethnic minority women in the Great Britain labour market[82]. This investigation aimed to improve understanding of the diverse experiences of ethnic minority women and the key factors which impact on their participation and progression in the labour market. As a result of this investigation, various projects, like Working for Families Projects (WfFP) were initiated in Scotland mainly to identify employability skills opportunities. These projects used Information, Technology and Communications (ICT) tools as a means to facilitate and hence improve skills of ethnic minority prior to entering the job market.

This paper reflects on phase II of an on-going research that focuses on one of the Working for Families Project (WfFP) initiated in Scotland. The scope of phase I was on the holistic support and resources such as child care and ICT training/learning skills in particular. Our findings in phase I highlighted a lack of capability and gaps in provisions of child-care facilities provided by WfFP. This, among other factors, de-motivated women within ethnic minority women to avail ICT training. This is in turn, had an impact on the jobs and other opportunities not being taken up by women in the ethnic minority group in particular (also see paper presented at Ethicomp2008 conference[83]). These findings were consistent with the recent report published by the Napier University that presented the Final Evaluation Report of the Working for Families Fund programme up to the 31 March 2008 (from April 2006- March 2008). It was carried out by the Employment Research Institute, Napier University, Edinburgh, for the Scottish Government[84], where the price of childcare was also stated as a main barrier for parents. It also showed a mismatch between women starting work and having to pay for childcare, and receiving their first wages. Some of the challenges for parents included hours of work, finishing-time, use of public transport, and closing times for nurseries and registered after-school clubs. As mentioned earlier, the main focus in phase I was to identify the problems linked with affordable and flexible childcare facilities provided by the WfFP. Hence, the research questions addressed in phase I included: Why do the women within the ethnic minority do not avail affordable and flexible childcare facilities provided by WfFP and What are main barriers that prevent women from ethnic minority to seek education or/and training for employment purposes?

Against this backdrop, in June 2008, an exercise was undertaken with women who had engaged in WfFP between the dates of 1st January 2008 and 31st March 2009. Initial findings (Phase I) were presented in September 2008 at ETHICOMP. Focus groups and interviews were conducted again from

82 See http://83.137.212.42/sitearchive/eoc/Defaultbdae.html?page=18694&theme=print

83 See Sharma, N. and Kesar, S. (2008), ―Engendering Action to Fill the Gap of Ethnic Minority Employability: A Study on Working for Families Project for Women in Scotland. Ethicomp2008, Italy.

84 See http://www.scotland.gov.uk/Publications/2009/04/20092521/2

October 2008 to March 2009 (Phase II). Facilities and services provided by WfFP were modified based on the feedback of Phase I (discussions and suggestions from researchers in ETHICOMP conference were also taken into account). Phase II mainly focuses on improving ICT skills of women within ethnic minority.

This paper is organised in six sections. After a brief introduction, Section 2 reviews literature in the context of focus of this paper. This is followed a discussion on research method. Section 4 highlights the findings by taking support of Kolb's Cycle. Finally contribution of this paper is discussed in Section 5, followed by a conclusion in Section 6.

2. Review of Literature

Around 200 public bodies in Scotland spend more than £31 billion of public money each year. It includes the Scottish Government, local councils and NHS bodies. The duty of the Auditor General and the Accounts Commission is to help ensure that public money is spent properly, efficiently and effectively. There are three public sector equality duties for race, disability and gender. These place duties on public bodies to mainly eliminate unlawful discrimination and harassment and promote equality of opportunity. The public sector equality duty for gender, introduced in June 2007, requires us to report annually on progress on our Gender Equality Scheme. The Gender Equality Scheme 2007-10, for example, published in June 2007, contains an action plan which set out the specific steps we planned to take to improve gender equality within Audit Scotland. Progress in achieving these steps are reported against the key areas of the diversity excellence model which is a measurement framework structured around key processes and their impact[85]. Also see recent "Race Equality Scheme Annual Report" published in November 2009[86].

Various studies have been conducted to provide analysis of how labour market outcomes for women and men are linked to traditional barriers such as childcare, poverty trap, tax credits to employment. Such issues seem to remain firmly well established in the minds of the majority of those living on a low-income in particular. To overcome the current barriers and real constraints governments are tackling through a raft of policy initiatives. For example, The six New Deal programmes of the Department for Work and Pensions (DWP), for example, have been "created to help unemployed people into work by closing the gap between the skills employers want and the skills people can offer" (DWP 2005). In trying to close the "Opportunity Gap", based on the Green Paper "Meeting the Childcare Challenge: A Childcare Strategy for Scotland" (May 1998) interlinked and outlined a strategy linked to childcare issues. The Scottish Executive adopted this strategy. As a result, major sources of funding became available from 1999/2000 onwards to help achieve its aims, including Childcare Strategy funding, New Opportunities Fund programmes and Tax credits.

In addition to adopting the Childcare Strategy, the Scottish Executive also recognised the need to initiate efforts that specifically focus on the ethnic group in this context. The statistics from the Scottish Executive (2004) showed the census figures for 2001, where minority ethnic women represent 1% of the Scottish population (approximately 55,000 women). Within the ethnic minority, Pakistani or Bangladeshi people represent the largest number in Scotland, making up 0.7% of the population after that Indian people 0.3%. The report also revealed that the ethnic minority population in Scotland has increased by 62% between 1991 and 2001. However, the exact data by gender and ethnic group in Scotland is mostly limited. Although, the Office for National Statistics does produce this kind of data but the Scottish Executive will only publish data that meets ONS reliability thresholds. Despite the lack of data about gender within the ethnic minority in Scotland, other reports in the UK in general, reflect ethnic minority, women, in particular are under-represented in the labour market. It revealed that only 45% of minority ethnic women in employment compared to 59% of white women. Consequently, the 'employment rate gap' between white women and minority ethnic women is 19%.

In 2003, the Employment Research Institute of Napier University (supported by Capital City Partnership) conducted a study on race and gender equality. This study examined pre-employment service providers operated under Joined Up for Jobs and Edinburgh's employability strategy to

85 See http://www.audit-scotland.gov.uk/docs/corp/2009/as_gender_equality_progress_0809.pdf

86 See http://www.gro-scotland.gov.uk/files2/about-us/race-equality-scheme-2009.pdf and http://www.equalityhumanrights.com/uploaded_files/Scotland/equal_opportunities_and_the_scottish_parliament_-_a_progress_review.pdf

understand some of the perceived barriers and real constraints within the ethnic minority in Scotland to ascertain how work organisation can be transformed to improve productivity practically for mothers in ethnic minority. The aim of this study was that to provide recommendations that will help in not only reducing the existing gaps in government current provisions but also positively impact on achieving the goals of increasing statistics of employment within the ethnic minority in Scotland. Since statistics indicate a high number of ethnic minority within Scotland and of which are mostly unemployed (particularly in low-income families group), the findings of this study provide valuable insight in improving productivity and thus delivering better lifelong choices for women within the ethnic minority group in particular. The summary of the study highlights: Difficulties in accessing alternative care that suits cost of child care; Fear of loss of benefits and housing security; Personal barrier-self-esteem, skill, job readiness; Additional costs of working such as transport, clothing, meal or school meal and The cost of training or education courses.

2.1 Background of WfFP

Dundee City Council was one of 10 authorities allocated WfFP funding where several projects were set up over this period including ‗Link Workers' employed by a variety of organizations. For the period 2008-2010 Working for Families has been funded by Fairer Scotland Fund. Two Link Workers were employed by Dundee City Council Leisure and Communities Department Adult Learning and placed in Adult Learning Teams. The main focus of the Link Workers was to:

- Engage with unemployed parents who wish to enter employment, training or learning;
- Offer ongoing, individually tailored support and guidance to clients; and
- Develop strong links with employers, training organisations, Further Education and Higher Education institutions as well as all the provision of the Adult Learning teams.

One of the Adult Learning Link Worker (co-author of this paper) has a specialist remit to work with parents from ethnic minorities. As mentioned earlier, Phase I highlighted various barriers to entering employment, training or education. Barriers included lack of knowledge of English language; lack of knowledge of local services and opportunities; overseas qualifications not being recognised; housing, money and immigration issues. In the effort of continual improvement of free facilities and services, WfFP assess and revaluated their services on a regular basis.

3. Research Method

For this paper, both primary and secondary data was collected. Primary data included qualitative techniques such as semi-structured interviews, workshops, focus groups and surveys. Twenty one interviews were conducted on the same ethnic minority women from Phase I from four groups. Secondary source for data collection of this paper mainly comes from an internal report written by WfFP Link Worker. This report includes feedback from both ethnic minority (from Phase I) and also some women who did not fit in the minority group but were part of ―Adult Learning" team.

A total of 35 women were interviewed, of which 21 women from ethnic minority had already participated in Phase I. The remaining 14 women ranged from British, India, Pakistan, and Africa origin. It was hoped that these interviews would allow researchers to not only address the research questions for Phase II but also compare the needs and requirements of women seeking employment in general. Hence, findings of this research will help WfFP to further improve its provisions and facilities to women. Research question in phase II were:

- Whether modified childcare facilities were helpful to the women?
- What other factors restrict women from ethnic minority to avail resources provided by WfFP?

This paper takes the support of Kolb's cycle (1984) as part of action research method to collect data from ethnic minority group. This framework has been most suitable to increase our understanding of an immediate social situation, with places emphasis on the complex and multivariate nature of this social setting. Further, action research assists in practical problem solving and expanding knowledge.

In phase II, an evaluation plan was mapped out to include details about data was collected during this phase. Table 2 below summarises the evaluation plan.

Outcome	Indicators	How you will collect supporting information
Clients develop knowledge and skills as a result of participating in learning opportunities	• No of clients participating in learning opportunities • No of clients gaining accredited awards • No of learning opportunities on offer through WFF • Clients describing an increase in their knowledge and skills	• Reports from DEMIS[87] • Reports from CDMS • Copies of certification & awards • Workers records • Learner logs, Individual plans and reviews
Clients have improved levels of confidence and self-esteem	• Clients engage in more local/community-based activities & services than before • Clients express that their confidence and self-esteem has improved.	• CDMS reports • DEMIS reports • Evaluation sheets that clients complete after courses • Learner logs
Clients progress up the employability pipeline	• Clients progress further up the employability pipeline	• DEMIS reports • CDMS reports • Workers records

Table 1: In Evaluation Plan

3.1 Brief Description of Kolb‘s Cycle

There are many ways that action research has been used for dealing with problems associated in people‘s daily activity. Kolb‘s cycle (1984) presents four stages to explain experimental learning: concrete experience, reflective observation, abstract conceptualization and active experimentation. The four within Kolb‘s cycle are: stages to explain experimental learning: concrete experience, reflective observation, abstract conceptualisation and active experimentation.

The benefit of using Kolb‘s cycle is that this reflective practice with action research method will enable to identify barriers women within ethnic minority face in their everyday activities that poses challenges for seeking employment or training and education for employment purposes. This in turn, will in modifying existing approaches/guidance to motivate women within the ethnic minority to seek employment or education/training for employment rather than claiming benefits from the Scottish Executive. In order for WfFP to contribute in reducing the –Opportunity Gap”, it is necessary to reflect on the experiences of ethnic minority within Dundee. With this in mind, data is collected using Kolb‘s cycle as a framework. This will help in further improving projects such as WfFP that focus on ethnic minority within Dundee. Kolb‘s cycle was used as a reflective practice to enable us to identify barriers women within ethnic minority face in their everyday activities that poses challenges for seeking employment or training and education for employment purposes. As mentioned earlier, majority of the suggestion made from phase I research incorporated in WfFP‘s training, workshops and seminars. Findings in this phase examines whether those in modifying existing approaches/guidance motivate women within the ethnic minority to seek employment or education/training for employment rather than claiming benefits from the Scottish Executive. It is for this reason the researchers were careful to interview the same women from Phase I.

[87] DEMS is a database used by Dundee employability team and CDM is used by other Adult Learning Team.

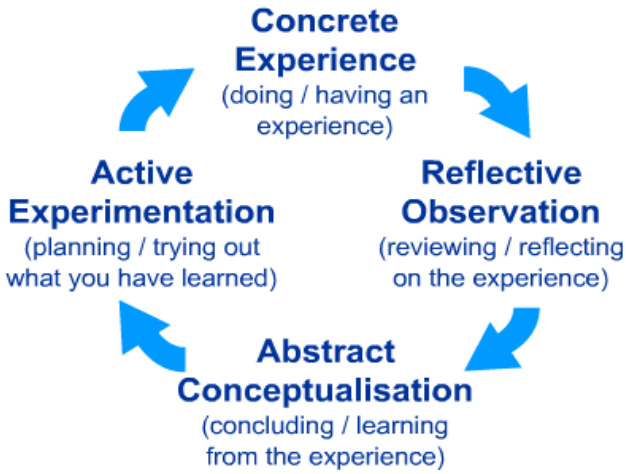

Figure 1: Kolb's Cycle

4. Findings

The Table 2 below summarises findings of phase I and II. This allows us to examine whether the modifications had an effect on the ethnic minority women's motivation. The twenty women in phase I included from different ethnic minorities groups: Dundee International Women Centre; Wellgate Centre; Maxwell Information Centre; Mitchell Street Centre. Changes made by WfFP and reflected in this paper are from Phase II[88] findings. The main aim was to examine whether the client overall have: increased their knowledge and skills; grown in confidence and self-esteem; and undertaken voluntary work.

Kolb's Cycle	Phase I
Concrete Experience	• Did not avail the affordable & flexible childcare facilities provided by the WfFP
Reflective observation	• Lack of motivation • Lack of confidence to use ICT skills • Inadequate understanding of the English language & cultural background • Lack of awareness about free facilities • Uncomfortable about insensitivity about religious issues in childcare • Lack of ICT skills • Conservative community

Table 2: Phase I findings in context of Kolb's Cycle

4.1 Abstract Conceptualization (concluding / learning from the experience)

Modifications made within WfFP in Phase II included are summarised in the above table. In this section, fourth stage of Kolb's Cycle (Abstract Conceptualization) stage is used to discuss the finding of phase II. This stage is takes into account the modifications/suggestions from phase I incorporated in WfFP.

4.1.1 Motivation

Services such as childcare travel cost aimed to motivate women in two main ways. Firstly, qualified women avail the facilities such as childcare-travel cost provided by the WfFP while seeking employment. Secondly, women, particularly those who have received qualification from their home

88 Note that a report was published to highlight the changes in WfFP in general.

country could now also avail ICT facilities to either enhance their skills or acquire training and education prior to them seeking employment. Despite this it was found that most women in Phase I did not avail such facilities.

In order to overcome one of the biggest barriers concerned with lack of motivation, Link Worker decided to speak to the women on an individual basis. This allowed the Link Worker to better understand their issues whether they pertained to domestic or religious reasons. In addition, the Link Worker could provide the necessary information and enhance awareness about the benefits of education and free ICT training provided by WfFP. As a result the Link Worker was able to convince these women to come to the Center for further guidance and support. This was a huge first step as it was seen that women were motivated to know that support, guidance and free training was available to them. In addition, Link Workers took initiatives to contact employers prior to suggesting a job to these women. Hence, so called guidance session increased the women's' confidence and motivation about availing training facilities. In the survey, approximately 68% of the women acknowledged that they would not have made the changes without Working for Families.

4.1.2 Qualifications

Another barrier underlying lack of motivation among ethnic minority was the lack of skills, particularly ICT and language. Although, WfFP provided facilities to enhance ICT skills, as mentioned earlier women did not avail these facilities. Indeed this is no straightforward solution for this since there are many factors to take into account. Having said that, suggestion such as providing more one-to-one guidance sessions to women were taken into account.

The WfFP began to provide facilities where women can pass their computer skills and consequently prepare them for credit qualifications such as European Computer Driving Licence (ECDL) for employment purposes. The ECDL is also known as International Computer Driving Licence (ICDL)[89]. WfFP provided facilities and training for women to improve skills to be able to pass practical skills and competency test. The ECDL consists of seven separate modules that covered computer theory and practice. To achieve an ECDL / ICDL certification, women had to successfully pass a test in all seven basic modules: Concepts of Information Technology; Using the Computer & Managing files; Word Processing; Spreadsheets; Database; Presentation; Information & Communication. Overall main for providing such facilities was to motivate women to seek employment and also avail childcare facilities as the issue of language was a major concern. Findings highlighted that most of the women actually used the services provided by WfFP. As a result, most women found this service useful. In fact ECDL classes came out top with 19 clients rating it as most useful (The other services included: Ongoing Informal Support-12; Guidance-11; and Dundee College taster courses -12). Consequently, women felt more motivated to attend training and apply for employment. Subsequently, there was a tremendous increase in women's knowledge and skills. Specifically, IT skills (27); Communication skills (17); Knowledge of English (10); Employability skills including work experience through volunteering (13); Qualifications, for some a first qualification (12). Figure 1 demonstrates the overall growth in skills among women interviewed and Chart 1 highlights usefulness of ECDL classes.

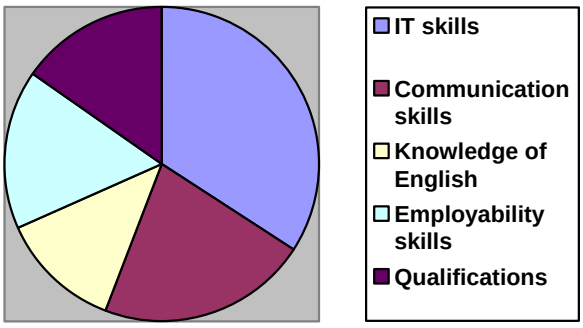

Figure 2: Growth in Skills

[89] See http://www.ecdl.com/publisher/index.jsp

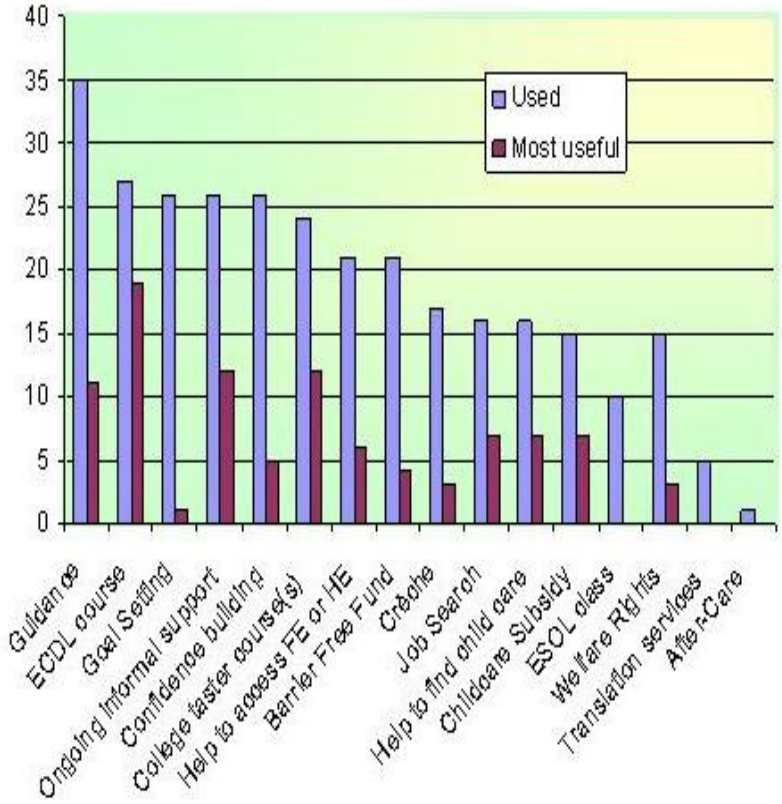

Chart 1: ECLD Classes

4.1.3 Awareness about Provisions

In spite of free facilities provided to women from ethnic minority by WfFP, findings of phase I revealed that most of the women did not avail them. Hence it was crucial to reach out to the community and enhances awareness about the different provisions including free childcare facilities. As a result, Link worker reached out to the various communities and provided necessary information and brochures to family members. The Link worker also ensured family members about safety of centres where training and focus groups were conducted. This was important since most of the women were from conservative families. In addition, women were encouraged to avail childcare facilities since these facilities were now modified and took into account various concern (such as diet) expressed earlier by women during Phase I of this research.

Findings in Phase II highlighted that majority of modifications in training and services by WfFP were welcomed by ethnic women. This in turn had an impact on their motivation to avail facilities such as childcare to attend training or/and education for employment (see Figure 3 below).

Reported changes in clients	**Growth in confidence**	**Growth in knowledge and skills**	**Involved in community activities**	**Using new services**
% of Sample	95%	89%	62%	49%

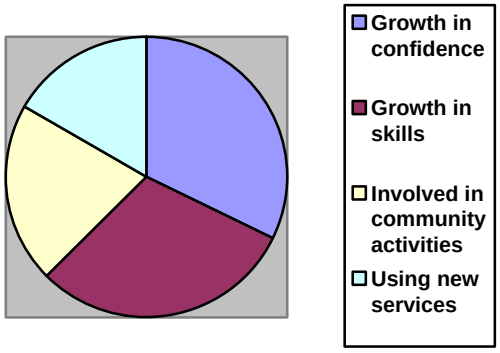

Figure 3: Findings in Phase II

4.1.4 Remaining Barriers

It is clear from the findings in Phase II that women were more open to avail facilities provided by WfFP. At the same time, WfFP recognise that there is a great deal of more work required to enhance women's motivation concerned with language and skills. It was found that although women were motivated to attend workshops at first, later were reluctant to avail facilities. As a result some women did not attend the workshops and focus groups. Indeed, motivating women on various issues requires careful planning and patience. An interesting observation was made during Phase II, most women from ethnic minority did not understand that the school systems and therefore found it difficult to help with children's homework or school activity. This is nothing new, in this context, Scottish Executive points out: "The family is a major influence on the career choice of ethnic minority women and is often regarded as the only source of careers advice. At the same time, it is recognised in Scotland that parents' aspirations for their children are limited by unfamiliarity with the education system"[90]. Similarly, it also pointed out, "between 40 and 50% of Pakistani and Bangladeshi women describe themselves as never having worked, compared with fewer than 10% of white women. Further work is needed to understand if this means that these women have never been in formal employment or have never been engaged in any type of work, including atypical work such as home working" [91]

Taking into account discussion so far, Link Workers of WfFP plan to enhance awareness by including information about school systems in workshops and focus groups. Hence, women can be more confident and motivated to participate in their child's school activities. Perhaps this will encourage women from ethnic minority to avail more resources provided by WfFP.

5. Contribution of this Paper

This research is significant in many ways. Firstly, the findings of this study will also help the Scottish Executive to further continue developing good practice and criteria for allocating resources to improve employability among ethnic minority, particular among women. Secondly, studies indicates that projects vary between different local authority areas and therefore they need to be modified and designed to fill gaps in existing service provision in each area (see Napier University Report[92]). Thirdly, studies on minority ethnic people in Scottish context are very limited and fragmented[93]. The existing studies available clearly highlight the complexities involved in analyzing minority ethnic experience. They also indicate that 'easy' and narrow cultural assumptions are frequently made about the employment position of minority ethnic women and references to their social and family roles mask other factors, such as workplace discrimination. This is also clear from our findings of phase I. Fourthly, the minority ethnic population in Scotland increased by 62% between 1991 and 2001[94] (Scottish Executive, 2004). Yet, in Scotland, minority ethnic women are underrepresented in the labour market with only 45% of minority ethnic women in employment compared to 59% of white

90 See http://www.scotland.gov.uk/Topics/People/Equality/18500/MinorityEthnicWomen
91 Source: http://www.scotland.gov.uk/Topics/People/Equality/18500/MinorityEthnicWomen
92 Source: http://www.scotland.gov.uk/Publications/2009/04/20092521/2
93 See Scottish Executive, 2001, http://www.scotland.gov.uk/Publications
94 See Scottish Executive, 2004, http://www.scotland.gov.uk/Publications

women. Therefore, the 'employment rate gap' between white women and minority ethnic women is 19% (also see Office for National Statistics[95]). Although, it is not easy to gauge the real picture of the opportunity gap by gender and ethnic group, it is clear that projects such as WfFP, are needed to train and enhance skills of these women who have never been in formal employment or have never been engaged in any type of work. This paper contributes in providing a rich insight to the importance of ethnic women-focused support that is tailored to their needs which will lead to effectiveness in dealing with their circumstances. To conclude, this research is significant to explore patterns over time and analyze causes and consequently work towards improving employability skills opportunities for women within ethnic minority group.

6. Conclusion and Future Directions

It is clear from findings of Phase II that modifications in services and training did bring a positive outcome in WfFP achieving its overall goals within women in ethnic minority group. Although, as mentioned above, this research in an on-going, hence researchers hope to revisit the WfFP and examine how women feel their lives have changed after employment. At the same time, researchers aim to address some of barriers mentioned above.

95 See http://www.scotland.gov.uk/Topics/People/Equality/18500/MinorityEthnicWomen

–ETHICULTURAL" SENSITIVITY IN E-LEARNING: DISCUSSING LUSÍADA UNIVERSITIES EMPIRICAL FINDINGS

Nuno Sotero Alves da Silva, Simon Rogerson and Bernd Carsten Stahl

Abstract

The intention of this contribution is to highlight the impact of ethical and cultural issues in e-Universities technological implementation for dissimilar cultures, through empirical data analysis, which resumes an ongoing PhD research between traditional universities in Portugal and Angola. For that, this contribution is divided into four major sections: research background (aims, objectives and framework); methodology (research design, data collection and data analysis); empirical findings (through case study and action research); synthesis; and discussion (overall differences/similarities and framework response).

Nevertheless, the authors inform that the empirical results clearly demonstrate that ethical and cultural issues deeply influence e-University implementation.

1. Introduction

To debate XXI century high education is essential to investigate connectivity and interactivity as key features of the learning society (Webster, 2006). For that reason, it is logical that governments or educational institutions, do not plan to mislay this prospect bounded to information society (Lallana, 2004), since e-learning is globally accepted as a prerequisite for future social and economic development, providing a new essential style, as a base level for accessible education (Richards, 2004). This argument is acceptable because e-learning can be defined as the acquisition and use of knowledge distributed and facilitated primarily by electronic means, which incorporates synchronous or asynchronous access and may be distributed geographically with varied limits of time (Hall and Snider, 2000).

Moreover, the internationalization of campus and community is simultaneously a chance and a challenge that higher education institutions ought to deal today. Although, chronological data as regards to knowledge transfer in higher education institutions exhibits a wide array of unequal results, when it concerns cultural restrictions (Altbach, 2004). This claim is consistent with the concept of glocal knowledge (Silva *et al.* in press).

Thus, this paper aims to debate the impact of ethical and cultural dimensions during e-Universities implementation in dissimilar cultures, through an interpretative analysis of empirical data (interviews, field notes, documents, focus groups and participant observation) (Walsham, 2006), which acknowledges an ongoing PhD research. For that, under scrutiny will be a qualitative approach based on action-case research (due to researcher organizational role), in order to configure best practices, policy development and solving practical problems.

2. Research background

Aims

The enabling research question, –what is the impact of culture and ethics on the implementation of e-Universities?", proposes to symbolise an holistic outlook concerning the impact of ethics and culture during an e-University project implementation. Regardless this argument, the multidimensional nature and complexity of this phenomenon imposes to exploit numerous research sub-questions which were addressed during ETHICOMP 2008 (for further details see Silva *et al*, 2008).

Objectives

It is expectable that the research project achieves the following processes:

- investigate ethical and cultural issues as regards to e-learning technology in an educational (university) context, as well as to perceive the potential impacts of these issues during implementation;
- from the previous analysis understand the differences between traditional, blended and virtual universities;
- compare case studies that will be addressed through an empirical inquiry in Portugal and in Angola;
- interviewing process based on a case study protocol agreed between stakeholders, in order to promote problem solving;
- collect information that will be synthesised in order to identify the ethical and cultural impacts that allow success or failure concerning e-Universities projects.

Conceptual framework

During ETHICOMP 2008 the authors have presented the conceptual framework as an evolution of main st s required to rememl

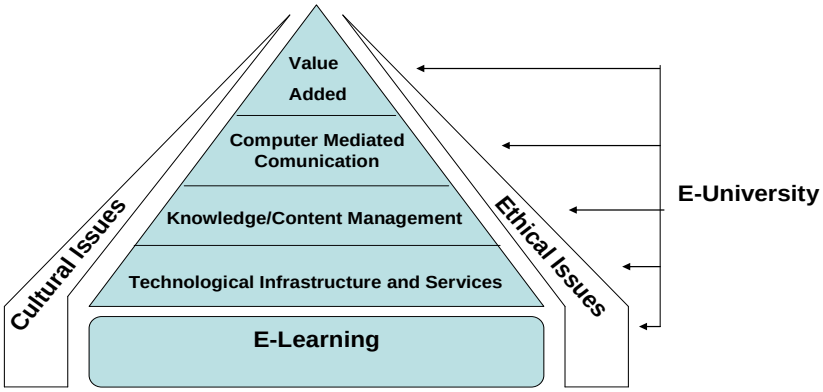

Figure 7. e-University strategic implementation conceptual framework

As depicted in figure 1, the conceptual framework is characterised by four layers that engage an interactive real time feedback process to allow a feasible comparison. Finally, at this point is important to sum up the key aims of each layer:

- Value Added- a transversal cost/benefit ethical analysis, which aims to provide information regarding the e-University project, and each layer individually;
- Computer Mediated Communication- technologies that make learning more interactive, diverse and an enjoyable experience. This layer is prosperous in social interactions;
- Knowledge/Content Management- emphasises content and knowledge production, management and distribution through multiple technological platforms;
- Technological Infrastructures and Services- encompass all technological means that support the distributed knowledge systems, as well as administrative services.

3. Methodology

Research design

The research design hypothesis for this PhD project encompasses a qualitative, interpretative, action research, and case studies scenario. Qualitative study uses an open, flexible, and inductive orientation but also requires careful and systematic coding and reliability checking (Ross and Morrison, 2001). Beyond that, qualitative approach was chosen because it permits obtaining in-depth, —ich" data directly from participants (Karpova *et al.*, 2009). Moreover, the role of the researcher in qualitative research is active participant, because he is involved into the process and does not —tsand back" from it. In fact, any individual bias is reorganised forthright leading to a non-attempt for obtain a completely

objective perception (Creswell, 2004). Interpretive researchers start out with the assumption that access to reality is only through social constructions such as language, consciousness and shared meanings, as a consequence of the iterative process between field data and theoretical model evolved in a longitudinal time frame (Walsham, 2006).

Action research has been widely perceived as a legitimate research technique in information systems and other research fields (Heinze and Procter, 2004), which is corroborated by the key organizational position of the researcher (IT Manager and lecturer). As a result, the author intends not merely to observe and understand, as well as to proclaim an intervention in order to promote organizational change, which is consistent with action case research (Vidgen and Braa, 1997). Likewise, to compare Lusíada University organizational contexts in Portugal and Angola requires a case study approach to validate possible findings (Yin, 2002), being also consistent with the researcher ambition to explore his organizational role for collecting data in accordance to Miles and Huberman (1994) techniques: participant observation, in-depth interviewing, narrative reports, among others in several cycles.

Even so, at this point it is crucial to integrate the research design along with the research project to permit a plausible and effective justification, which figure 2 demonstrates. Therefore, in its inner core are acknowledged the educational institutions (case studies) that share Lusíada University institutional designation; however, presenting different geographical locations, Portugal (Europe) and Angola (Africa). At last, this contextual environment is also bounded through an ICT joint implementation, in which the researcher is involved as IT manager and lecturer in Lisbon has previously referred, and tried to engage other informants in order to evolve the action research methodology.

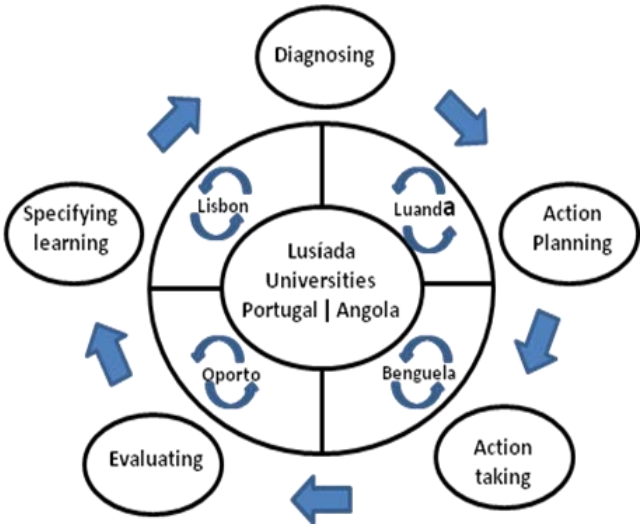

Figure 8. Research design for action-case method

In conclusion, a triangulated investigation plan will certainly improve the possibility of practical improvements (Baskerville, 2001), given that multiple methods consent an additional picture with reference to the events than a single method (Sawyer, 2001), enabling multiple levels of analysis.

Data collection

Throughout data collection are under scrutiny the following methods: participant observation, in-depth interviews, documents, focus group, field notes, collaborations and social network contacts. Despite this argument, in order to the Reader ought to comprehend this process it is necessary a higher level of detail concerning the analytical procedures, which is reflected upon this sub-section. As regards to the participant observation Walsham (2006) argues that to observe and interpret the behaviours of informants is a fundamental basis to carry out fieldwork, and for that, the researcher executed a considerable amount of classroom and working meetings, lecturing, as well as professional practices internally and externally throughout visiting cycles. These visiting cycles were distributed in the following manner:

- Portugal (Lisbon)- on a daily basis, because it is where the researcher is located within the organizational context as an IT Manager and lecturer;

- Portugal (Oporto)- three to five visits per year;
- Angola (Luanda and Benguela)- in 2005 and 2009 during two weeks in each visit.

Regarding collected documents Myers (2009) claims that consist in field notes, interview recordings and transcriptions, and formal and informal organizational documents. Therefore, and following Cohen *et al.* (2007) the researcher had conducted 34 semi-structured interviews across the four different locations to students, lecturers, staff and other stakeholders. Yet, these interviews happened into the following languages: native language in Portugal (Portuguese), and in Angola the official language (also Portuguese) despite the existing native dialects. Furthermore, the reasons for choosing these groups were convenience and snowball sampling, however it is required an additional justification:

- students and lecturers- effective users of the IT environment, as well as, some of them have frequent contacts with the researcher;
- staff- from this generic group were chosen IT staff due to its daily relationship with ICT, and managers due to the strategic importance of e-learning.

Finally, these interviews were digital recorded, ranging from 20 to 60 minutes, and backup copies were performed. After these processes were transcribed and carefully reviewed. Moving forward, Descombe (2007) refers that background and historical data can be performed to the involved stakeholders. Therefore, the researcher had obtained diverse documents (newspaper articles, governmental meetings summaries, internal strategic planning reports, requests for proposals, photos-photos, print-screens, etc.), and extracted some field notes for example during its participation within three governmental initiatives pertaining to e-learning. Finally, the researcher had utilised the social network to gather data namely through instant messaging, text messaging and computer mediated communication which Zhang and Fjermestad (2008) have also reported.

Data analysis

Data analysis in qualitative research typically begins with a general review concerning the whole amount of data collected. A hypothesis for this process is to follow Creswell (2004): taking first notes on the margins, interview transcriptions, or notes about videotapes or observations. Still following Creswell (2004), several models and techniques for analyze and interpret data exist:

1. text analysis or transcription- process of converting audio recordings and field notes into textual data;
2. coding process- the aim is to make sense out of textual data and to develop themes;
3. conveying personal reflections- personal interpretations of the researcher are used to interpret data from findings, as well as to develop and interpret themes;
4. compare with literature- literature is crucial in the early stages of data collection, however in this stage its aim is to highlight the empirical findings.

Therefore, to avoid loss of meaning (transcription) the researcher has decided not to translate the interviews to English, as well as during textual analysis the researcher had underlined the most important elements (analysis). Regarding coding process, the researcher has codified the data collect by taxonomies and themes, divided them according to the research objectives, and finally data reduction in order to reduce irrelevant data and to understand core meanings. Nonetheless, to analyze data the researcher has utilised hermeneutics (Klein and Myers, 1999), leading to a continuous back and forth movement between text and context in order to understand meanings. As Gadamer (2004) explains, this circular relationship intends to anticipate meaning in which the whole is envisaged, becoming explicit through the understanding of those parts that are determined by the whole, and they also determine this whole.

As a final remark, it is important to refer that the researcher as relied on two main forms of analysis for each case study (Miles and Huberman, 1994): within-case analysis (compare data against the used theory), and cross-case analysis (compare data with other cases).

4. Empirical evidence

Overview

This sub-section aims to resume the total amount of collected empirical evidences for each data collection method:

- participant observation- 300 field notes (diary, jottings, log, schedules, among others), including researcher interventions and participation within 3 governmental initiatives;
- in-depth interviews- 34 semi-structured, between planned and opportunistic which were recorded, backups performed and transcriptions made;
- documents- it resumes 200 internal and external, formal and informal raw data (letters, e-mails, photographs, print screens, newspapers, websites, reports, among others);
- focus group- two classes of IT students, being the researcher their lecturer;
- social network- 500 informal social contacts (instant messages, text messaging, multimedia, videoconference, among others).

Case studies

The first evidence that determined institutional choice for case study protocol was the existence of organizational strategic planning concerning ICT projects implementation, namely e-learning. This assumption was observed in Lusíada Universities, because in Portugal it was involved in a governmental plan to implement e-universities, as demonstrated by public information available in e-U website (www.e-u.pt); and in Angola, during an informal meeting with top management it was clearly referred that "*A Universidade Lusíada de Angola tem todo o interesse em acompanhar o que a Universidade Lusíada está a fazer em Portugal*" (Lusíada University of Angola has interest to follow the leading projects of Lusíada University in Portugal).

Therefore, the following step was to gather information that would characterise both institutions, which for: Lusíada University in Portugal was found into the institutional website, namely section background; and, to Lusíada University of Angola it was necessary to appeal to informants due to the absence of public information. From gathered data it was possible to conclude: "Lusíada University of Portugal was founded in 1986, and adopted a configuration of a non-profit corporation which became a foundation in 2003", as well as is geographically extended through Lisbon (centre of the country) and Oporto (in the north); and, Lusíada University of Angola was founded in 2001, encompassing a profitable organization which was perceived during an informal dialogue with a manager from Lusíada University of Portugal: "*em 2001, fomos a Angola ajudar na criação de uma nova Universidade (...), a Lusíada de Angola, mas a gestão deles é empresarial*" (in 2001, we went to Angola to help create a new University (...), the Lusíada of Angola, however their management is profitable). Thus, the choice of these two inter-continental higher education organizations was fully justified. Although, it is required to demonstrate the underlying

operations concerning the case studies:

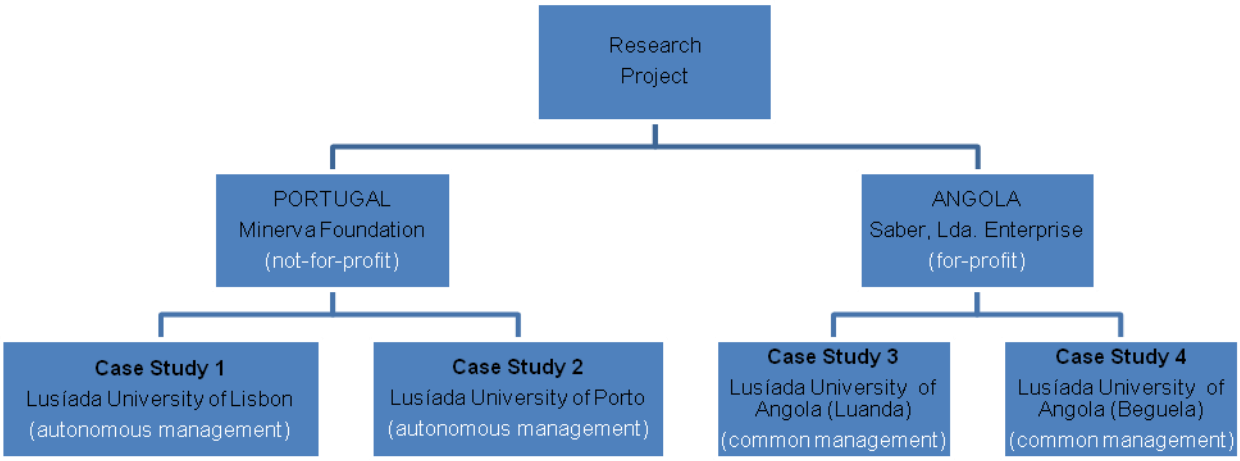

Figure 9. Case studies organizational structure

As well as, to highlight some open-coded examples as regards to collected data for each case study:

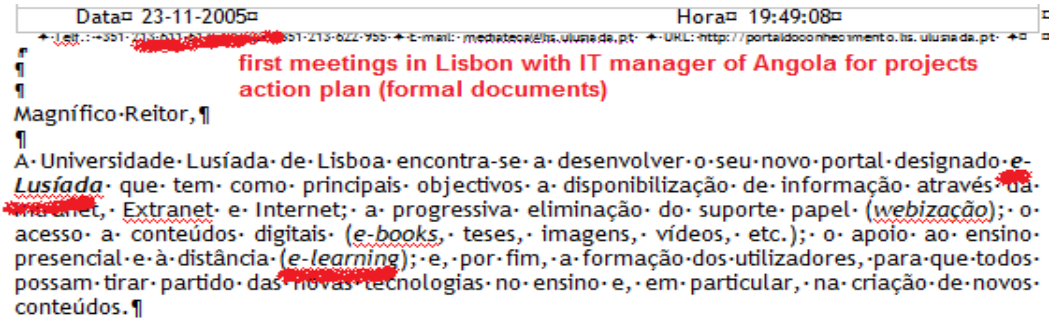

Figure 10. Formal document concerning ICT implementation at Lusíada Universities (e-learning) (technology)

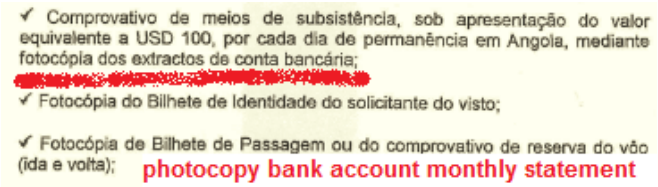

Figure 11. Angola credentials for visits (ethical issue)

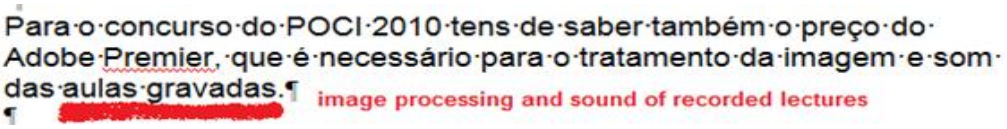

Figure 12. E-mail about contents creation within Lisbon case study (ethical issue)

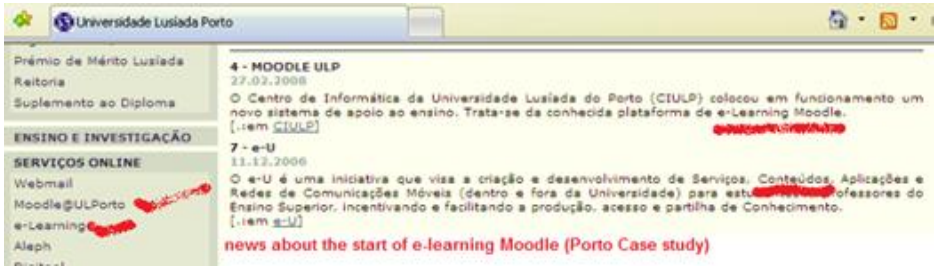

Figure 13. Oporto case study website referring e-learning Project information (technology)

Desde já agradeço o interesse e confiança demonstrada nas nossas competências, e o desafio para apresentarmos uma proposta de apoio à implementação do eLearning na Universidade Lusíada.

Relativamente aos contactos que me deixou do seu colega em Angola, já tentei entrar em contacto, mas no primeiro número ninguém atende, e no segundo vai parar a outra entidade. Será que me pode facultar um número geral e/ou um e-mail?

Obrigado pela atenção. Difficulties making contact to meet in Angola

Figure 14. Communication problem concerning an e-learning proposal by a common supplier (cultural issue)

sido efectuados testes quase que diariamente ao sistema de Videoconferência entre as duas universidades e estes têm se revelado bastante positivos com um grau de desempenho da Videoconferência no sentido bidireccional Luanda/Lisboa, considerado por ambos os departamentos como muito bom.¶

Figure 15. Formal document of videoconferencing tests between Angola and Portugal (technology)

Figure 16. Research jottings (Angola assurance, Lisbon Moodle Access, ethical practices)(ethical issues)

30-09-2008	18:33	LuisAng	Luanda again!
07-10-2008	21:29	LuisAng	Nuno ainda tas na univ?
19-10-2008	15:13	LuisAng	Ola Nuno Podes ir pro Skype?
19-10-2008	16:12	LuisAng	Tou d volta do gerador A luz falhou Da-me 3/4mins

Figure 17. Text messages with key informant in Angola (energy constraints) (infrastructure issue)

iis diz:¶
aki?!?!? lolol Nuno, aki é hábito quase q escrever um doc sempre q se espirra... é muito doc por tudo e por nada!!!!!!!!!!!!!!!!!!¶
sas@lis.ulusiada.pt diz:¶
o que é informal não funciona, é isso?¶

Figure 18. MSN messages with key informant in Angola (extreme need for formality)(cultural issue)

CIUL Nuno Silva	SEMINÁRIOS DEDIVULGAÇÃO E FORMAÇÃO DOE-LEARNING (MOODLE) NA UNIVERSID...	ter 03-06-2008 19:50
João Cabral	Conteudo de E-learning	ter 03-06-2008 11:47
CIUL Nuno Silva	URGENTE: Seminários e-Learning - Univ. Lusíada, convocatória	seg 02-06-2008 19:51
13000830@lis.ulusiada.pt	Fwd: Moodle Chat e Forum	ter 27-05-2008 17:21
CIUL Nuno Silva	FW: Plano de acção para o Moodle e-Learning	sex 09-05-2008 18:39

Figure 19. E-mails about Moodle (e-learning action plan and training sessions) (technology)

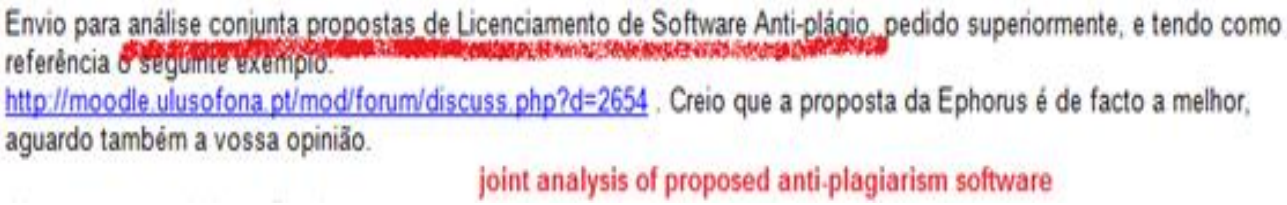

Figure 20. E-mail about anti-plagiarism software proposal (ethical issue)

Line	Content extracts	Issue	Notes
2	(...) distant lessons	e-learning	restrict definition
4	(..) content (...) daily update	e-learning	content relevancy
8	(...) yes (Internet at home)	e-learning	high digital literacy
14	(...) chat rooms	e-learning	CMC

Figure 21. Coding an interview transcription (focus group in Lisbon) (technological, ethical and cultural issues)

Action research

Throughout research evolution and progress, it is feasible to claim that the dominant component regarding the researcher role moved from a participant observer to a more action-oriented situation, as a result of its organizational role (namely as an IT Manager). This scenario is justified through a continuous balancing between technical support to users, and problem immediate resolution. Hence, action case approach was performed to allow intimacy, and personal interactions between the researcher, individuals and the community (Hammersley and Atkinson 2003), as well as to emphasise researcher thinking skills as a *moral agent* (Walsham, 2006) or, a *reflective practitioner* (Schön, 1983).

Nonetheless, the action research project was divided in embedded intervened cycles with two main changing scales: a smaller that corresponded to a semester, in which the researcher acted as a lecturer; and a greater, that encompassed the overall organizations, in which his posture was as IT Manager. The focus and content of these interventions are listed on tables 1 and 2.

Cycle	Problem	Involved	Plan
Sep.-Dec. 2005	ICT implementation	Managers, IT managers, staff and students	Report existing ICT based infrastructure
Jan.-Dec. 2006	ICT implementation	Managers, IT managers (Angola)	Develop and document new implementation procedures
Jan.-Dec. 2007	CMC	Managers, IT managers,	Videoconferencing
Jan.-Dec. 2007	Moodle	IT managers	Solve technical problems
Feb.-Jul. 2008	Moodle use in ICT classroom	Researcher as lecturer, 4 students (individual, 40% of the class) (Lisbon)	Access and contents
Jun.-Sep. 2008	Moodle use	Teachers and students (Lisbon and Oporto)	Training, usability and ethical sensitivity
Feb.-Jul. 2009	Moodle use in ICT classroom	Researcher as lecturer, 4 students (individual, 25% of the class) (Lisbon)	Access and contents
Feb.-Jul. 2009	ICT and Moodle implementation	Managers, IT managers, staff and students (Angola)	Report and develop existing ICT and Moodle use

Table 10. Action research project overview

Cycle	Data collection	Reflection
Sep.-Dec. 2005	In-depth observations, dialogues, and documents	Low level of ICT infrastructure implementation: Wireless Access Points offer (removed from Lisbon)
Jan.-Dec. 2006	Documents, notes	Cultural constrains on equipments deployment; different interests about project schedule and value
Jan.-Dec. 2007	Documents, notes and digital records	Angola installation was anticipated in order to avoid cultural constrains; Portuguese managers regular use
Jan.-Dec. 2007	Notes	Different assumptions on Oporto; lack of technical skills in Lisbon; indifference in Angola
Feb.-Jul. 2008	Digitally recorded interviews (two phases)	Technical problems imply difficulty on access; few contents (only Word and PowerPoint)
Jun.-Sep. 2008	Digitally recorded sessions	Low participation of teachers, null participation of students, evidence of intellectual property issues, cost versus awareness
Feb.-Jul. 2009	Digitally recorded interviews (two phases)	Difficulty on access due to technical problems; enough contents (only word and PowerPoint)
Feb.-Jul. 2009	Field work, open sessions, digitally recorded interviews	Successive delays; Moodle not used; current videoconferencing sessions; high individual use of ICT by students; evidence of privacy and plagiarism

Table 11. Action research project results

5. Synthesis

Throughout data analysis it is possible to recognise some ethical issues and social dilemmas. For instance, is compulsory to compare both countries with reference to ICT infrastructure liability and adoption. For that, the authors point out the World Bank (2009) report concerning *Information and Communications for Development*:

- Portugal- with reference to Internet subscribers (per 100 people) in 2007 is referred 15.2, and infrastructure liability (international Internet bandwidth (bits/second/person)) encompassed 4.790;
- Angola- as regards to Internet subscribers (per 100 people) in 2007 the integer was 0.3, and infrastructure liability (international Internet bandwidth (bits/second/person)) coverage was 17.

This veracity is effortlessly observed through field work as the subsequent examples reveal: Internet connection through satellite is extremely difficult to obtain in Angola campus, and even its liability is questionable. Although, if under scrutiny is common curricula and courses in each university various important findings seem to arise. The intentional outcome of Bologna Process in Europe, which is not being adopted in Africa, exhibits a remarkable social dilemma: current curriculums and programmes require a resynchronization in order to permit knowledge sharing and distribution. In spite of this resynchronization, it is clear that current Bologna curriculums and programmes do not address local labour market needs.

Apart from these social dilemmas, it is vital to acknowledge an ethical issue that is a consequence of misusing incorrect information, despite an inherent consent (African culture). This matter is facilitated by the inexistence of an authorised website for Lusíada University of Angola, as well as the creation of several non-authorised websites. So, when an African learner access to these web pages does not acquire trustworthy institutional information; as a consequence, seeks Portuguese Lusíada University website and download the current curricula and programmes, which are applied in his *curriculum vitae*.

As regards to the educational procedures, several significant social dilemmas can be referred: inequality regarding regulatory procedures; and, inequality concerning knowledge sharing. Inequality about regulatory procedures resumes Portuguese content development, which is in accordance to Bologna Process. However, in Angola regulatory procedures are reduced, and constantly neglected: absence of a syllabus, or even class summaries are illustrating examples.

Additionally, it is reasonable to attend knowledge sharing and its underlying issues: linguistic understanding; learner‘s cognitive skills; and, content cultural sensitivity. Regarding linguistic understanding abundant inconvenient have been reported, since lecturers are mostly non-African natives. The most frequent nationalities are: Portuguese, Brazilians, Cubans, Russians, and even Eastern Europeans. Some cases of linguistic understanding are: to utilise *pandilha* (Brazilian) as a substitute for *folha de cálculo* (Portuguese) regarding Excel sheets; Cubans do not articulate

accurately Portuguese words derived from Arabic idiom, such as *algarismo* versus *algoritmo*. These findings are increased due to 42 unlike native dialects that exist in Angola, in spite of Portuguese be the official language; nevertheless, learner's communication is based on their own dialects. Furthermore, Portuguese content development is simply in Portuguese and following Bologna Process leading to the absence of cultural sensitivity (ignoring local needs). Apart from these statements, lecturers have to deal with another ethical issue: the use of global references (even digital), or instead a combination of global and local didactical references?

6. Discussion

Overall differences/similarities

Data analysis leads to the following line of reasoning: simply layer 1 issues have possible answers, which justifies the underlying principles of research design and field procedures. Moreover, despite e-learning emerged in 2005 strategic planning for both organizations, the truth is that practical implementation is still under development and encompasses remarkable differences. This assumption is consistent with the suggestion that it is required a bottom-up rather than a top-down analysis. Going deeper into the analysis, the authors conclude that the pilot studies provide a basis for addressing systems implementation in Angola, as well as it is an imperative to carefully evaluate these implementations in order to avoid additional risks. This argument is defensible due to the overall argument, as well as results significant reliability and rigor after an extensive self-examination. As a final remark, the authors present a two dimension analysis regarding each case study characteristics versus framework layers: first dimension, corresponds to a sub-set of the research question (culture, ethics and e-learning) represented in framework layers; second dimension, data collection evaluation as regards to multiple cases, considering longitudinal remarks to facilitate comparison (observe figure 16).

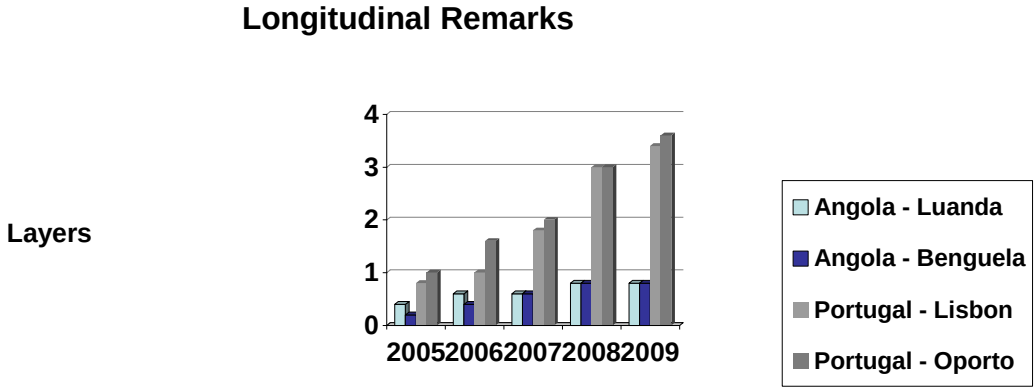

Figure 22. Case study evaluation versus framework layers: a multiple analysis

"Ethicultural" sensitivity: a framework response!

The concept ethicultural resumes a combination of the words "ethical" and "cultural", and simultaneously exhibits e-learning ethical and cultural dimensions, which the conceptual framework aims to report; nevertheless, it is necessary to shed some light concerning ethical and cultural sensitivity. Ethical sensitivity is "awareness that something might do or is doing, which can affect the welfare of someone else (or may affect others' welfare indirectly by violating a general practice or commonly held social standard)" (Bebeau, Rest and Yamoor, 1985: 226). Cultural sensitivity comprehends that diverse cultures have different contexts and perceptions on what is proper and respected (Green, Betancourt and Carrillo, 2002), which is consistent with cultural relativism: a different culture does not agree with a particular ethical standard, so that standard should not be applied in that culture. Therefore, ethicultural assumes diversity as an essential ingredient in 21st higher educational contexts, which highlights the trade-off between homogeneity and heterogeneity in education.

7. Conclusion

Given the nature of this contribution, ongoing research project, the authors argue that is reasonable to highlight some important findings. For that, the argument approaches different analytical dimensions: research design structure, data collection methods, data analysis; discussion; and authors' perception. Research design structure appears to retort optimistically, specifically data collection and analysis methods, as well as the framework. Moreover, the empirical outcomes reveal a considerable amount of ethical issues and cultural dilemmas that substantiate the aims and objectives of the research project. In conclusion, to acknowledge different organizational cultures is to point out unlike perceptions concerning IT, in which technological appropriation is an evident hypothesis, given that technologies were initially developed for a Portuguese learning environment. Moreover, in spite Lusíada Universities (Portugal and Angola) strategic interest in e-learning, continuous reassessments introduce also incessant dilemmas ethical issues and cultural dilemmas.

Acknowledgements

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TECHNOLOGY AND THE CONTROL SOCIETY: A RESEARCH PROGRAMME INTO THE AMBIGUITY OF TECHNOLOGY

Bernd Carsten Stahl

1. Introduction

While it is hard to deny that technology has affected our individual and collective lives, it is more difficult to find agreement on the description and evaluation of these changes. One reason for this is the deep ambiguity of technology. Technologies can be used for a range of often contradictory purposes based on varying intentions and with often unpredictable results. Technological development has improved our lives in many ways, for example by lessening the requirement for physical labour, extending our life-expectancy but also in many more subtle ways, for example by providing improved communication channels or leisure activities. At the same time technology facilitates new ways in which humans can be exploited or marginalised. At the extreme, technology may threaten our very existence (e.g. through nuclear war) or essence (e.g. bio-engineering).

There is a multitude of research approaches that try to capture the changes. Many of these, predominant in computer and information ethics, concentrate on individuals, either the individual technology user or the professional involved in them. Simultaneously much research is undertaken to evaluate individual types or instantiations of technology. A further strand of research investigates how ethics and values can be incorporated into technical artefacts and the processes that lead to their development and design.

The present paper takes a different approach and suggests that a different understanding of the relationship of society and technology may be helpful in conceptualising the social and ethical consequences of technology. The term —ontrol society" is proposed to represent this new conceptualisation of technology and society and which incorporates the manifold ambiguities of this relationship. Central to the control society is the ever-increasing amount of control that is required to organise and manage modern and functionally differentiated societies. Control can have a range of meanings, which find their reflection in the use of technology. Control can mean power, command and domination but also regulation or restraint, as well as the avoidance of something undesired.

The present paper explores the notion of control and develops an understanding of the meaning of "control society". It discusses the different meanings and roles that control has in society and outlines how technology in general and ICT in particular are implicated in such a control society. It briefly discusses the relationship of the concept of control society in relation to alternative conceptualisations of society, such as risk society, information society, and surveillance society. The core difference of the control society is its direct reliance on technology and the intrinsic (moral) ambiguity of this technology.

In order to develop the concept of the control society, the paper commences with a discussion of the concepts of technology and control. This leads to an outline of different ways of understanding the control society. This outline will cover some of the theoretical approaches that can be employed to understand the control society and some of the theoretical alternatives of the concept. The following sections discuss different roles that technology can play with regards to control.

2. Technology and Control

Both of the core concepts of this paper are complex in their own right. The idea is therefore to give an indication of their meaning in this paper rather than provide a comprehensive discussion.

Technology

Technology, etymologically the study of a craft, has to do with the way human beings use their environment to achieve their aims. There is a considerable amount of literature that deals with the philosophical foundations of technology in general (Dusek, 2006; Olsen, Pedersen, & Hendricks, 2009; Tabachnick & Koivukoski, 2004). Very briefly, one can say that technology is typically (but not

necessarily) linked to physical tools and artefacts. It relates to a systematic understanding of the world. Modern technology is closely linked to science and research but technology predates science and is also a necessary condition of modern science. Technology has been described part of what it means to be human. Human beings lack genetic specialisation to particular environments and require technology to survive (Gehlen, 1997).

Of particular interest in this paper are those technologies that relate to information and communication, the information and communication technologies (ICTs). These again raise conceptual questions such as the meaning of information. A pragmatic definition could posit that computing-related as well as information exchange-related technologies fall under this category. This sort of pragmatic definition is not particularly palatable to philosophers who like conceptual clarity. It is also problematic because of current technical developments, in particular the alleged convergence of different technologies such as nanotechnology, biotechnology and cognitive technologies with ICTs. Despite this uncertainty surrounding the exact extent of the concept of technology used here, it will suffice for the paper, which aims to show general trends rather than pinpoint particular aspects.

Technology has a systemic character. While early forms of technology such as stones or bones used by our prehistoric ancestors may not have required particular forms of social organisation, the same cannot be said of modern technologies. These are intimately linked to the social context in which they are developed and used. This refers to the social and technical infrastructure (e.g. a car is worthless without a petrol station, a computer cannot serve its intended purposes in an environment where there is no electrical power). The social character of technology goes beyond this infrastructural environment. Technology needs to conform to expectations of users if it is to be used and it needs to incorporate social expectations. At the same time, technology also shapes social experiences and thereby expectations. Technology can therefore be described as social in nature, which underlines the importance of a perspective that allows seeing modern technology in terms of modern society.

Control

The concept of control was chosen for this paper because it is ambiguous in its own right and therefore captures the ambiguity of technology. A look at the definitions of control in the Oxford English Dictionary (www.oed.com) shows the richness of the term. First, it is important that the English term "control" is a noun as well as a verb. The most important meanings of the term as a verb for the purpose of this paper include "to check or verify, and hence to regulate", "to check by comparison, and test the accuracy of," "to take to task, call to account, rebuke, reprove (a person)", "to challenge, find fault with, censure, reprehend, object to (a thing)," "to exercise restraint or direction upon the free action of; to hold sway over, exercise power or authority over; to dominate, command," "to hold in check, curb, restrain from action; to hinder, prevent," "to hold in check or repress one's passions or emotions; so to control one's feelings, tears, etc.", "to overpower, overmaster." This is a somewhat richer view than the equation of control with power as ability to do an agent one's bidding. It reflects relevant literature in ethics and technology, e.g. Brey (2008) when he distinguishes between behavioural and situational control power as the ability to influence an agent's behaviour or the situation she finds herself in.

A quick look at this non-exclusive list shows that the term "control" refers to a range of activities that are related but far from identical. Let's use the example of a very simple statement: "A controls B". According to the above definitions this can mean that A checks B, tests B's accuracy, regulates B, reproves B, restraints B, exercises power over B, dominates B, or even overpowers B. There seems to be a continuum of relationships that is hidden in the term.

A further important aspect of the term is its ethical standing. The ethical evaluation of an instance of control is clearly context dependent. Whether A's control of B is perceived to be a good thing depends on both A and B as well as the basis of their relationship. If A is a police officer and B is a violent offender, then A's control over B is likely to be an uncontroversial moral good. If A and B swap places and A is the criminal (or dictator or paedophile) and B is the police officer (or citizen or child), then the control relationship is morally problematic. This leads to the question of ethical evaluation of control. From a utilitarian point of view, the above example indicates that the evaluation would be context-dependent. However, from a deontological perspective, such a statement is more difficult to uphold. At least certain types of control might arguably conform with the Categorical Imperative. The virtue ethicist might see control as a virtue, at least self control but also control mechanisms within

society that uphold social structure. The position of ethics of care might come to the conclusion that care requires control and therefore control is a moral good.

The point of the last paragraph is to show that control is morally and ethically ambiguous. Its connotations are neither always good nor always bad. Control has a link to established moral goods such as privacy or security but it can also easily be linked to problems such as surveillance or oppression. This ambiguity, in conjunction with the interpretive flexibility of technology is a core characteristic of the control society which will be described in the next section.

3. Control Society

All societies exert some sort of control over their members and are, in turn, controlled by their members. Societies determine the boundaries of acceptable behaviour and define sanctions for transgressing these boundaries. The idea behind the term "control society" is that modern societies increase the level and depth of control over their members. However, unlike dictatorial and totalitarian societies, which often explicitly set out to control members, the control society is characterised by its members' agreement to and even desire of increased control. The argument here is that modern western societies collectively take a turn towards increased control and that they do this with general agreement of its citizens. Control societies are furthermore intrinsically linked to modern technology, which require and facilitate the development of control, as will be argued in the following sections.

At this stage, I can only offer anecdotal evidence for the truth of the suspicion that western democratic societies are moving in the direction of control societies. In the UK, a primary example is that of surveillance. It is widely known that the UK is the "CCTV capital of the world" with a very high density of technical surveillance mechanisms. The interesting aspect is that this surveillance is generally met with approval by citizens. It is promoted under the heading of security and crime detection and prevention, which citizens generally seem to accept (despite a lack of evidence that CCTV has such consequences). Another aspect of control that seems to spread across democratic societies is that of control of life style choices. Prominent here is the example of smoking and the way states use a range of mechanisms from economic incentives and awareness campaigns to statutory regulation to move citizens to adopt certain behaviours.

If the initial suspicion that western societies are turning into control societies is correct, then this warrants the question of the cause of this development. This question is an obvious one because there is a prima facie suspicion that control and freedom may conflict and freedom is one of the primary values that western democracies profess to uphold.

An important aspect of the allure of the control society for the individual citizen seems to be that of security. This needs to be seen in conjunction with the rise of Islamist terrorism and the western reaction to it during the first decade of the 21st century. Control of citizens by society via the state may be seen as a mechanism that increases the individual. This refers to terrorism but also to all sorts of other criminal behaviour. Crime is seen as a central problem in western societies, typically relatively independent of actual development of criminal statistics.

While the wish for security is arguably a central cause of citizens' wish for the control society, this in itself is probably not enough to explain the growth of the phenomenon. A further important psychological cause is likely to be the desire for clarity and the hope to overcome ambiguity. The modern world is often perceived to be overly complex and confusing. Individuals often have more choices than ever before in human history but many find it difficult to identify what exactly these are and according to which rules they should make their choices. A related phenomenon is that of globalisation which has led to international migration on a large scale and has contributed to a further blurring of national, ethnic and other boundaries. Individual and collective identities which may have been relatively unproblematic and stable in the past are now threatened and in need of justification and explanation. Control of society and its citizens then seems to promise a higher level of stability and dependability of the future. It addresses real or perceived problems and relieves the individual of personal responsibilities to order their view of reality.

These explanations may also go some way towards explaining why democratic governments are willing to support the increase level of control required in control societies. Again, one can ask why democracies risk liberties as their primary political value in order to cater for the wish for control. Democratic politicians get elected on the promise of fulfilling citizens' requirements. If citizens wish

for increased levels of control, then democratic politicians have to take such wishes seriously and, if possible, implement them. Furthermore, politicians need to be perceived to be active rather than reactive, to lead and shape current and future realities. There is an element of catering to populism here but it goes beyond base instincts. Democratic governments know that they have to fulfil competing and often contradictory demands. They therefore have to make choices that they see to serve their countries best. In current climates, these often seem to be choices for more control.

Relationship to other Conceptualisations of Society

The idea of the risk society is related to but different from several other attempts to characterise modern society. This section briefly outlines this relationship to some of these alternative conceptions.

Ulrich Beck's risk society (1986) is a prominent example of a description of society that conceptualises the role that technology plays in modern society. Published immediately prior to the nuclear accident at Chernobyl, Beck captured the problem arising from the attempt to manage and limit risks using technological means which, in turn, raise new risks. He showed how technology creates risks while simultaneously improving the ability to describe these. The phenomena at the basis of the risk society are core to explaining the rise of the control society. Indeed, one important aspect of the control society is to address the risks that Beck has pointed to, using mechanisms of social control.

A further concept of society of relevance to the control society is that of the information society. This is a much more diffuse concept than the risk society that can refer to numerous contributors and has a range of different meanings. At its core seems to be the observation that information, its availability and exchange, has changed many aspects of democracies. A core area of impact is that of the economy, which is allegedly moving towards a "knowledge economy" in which the relevance of traditional economic activities such as agriculture or industrial production decrease in favour of information and knowledge based products. The network society (Castells, 2000), one aspect of the information society, is characterised by the instantaneous flow of information, capital and cultural communication. It accelerates cultural developments and economic exchange, while excluding large parts of the world. The information and network society provides a description of the phenomena that cause the development of the control society such as globalisation and uncertainty. They do not necessitate the control society, however, as different developments, such as a less controlled society would be conceivable and possibly even more plausible in the light of the information society.

The surveillance society, whose prototype was described by Orwell in "1984" (Orwell, 2004), has been described by scholars in the field of surveillance studies. The possibly most prominent description of the surveillance society is provided by Lyon (2001). Lyon analyses the role and organisation of surveillance in modern societies and argues that surveillance is problematic in ways that go beyond the broadly discussed issue of privacy and data protection. As indicated earlier, surveillance is a core aspect of the control society but not the only one. Surveillance is one means of control but by far not the only one. The theory of the control society therefore needs to incorporate that of the surveillance society but move beyond it.

These very brief paragraphs are meant to underline that there is a rich literature on related conceptualisations that support or accompany the concept of control society. A more detailed discussion of these theories as well as further ones will need to be undertaken during the development of the theory of the control society.

For now, an important point to discuss is the question which role technology plays in the control society.

4. The Relationship of Technology and the Control Society

There are several different ways in which technology and the control society can affect each other. This section outlines some of these relationships.

Ontological Relationship

A brief remark about the ontological relationship between technology and the control society is probably in order to head off unnecessary criticism. The theory of the control society developed here is closely linked to critical and social constructivist accounts of technology. This means technology is not seen as an independent and external entity that has more or less predictable consequences for the

control society. Instead, technology and the control society are mutually constitutive. The technologies including the constituent artefacts that we can observe are shaped and produced in a social context. They are appropriated by users on the basis their socially shaped experiences and expectations. This position avoids the problems raised by both the technical determinist and the social determinist positions.

Within this mutual embeddedness (Orlikowski, 2007) of technology and the control society one can nevertheless discern several different roles that technology can play, which are discussed below.

Technology as the Medium of Control

The most obvious role of technology in the control society as that as a medium of control. This means that technology can be used in order to implement and achieve the aims of the control society and exert control over its members. Examples of this abound in the literature on ICT and society, in particular in surveillance studies. Much research in this area is based on Bentham's idea of the panopticon and Foucault's subsequent development of this idea (Foucault, 1975). However, there are further areas in which technology can take the role of a medium of control. A prominent one is the area of human enhancement. While it is difficult to define what exactly constitutes enhancement as opposed to healing, one can argue that there are some applications of technology to the human body that serve to improve its capacities and overcome its weaknesses. The latter is what the transhumanist movement aims at.

This shows that technology as the medium of control can be aimed at different objects. The first one, surveillance, is aimed at individual behaviour whereas human enhancement is aimed at the human body. The two are clearly related but not identical.

There are further objects of control by technology. These technologies can be used to control either other technologies or the environment. Technologies to control other technologies are well established. It is one of the main achievements of ICT to facilitate a higher level of control over established technologies, such as engineering production technologies. Technologies to control the environment are also well established and may be traced back to the use of fire to clear forests. Again, ICT offers new avenues of control, for example in the fight against climate change which requires new levels of control.

Technology as the Object of Control

At the same time that technology can be used to establish control it can also become the object of control. Many of the problems the current world faces are problems caused by technology. This includes climate change but also the potential annihilation of human culture and possible the human race by nuclear weapons. There is a host of smaller issues where technology needs to be controlled, for example transportation-related technologies which need to be controlled to avoid an even more excessive level of danger than the one we currently face. Finally, technology may need to be controlled in instances where it affects the way that humans interact. A current example is the group of technologies that are often called Web 2.0 technologies.

There are different ways of controlling technology. These include social arrangements such as laws or other governmental control mechanisms. Particular technologies can be regulated directly, e.g. by outlawing them. More differentiated ways of controlling technology may provide processes of control that develop criteria and ways of applying them to technologies or individual artefacts. This is what most societies do with the control of cars. Control of technology can also be implemented via the development of directions for those individuals that are directly involved in them. This is the area of professionalism and professional ethics. A further way of controlling technology can be the development of clear social preferences, e.g. by highlighting the acceptability (or lack thereof) of a particular technology that then leads to further actions. This is what was done in the case of genetically modified organisms, particularly in Europe.

It is interesting to note that the significant parts of the field of computer or information ethics can be described as belonging to this domain that aims to develop principles of control of ICT.

Technology as the Cause of Control

In addition to being a medium and an object of control, technology can also be the reason why control is needed in the first place. This is the case, for example, in control of technical artefacts. A nuclear power station is an artefact that requires high level of systemic control.

More interesting is the idea that technology affects society in a way that requires an increased amount of control of its members. Due to the complexity of technologies they often require individuals who use them to have particular characteristics. Prime among them is a need for a particular type of educational background. An internet-oriented society of the year 2010 not only needs a population that is capable of reading and writing but also has a high level of familiarity with the artefacts that allow access and the detailed knowledge that allows operating them.

High tech control societies are also accelerated societies in which many activities happen at a greater speed requiring its members to have individual characteristics that go beyond the cognitive. Members need to appreciate the importance of speed and need to be willing organise their lives around socio-technical requirements (e.g. check email 7 days per week, update social website status regularly).

While some of this control is based on social agreements, it can, in turn, be facilitated by technologies. The operator of the nuclear power plant who needs to be reliable and stable can be checked for diseases or substance abuse by technical artefacts.

Technology against Control

An important part of the narrative in this paper is that control is not a one-way street. Control can be subverted and resisted. Any power relationship is a two-way relationship that allows the one over whom power is exerted to respond. In the literature on information systems this aspect of resistance is well explored.

Technology can therefore be used as a means to avoid control or overcome it. Where control may seek to normalise behaviour by instituting surveillance, technology can be used to hide activities. Privacy enhancing technologies are a category of technologies that aim to ensure that users are not subject to surveillance by others.

5. Conclusion

This paper is the first attempt to outline a much larger research programme into the relationship of technology, control and society. It posits that we can gain by developing a new conceptualisation of society, namely the control society. The control society is an ambiguous concept in itself because the term allows different interpretations. It is positive in that it allows individuals and collectives to take charge of their environments and lives but at the same time it embodies a threatening undertone of power and subjugation. The brief examples used in this paper were meant to provide plausibility of the claim that the "control society" is a good term to describe current societies.

The paper then argued that technology and the control society are intimately related. Technology can play a number of roles in the control society. Technology can facilitate, necessitate, exert, receive or evade control. This interplay between different aspects of control may be a good way of describing the way technologies are used in modern societies.

The narrative of the paper is purely descriptive. Its purpose is to develop a conceptual frame that will allow a better description of social realities. If it turns out that it can do this, that the control society is a useful way for conceptualising the way we deal with technology, then a further task, to be delivered at a later stage, is to think about whether this can lead to practical recommendations on how we should shape technology or the control society.

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ABOUT INFORMATION ETHICS REGARDING PAIN AND HUMAN SUFFERING

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Abstract

Human suffering and pain in the media appear as front-page news. Sometimes, journalists deliberately select situations of suffering and pain, not for the so-called informative interest, but because they are images that speak for themselves: these images put tremendous emotional strain on the audience.

This study pretends to facilitate an explanation to the treatment that the media provides regarding such delicate topics, where there should even be a guarantee covering the maximum protection of the fundamental human rights of those who are suffering. Furthermore, the effects that they have on the receiver of traumatic information dealing with pain and suffering are analyzed.

1. The Concept Of Human Pain And Suffering

What is pain? The concept basically is difficult to define because many medical, psychological, sociological, anthropological, cultural and religious aspects come into play, among others. Moreover, this concept is not always comprehensible for man's reasoning, as pain itself does not admit a rational explanation. Viktor Frankl has expressed on several occasions that he is convinced that the human being is able to find an explanation to pain and death; principle also believed by Christians.

What is the difference between pain and suffering? It is not easy to answer this question, mainly because pain and suffering present a complex relationship when wanting to define both terms. Without any doubt, they both have their subjective characteristics in common, an emotional and extremely unpleasant experience, a mutual interaction in the perception of anything unpleasant, and both feelings or states can provoke behaviour of rejection, evasion or having to face up to them. However, pain and suffering are not synonymous; they are not the same experience. Suffering is not necessarily measured by the level of pain, nor pain itself, however intense it may be, necessarily leads to the experience of suffering. Although not all suffering can be measured by the level of pain, common sense and experience have proven that any pain bears some measure of suffering. However, although they cannot be compared, it is a well-known fact that pain is usually an important sign preceding suffering. In fact, patients complain of suffering as a result of physical pain, especially when pain is totally irrepressible, reaching overwhelming levels, when the causes can't be diagnosed, in other words, it has become chronic, or it has terrible consequences such as in terminal cases, to name but a few. From this mutual interrelationship we can deduce that —pain is a distressing and abnormal state which affects the person who suffers it. On the other hand, suffering is the personal or subjective, real and unpleasant experience of a singular atypical situation. It is the way in which each of us experiences and shows pain in our own particular way". In this sense, we can conclude that the concept of pain is always focussed from an objective perspective, while suffering is based on one of subjectivity, and therefore, much more personal. But the question remains: why has man, from the beginning of his anthropological roots, always tried to avoid such issues as pain and suffering? Why is suffering, in itself, so distressing? Pain produces defiance; it stops man from reaching certain levels of satisfaction and happiness itself, even though we put up with suffering in the present, the root problem may lie in past events or may even be found in the future. In his novel *Crime and Punishment,* Dostoyevsky had already quoted: —Suffering and crying are the essence of living." Pain draws a fine line between well-being and suffering. Suffering shows itself in many different ways, depending on whether you are able to take everything in your stride or not and is able to have a substantial influence on an individual's life in one way or another, which in turn depends on whether the person who is suffering, is able to think in realistic terms or not.

Suffering can overcast someone's day-to-day quality of life, and even more so when it seems to be taking over their own personality – their true identity. Pain plays an all-too-common role in everyone's daily life and affects anybody, no matter whom, at different stages throughout our lives. Nevertheless,

it is indeed a universal phenomenon produced by universal causes, such as hunger or cold, as well as laughter and sleeping. However, no two human beings are the same, and in consequence, neither is their suffering.

2. Is Information Regarding Pain Really Necessary?

There is a generalised criticism that most information published or televised in the media feeds on human pain. News headlines and articles of this gender never seem to vary, as these seem to be the most sought after on the journalistic front. Ethically correct or not, criticism must be based on certain fundamentals. The dictionary compiled by the Royal Academy for the Spanish Language states that "*news* is any event which is up to date, interesting and communicable." It is true that human pain comprises of these three features, so in actual fact coincides with the definition of what "news" really is. Reducing the amount of news based on human suffering and filling in with just the news that sounds "good", only worsens ethical standards, just as it contorts what we considered as reality. Nevertheless, it would be fair to say that although the deontological problem does not very often appear amongst the so-called "distressing news", the ethical drawbacks are found in the calibre of the news itself when reporting about an inevitable reality.

It is obvious that to justify the need and the opportunity of information concerning pain, it is not acceptable that the piece of news in question is covered by a high percentage of all TV channels, nor is it justifiable, simply because of the fact that it is considered of interest to the general public. What goes beyond all doubt is the fact that pain provides masses of information, precisely due to the fact that it is universal, affecting absolutely anyone in the same way, and therefore already generates huge public interest beforehand. There is not only no TV channel which doesn't tend to broadcast headlines of this genre, at all times, throughout the day, but there are also many programmes in a wide variety of formats, which include information about pain. What is also undeniable is that reports on television, on most of the programmes we can see concerning pain, have acquired all the ingredients for a complete and utter spectacle.

There are specific cases where pain itself is not as a matter of fact the focus of interest, but actually, only the person who is suffering, all depending on how well-known the person is. In any event, those who are constantly in the public eye should have the same right to respect and therefore be allowed the right to suffer in privacy just as any other. The distress, in this case, on receiving the horrendous news of a serious illness, is exactly the same whether it can be somebody famous or not, and therefore, is entitled to exactly the same amount of consideration, even though the curiosity brought about by the information in both cases is not comparable.

The actual cause of the distress could lead to generating even more interest in itself, in cases such as people becoming infected with AIDS, for example; the consequences that this has, for instance, the social and occupational discrimination which people suffer in these situations; or the circumstances surrounding these issues: the lack of security measures in blood transfusions, for example. Having said that, in all the cases that have been mentioned, maybe the identity of the person or knowing what they look like doesn't have much significance at all; but the simple fact of publicising their suffering is what really matters. Something similar happens when somebody commits suicide. It will have informative repercussions if it happens in a public place – in the street, jumping off an aqueduct, diving in front of an on-coming train, to name but a few; but, what is more important is to describe the string of events leading up to the incident, thus making the need to reveal the victim's identity even less significant, especially in the case of the person being anonymous. It is a different case altogether when dealing with people with certain celebrity, as was the case of Erika Ortiz Rocasolano, the Princess of Asturias' youngest sister. Regarding the causes leading up to her death, journalists-come-judges, psychologists and psychiatrists all took part in the morbid and totally inadmissible media circus, speculating and making assumptions on her hypothetical suicide.

Taking these considerations into account, the answer to the question if information concerning pain should be publicised or not, lies with the journalist and whatever his/her conscience dictates together with the professional experience he/she has cumulated.

3. The Consequences Information Concerning Pain Have On The Audience

If we listed the number of effects that human information concerning pain and suffering causes on the audience, before deciding to release images or information with a great emphasis on pain, the following questions would have to be put forward: is the general public really being given information or are we just causing unnecessary pain to both the victim as well as the audience? For this reason and for many others, correspondents must be extremely careful when broadcasting live images which entail pain or suffering.

In general, the public is very sensitive towards reports concerning death: scenes of anyone being shot to death instinctively provoke complaints straightaway. Likewise, pictures of bodies in a road accident, after a terrorist attack, or resulting from disease or violent crimes, although they are not often bloody, usually have a huge impact. On the other hand, an excessive dose of information regarding pain, containing the usual alarmist and sensationalist ingredients, could have the opposite effect on the audience, who usually shows indifference and insensitivity on seeing such horrendous scenes. As a rule, those who have survived a tragedy are not usually bothered by reporters who are filming or giving information about the incident. Most of them think that the resulting report will have no comparison whatsoever with what they, the victims, have just had to go through. But they will more readily accept the information if reporters respect three basic rules. Firstly, reporters must produce the least amount of suffering as possible, not only to the victims, but to their relations or to anybody else who has had to go through the same ordeal as well. Secondly, that they make sure that the information serves a specific purpose; and finally, that those involved in the catastrophe are able to manage what the message or material contains as far as possible.

What effects do scenes showing pain actually have on somebody who is suffering from pain? In many cases, people who are themselves under suffering, find information about their ailment useful and comforting. By being able to simply express their feelings to others comes as a great relief; in other words, this information can have mitigating and soothing effects. Likewise, any information dealing with pain, together with the appropriate treatment, produces understanding, compassion and solidarity among victims. Nevertheless, not all information dealing with pain is necessarily beneficial for everybody; there are also those who react adversely; those who, on hearing the news, experience even more intensive levels of suffering.

4. Faults Made When Dealing With News Concerning Pain

Sometimes those responsible for relaying information do so as if it were a subject which didn‘t affect them in any way at all; as if it were some sort of spectacle or as if it were something trivial. For the renowned American novelist, Susan Sontag, when we do not sympathise with somebody else‘s pain, there is a lack of an imagination, a lack of empathy. Her work *―Regarding the Pain of Others”* is mainly an analysis of the role photography has to play, but the concepts she depicts are on a par to those concerning television. Sontag states that photography that represents suffering should not portray any beauty at all. Another trait which this essayist emphatically underlines is the sentimental exploitation of pity, compassion and resentment; aspects which must not be ignored at the time of covering news to do with pain. Coaxing somebody into getting as many sordid details out of them as possible, and who is obviously at the mercy of the reporter because of their weak affective state, is to carry out a totally unprofessional job without taking ethics into consideration whatsoever.

On carrying out their reports, professionals may well fall into some pit-falls which, as a consequence, will directly affect the ethical or lawful publishing of a particular article. The first mistake made is to minimise or hide the pain of an unknown individual, because only the large number of victims resulting from a natural disaster or numerous victims in a road accident is what makes the front-page; however, pain suffered by an individual who isn‘t well known at all doesn‘t usually make the headlines. By adding one million people to the number of those who are already suffering does not make the pain any more intense. Taking this hypothesis as the mainstay, the idea that death on a large scale is more ―sensational” because it is ―more painful” is as morally wrong as saying that the death of someone prestigious is a ―greater loss” than that of somebody who was just your day-to-day citizen.

The last ethical distortion consists of minimising the importance of pain. This is usually the most obvious consequence when treating pain as if it were part of a spectacle, basically when the show has already been heavily publicised and repeated over and over again. Carlos Soria sums up this situation

very well: at the beginning any bad news is shocking. Then, what we find so appalling is the insignificance of it all and the way this type of news is simply taken for granted. Later on, what is even more shocking is our incapacity of anything actually being able to leave us shocked; that in itself is shocking. In the end, everything, no matter how horrifying it is, leaves us simply impassive. Violence, murder, extortion and torture - all have become something trivial, quite ordinary, boring, monotonous and dull.

The continual lack of professionalism shown by journalists towards the victims of tragedies and disasters led the National Center for Victims of Crime in Texas in the United States to concentrating on the rights that these victims should have as one of their main aims on their list of priorities dealing with this issue. Their advice was that the mass media should always respect the victims' rights to be heard, as well as respect their privacy and always take their suffering into consideration. In short, to avoid making all these and other mistakes during the course of releasing news items, the correspondent's main aim should not be to increase the harm already done, but to soften the blow as much as they possibly can.

5. Example Of Information Dealing With Pain: A Comparison Of The Terrorist Attacks On The S-11 In New York And The M-11 In Madrid.

Portraying pain and tragedy is a problem which is not only a question of professionalism, but also one of morality and ethics. Nowadays, there is a general consensus constituting three main approaches which are considered imperative within the media field when dealing with information on terrorism: no neutrality concerning terrorism; no justification whatsoever for resorting to violence and finally, respect at all times towards the victims, their family and relations. A great deal of debate arises concerning this issue. Do scenes loaded with severe distress and agony serve the purpose of making people more conscious of terrorism, and at the same time, bring to light the perversity of the whole question? Does this fact compensate for all the pain and suffering which is caused? Does the purpose of bringing about more social awareness justify the methods used where pain and suffering are the universal issue?

To clarify these and other self-evident questions within Spain itself, on January 15th 2002, *Dealing with Terrorism in the News Media* was published by the advisory board belonging to RTVE (the state-run Spanish Television Corporation.) The report quite clearly stated that the media ~~"c~~annot take a neutral stance concerning those who put liberty at risk." Furthermore, in the same document, it was underlined that ~~"t~~he release of any images whose distressing impact disregard the victims' rights to privacy or could perturb people's feelings should be avoided at all cost." Little or next to nothing was done with regards to this report when, in 2004, during the aftermath of the bloodiest terrorist attacks Spain had ever seen, on March 11th to be precise, the crude reality of seeing blood, mutilated bodies, the dead and injured were all photographed without any remorse whatsoever.

We will now proceed to look at our research which compares how the news media dealt with the information in both monstrous terrorist attacks, heavily publicised worldwide, but which took place in two different settings: the attack on the World Trade Centre and the Twin Towers in New York on September 11th in 2001, and the other which took place on March 11th 2004 (*M-11*), killing passengers on local train services in and around the Spanish capital.

With regards to *S-11*, most American newspapers chose not to print gory images showing scenes of the dead and the injured and, at least on the front pages, abstained from publishing the most gruelling scenes such as people throwing themselves out of the top windows, and unanimously opted for pictures of the Twin Towers to symbolise the mass destruction and death. The large number of photographs taken from all different angles and viewpoints and the film footage available contributed, beyond all doubt, to the way in which the news was finally presented. As Susan Sontag quoted, the newspapers published an ~~"i~~llustration of absence, death but without the dead." Apart from the pictures of the demolished Towers, two other scenes were even more dominant at the time of going to press in the American newspapers; on the one hand, images of people trying to escape from the scene of the attacks, and on the other, a picture of a woman trying to console a man, which conveyed the idea of solidarity as opposed to the adversity of the situation. As Amor Muñoz reiterates very well, ~~"t~~he rare presence of victims shown in the photographs of *S-11* is what has led us to believe that there was a *depersonalisation* regarding the pain in the aftermath, besides which, helped to globalise the threat of

terrorism. The idea that it was western society rather than just the United States population which had come under attack was heightened by precisely avoiding the use of photographs in which victims who had been directly affected could be seen".

As far as the case of the *M-11* bombings are concerned, most Spanish newspapers didn't show much remorse about printing pictures showing injured people or dead bodies. Most front pages in the national press showed photographs of young people whose bodies had been terribly mutilated, in amongst the destroyed carriages and trains, with emergency workers aiding the injured on the railway tracks nearby. Enma Torres states that "here we find ourselves in a real, live situation which was extremely sickening; the terrorist bombings in Madrid on March 11th were even more dramatic in that, as a consequence of the explosions, bodies were flung out of the trains onto the streets, landing next to passers-by. Firemen weren't in charge of cleaning up or collecting ashes and rubble, but human remains." In her research, the author goes on to say that, "the central point of the news items were the victims themselves, either indirectly – the dead, covered with sheets – or directly, where close-up shots of mutilated bodies could be seen in newspapers and on television alike. Although those who were injured, apparently, did not play a major role, it should be underlined that they made up the major part of news reports on the inside pages of the national newspapers". In conclusion, contrary to news reports in the U.S. after the *S-11* attacks, which followed completely different criteria, there was no evidence of any *depersonalisation* dealing with pain in the aftermath of the Madrid bombings. Firstly, due to the fact that it happened in a relatively unknown part of the world – not nearly as symbolic as the site in New York – but also because pictures of the injured and the dead were published in both the national and international press.

Without any doubt at all, the UDHR has played, and is playing, a vital role in the way human pain and suffering are dealt with in the media. With this in mind, we are going to study the relationship there may be between the Declaration and the famous Dreyfus Affair which flooded the press worldwide at that time.

6. The "Dreyfus Affair' And The Defence Of The Fundamental Human Rights

As everybody will know, the Dreyfus Affair was a trial in which a French artillery officer of Alsatian-Jewish descent, Captain Alfred Dreyfus was falsely convicted of spying and treason in 1893. The scandal was the result of a miscarriage of justice, stemming from what was essentially a surge in anti-Semitism and, at the time, outraged French society for some twelve years. His conviction subsequently produced a national dispute on such a scale that it led to a surge in popularity of the Progressive Republican sector, this becoming one of the foremost parties on the French political scene, and which finally culminated in a division between the Church and the state Government. The source of the affair came to light when Dreyfus was accused of having written a *bordereau*, a list of top-secret military documents, belonging to the French Government, and which he supposedly intended to pass over to the German embassy in Paris. He was consequently court-martialled, and in 1894 sentenced to life imprisonment for having committed high treason by a military tribunal, which he was to serve on *Devil's Island*, a prison island off the coast of French Guiana. He was in actual fact innocent, later proven so in 1906, of the crimes he had been accused of.

The main reason for including this case in our work is due to the fact that it was front-page news, having tremendous importance in the press at the time, which without any doubt, contributed to swinging public opinion towards his being a criminal and considering him guilty of a crime which he had ever never committed. This, needless to say, violated fundamental human rights. It was a very unfair, and at the same time, equally outrageous case for two basic reasons. Firstly, he was deemed guilty even before given the chance to prove his innocence; and secondly, the manipulation of the corresponding information whose only intentions were to spread hatred towards the Jewish population at the time. In both cases we are confronted with pain and human suffering and the dilemma of judicial-ethics when dealing with information surrounding these two topics. It would be therefore unquestionable the levels of pain and suffering experienced by Dreyfus and his family, together with the pain and suffering endured by the Jewish population who were scorned and marginalised as a result of the wave of anti-Semitism spawned by the press surrounding this affair.

Another point which should be underlined is the relationship that this case has to do with the UDHR (The Universal Declaration of Human Rights), on the 60th anniversary of its proclamation and

adoption in the General Assembly of the United Nations. To be able to understand all the underlying repercussions it had, we have to start off with Dreyfus himself, analysing at the same time the way in which Zola reacted, together with the influence René Samuel Cassin had, forefather of the UDHR and winner of Nobel Peace Prise, which he was awarded in 1968.

Alfred Dreyfus was an artillery captain, as we have already mentioned, and of Alsatian-Jewish descent, nevertheless, it was the fact of having Alsatian roots which caused so much revulsion, as Alsace was in German hands at the time after the end of the Franco-Prussian war. At the time he was an officer responsible for the German language and culture and who was later renowned for, due to political reasons, his religious status. This military character was known for his cold, introvert and even arrogant personality. Furthermore, he was well known for being very wealthy, consequently he was very often resented, and which undoubtedly changed the course of the investigation and the case against him by manipulating evidence to ensure his guilt beyond all doubt. On October 13th 1894, without any full-proof evidence against him, he was arrested and accused of spying. He was offered a revolver, advising him to commit suicide; however, he flatly refused, wanting to live so as to be able to prove his innocence. The lack of neutrality regarding the charges made against the officer and the more-than-suspect manipulation throughout the whole trial, led the writer and novelist, Émile Zola, to taking action by publishing an ardent letter in one of the Parisian newspapers, titled *J'accuse* (I accuse), a discourse defending Dreyfus' innocence and which eventually prompted a generalised change of opinion amongst other intellectuals about the case, which Zola deemed as a "monument to prejudice." The document was a formal, explicit and direct attack which had important repercussions not only all over France but abroad as well. The outcome led to Zola being insulted, threatened and pursued. In the end, he was condemned and had to flee to Britain in exile. At the time, the press went 'wild.' The newspapers such *as La Libre Parole*, *L'Autorité*, *Le Journal* and *Le Temps* spread all kinds of lies about the life of the military officer, news which was published, not only without verifying the facts and their authenticity, but instead were manipulations together with false evidence used against him. In the same year, on November 8th, General August Mercier maintained that Dreyfus was guilty in an interview, published in *Le Figaro*.

On the other hand, the army never ceased in their declaration regarding his innocence throughout the whole trial; as a result, the lack of a motive became an ever-increasing problem for the accusation. We mustn't ignore the fact that Dreyfus was considered a very patriotic officer and besides this, he was very wealthy, leaving no grounds which justified an act of espionage or treason, in other words, his motive, if any, could not be based on political ideas or a need to prosper. On December 22nd, the seven judges in charge of the trial found Alfred Dreyfus guilty of high treason; he was stripped of his rank, submitted to military degradation and finally sentenced to life imprisonment in a fortified penitentiary. Both the general public and the press demanded capital punishment; fortunately, this was not to be, as the death penalty had already been abolished in line with the French constitution of 1848. The real traitor, Captain Esterhazy was subsequently acquitted; nevertheless, Dreyfus was to be given a second trial at a later date in which he was tried and found guilty once again, but this time he had his sentence reduced.

Zola died in 1902 and at his burial, Anatole France, who was to be awarded the Nobel Prise for Literature some years later, in 1921, pronounced the following words, "Zola's unfailing fight for truth and justice in his cause to defend A. Dreyfus have brought him contempt and disrespect in ways which had never been encountered before: stupidity, ignorance and evil; even so, he is still regarded by many as a monument to human conscience".

But, what relation does this story of tremendous human pain and suffering have to do with the UDHR? The UDHR is a declaration adopted by the General Assembly of the United Nations in its resolution 217 A (III) passed on December 10th 1948 in Paris and whose purpose is to record and document all the fundamental human rights. As we already know, this Declaration together with the International Conventions of Human Rights constitutes what has become to be known as the Universal Declaration of Human Rights.

Why was the figure and endeavour of René S. Cassin so important? The most likely reason why this great legal practitioner was so concerned with the fundamental human rights probably lies in the fact that he came from a Jewish background, whose father was Italian with Cassin for a surname and Alsatian from his mother's side. The connections are more than obvious due to similar family backgrounds when analysing the ties between this illustrious legal professional and Alfred Dreyfus,

due to the fact that as a child he would have heard family and people around him talking about the pain and suffering of somebody who had been wrongly accused of a crime which he had never committed.

Cassin died in Paris on February 20th 1976, after which his ashes were taken to rest in the Pantheon in Paris, where Émile Zola had been laid to rest, as we have already stated. Therefore, the two foremost figures in the defence of human rights and justice rest in peace together, all as a result of the implications and connections in the Dreyfus Affair.

7. Conclusions

The media, especially television, very often gives very little importance to even the most profound feelings concerning suffering, and moreover, tends to exploit the far reaches of human pain. Sensationalism is very often used as a media tool when dealing with these topics to provoke public interest or excitement, especially, in the so-called yellow press where articles are able to rouse even the most insane, underlying curiosity in human beings. Information dealing with circumstances where pain is involved should be handled rigorously, with a great deal of care so as not to cause any trauma amongst readers or spectators, nor deepen the pain or distress in the victims, their families and relations. However, these recommendations give rise to a number of deontological issues related to the way pain itself is shown or expressed in a specific way and how it captivates the general public.

After the *S-11* attacks in New York and the *M-11* bombings in Madrid, the media had what turned out to be a very hard job: covering a lot of very harsh facts which the public was eager to learn about; the only drawback that could be condemned is the issue of whether the audiovisual coverage was acceptable or not. While symbolic images were used after the *S-11* tragedy, such as footage and photographs of the Twin towers razed to the ground, on the contrary, in the *M-11* holocaust, the most dramatic photographs showed mutilated bodies of the victims, more often than not covered with a sheet, but in most cases they were perfectly recognisable. The bombings in Madrid on M-11 have become a paradigm for heated debate which sometimes arises between freedom of speech and the right to privacy. As far as this latter case is concerned, there is even more confrontation concerning the right of every human being to suffer in privacy, to die with dignity, alone – without any publicity or news coverage which the victim has neither asked for nor wishes to be part of.

One of the reasons why the French lawyer, R. Cassin came to playing a major role in the creation of the UDHR and to work for the internationalisation of the those very rights and freedom, was precisely due to the enormous impact that the way the press handled the Dreyfus Affair at that time. What we have set out to do in our research is to give a place of honour to those who have worked incessantly to achieve justice and the implementation of the Human Rights all over the world, whether they belong to the world of the news media or they are directly related to the judicial profession.

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CONTENT AND COMPARATIVE ANALYSIS OF THE 83 ABSTRACTS APPROVED FOR THE ETHICOMP 2010

Lucia Tello, Amaya Noain and Porfirio Barroso

Long Abstract

The year 2010 we will be celebrating the eleventh edition of ETHICOMP (Ethics and Computer). Ten past or gone by editions in which this congress has become one of the most important and relevant congresses in the world about Computer Ethics and it has also become a central reference within the field of Computer Ethics. Some time has passed since the first edition that took place at the University of Leicester UK in 1995. We organised the second ETHICOMP in 1996 at Madrid, Spain. Many papers have been sent along with over 700 documents. Due to this wealth of material, it is necessary to do a qualitative and a quantitative analysis of the 82 Abstracts sent and approved in the year 2009, for the ETHICOMP 2010, in order to present next April in Spain.

This research aims to illustrate how many items appear and how many times, which is the frequency in decrees order from our 20 themes as a model of Computer Ethics subject. That topics or principles are the 20 lesson we teach in our Computer Ethics and Internet Ethics classes. This research we did with a numerous group of Official European Master Degree students and we will present as a full paper, we know in the decrees order which is the first and the last topics and we can present in a figure or table our all results.

Our methodology is a quantitative research on all 82 abstract approved to the next ETHICOMP 2010 in April in Spain. This group of students working, firstly translating the abstracts, from English language into Spanish, because not all the students know English language quite well, and all of them have to participate in our research. After have translated all the 82 abstracts we deepening on the idea, it would not be wrong to point out that the main objective of this article is to discover the key to the growth and development of the some topics more frequent than another. For example the PAPA (Privacy, Accuracy, Property and Access) appear more than another themes of the 20 we have in our catalogue or programmed. That is, we need to do an analysis of all abstracts sent to the ETHICOMP 2010. To accomplish this task, the chosen material could be no other than the 82 abstracts. Work that would allow us to extract the entire database from which we can perform our quantitative analysis from the point of view content and comparative analysis of all the abstracts presented and approved. We continued to the reading, analysis, and categorization of all articles submitted. This process was conducted in a systematic way to extract patterns and common modes of analysis to frame all presented abstracts in a series of common levels comparable among them. To accomplish such a task, we developed a thematic categorization of the abstracts according to a series of 20 ethical principles that served as a basis on which to frame and observe the range of thematic categories that appeared more frequently over the 82 abstracts.

Findings: Computers and Ethics. Computer and Internet have enlightened many people but these technologies have also raised some ethical issues such as intellectual property, privacy and intimacy invasion, unauthorised access for children, rich and poor, men and women, young and old people, and use of computer systems. Mason (1986) was summarised ethical issues related to information technology usage by means of an acronym – PAPA (Privacy, Accuracy, Property, and Accessibility). Intellectual Property is one of the major ethical issues that have arisen in the context of information technology usage. Software piracy is globally widespread phenomena and costs software manufacturers billions of dollars annually. The ease of copying software has made the issue of piracy very well-known and widespread around the world. We got from our study on the abstracts of ETHICOMP 2010, on the PAPA, that the topic more frequent is Privacy second is Property or Intellectual Property, the third one is Access and the last one is Accuracy in the information. In the full paper we will show our results in decrees order in a table the most quantitative topics of the 20 one. What will be in the last place of the figure and what will be in the middle of the table?

Research limitation/implication: Although our research is limited to 82 abstracts presented already to the ETHICOMP 2010 and it is in a very specific context, we consider that this study will be very

interesting, firstly to the organisers, conference directors, programmer committee, reviewers and finally to all presenters.

Practical implications: The paper calls attention to the need of discussing what are the more frequent and less frequent topics or themes are presented already in the next ETHICOMP 2010 in Spain, attending of the summary or minutes presented for the authors in their abstracts.

Originality/value: The paper contributes to know and show what are the themes or original topics that the authors in ETHICOMP 2010 are researching or teaching or they are working in them.

Key words: ETHICOMP 2010. Content and comparative analysis, 20 themes, decrees order, quantitative research, European Master Degree students. Ethics, Spain.

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BUILDING SOCIAL CAPITAL THROUGH WEB 2.0 TOOLS. THE CASE OF THE CATALAN THIRD SOCIAL SECTOR

Teresa Torres-Coronas, María Arántzazu Vidal-Blasco and Ricard Monclús-Guitart

Abstract

Both the Organization for Economic Cooperation and Development and the European Union believe that the information and communication technologies have the potential to transform the way in which we work. Many organizations, including those of the Third Social Sector, have to incorporate the web 2.0 tools and social software into their structures and their daily activity. The aim of this communication is to analyze whether these tools are regularly used by institutions of the Third Social Sector in Catalonia in an attempt to transform their daily tasks and move towards a change in their organizational culture.

1. Introduction

The organizational and business structures of the 21st century are increasingly moving towards structures that are organised in networks and which are working more and more in virtual teams. This requires the use of social software and technological tools that allow documents, data and information to be exchanged freely and easily, thus facilitating processes of collaborative creation. Undoubtedly, within this new organizational framework, the most recent challenge has been laid down by social software and collaborative software, essential for working in a network. Interpersonal communication has now become an integral part of the whole process of creating content and this is where the importance of on-line communities and social networks lies (Abell, Chapman, Phillips, Stewart & Ward, 2006).

There is a strategic interest in the social technology that has changed the concept of digital literacy and the digital divide. The importance of knowledge as a condition for economic growth has led governments, companies and educational institutions to become more interested in a networked knowledge society. Today, the so-called ―digital natives" are already using social software in their daily life to develop abilities to deal with social, occupational and technological changes.

In the current climate of economic crisis and in the face of a new economic model, it cannot be forgotten that the ICT, the web 2.0 tools, and social software have changed not only the needs of the labour market for knowledge workers but also the way in which business organizations work.

Because of the development of social software and 2.0 technologies, technology is increasingly easy to use. Social software involves systems that allow users to interact and share information. These systems of computerised communication have become popular thanks to virtual communities such as MySpace and Facebook, environments for sharing photographs and video such as Flickr and YouTube, and shopping sites such as eBay. Virtual communities are designed to provide users with a wide range of tools for their personal development. Web 2.0 technology and social software help members define new forms of learning, and create knowledge and social capital.

As the world adopts new forms, then, thanks to the 2.0 technologies and social software, our daily life and learning experiences start to transform and lead society towards new ways of constructing social capital. All those people who are members of a virtual community are involved in social activities. And it is for this reason that, in the connected society, virtual social capital complements real social capital (Rafaeli, Ravid & Soroka, 2004) by sharing knowledge management.

As we have stated above, the changes in the digital world affect how organizations work and do business. The emergence of the Enterprise 2.0 model expresses the idea of change that can lead to the development of collective intelligence, social interaction and social capital as sources of value for business organizations. In the web 2.0 business model, workers from all sorts of organizations need to know how to use on-line communities and social software to help their organization achieve its

mission. The integrating principle that underlies this new learning culture is connectivism, in which knowledge is generated by means of a participatory culture or "2.0 learning".

Web 2.0 tools and social software, then, can be used in a wide range of organizations, including those of the third social sector. According to the definition of the Observatory of the Third Social Sector (Yearbook of the Third Social Sector of Catalonia, 2009), the third sector consists of legally-constituted, non-profit organizations that are registered in a public register and privately owned. The third social sector consists of those organizations that work for the advancement of people and the inclusion of vulnerable groups, and its importance in terms of sise and visibility within the social and economic system is steadily increasing. In recent years in Spain the third social sector has grown rapidly, highlighting its increasing importance in the development of social policies.

In the present communication we analyze whether the ICT, and the web 2.0 tools in particular, are regularly used by organizations in the third social sector to transform their daily management and take steps towards a change in their participatory culture. To this end, we shall first briefly discuss the main aspects of the web 2.0 tools and social software. Secondly, we will define what we understand by the third social sector and its introduction in Catalonia, and then we will go on to analyze the application of web 2.0 tools in the third social sector. Subsequently, we make an empirical study of whether the organizations in the third social sector in Catalonia use these web 2.0 tools and we finish by summarizing the conclusions resulting from our work

2. Web 2.0 Technologies And Social Software

The emergence of the new technologies at the end of the twentieth century was the cause of the so-called "Digital Revolution", which has succeeded in getting all areas of society to adopt the changes brought about by the ICT very rapidly. One of the features of this new society—known as the Information Society—is that large volumes of information can be accessed and people can connect with others.

The so-called Enterprise Social Software, also known as Enterprise 2.0, is an Anglo-Saxon term that describes the social software that is being used in business contexts. This definition was taken from Wikipedia (see http://en.wikipedia. org / wiki /Enterprise_social_software). It includes social and networked modifications to intranets and other software platforms used by companies to organise their communication. Business organizations are increasingly relying on information connecting people with people, and people with content via web 2.0 tools, and techniques of collaboration, and knowledge and information exchange. The importance of ICT as a factor of growth and development in organizations is undeniable.

The Business Information Survey explores the penetration of the web 2.0 tools in the business world. The results show that there is considerable strategic interest in social technology and web 2.0 tools, although they have not been widely developed (Foster, 2008). As workers increasingly lead web 2.0 lives, business organizations will need to modify their corporate e-learning practices. In this regard, Trondsen (2006) predicts that there will be a strong uptake of virtual worlds within corporate learning and that an increasing number of pilot projects will include the latest technological advances.

The concept of social software is generally attributed to Tim O'Reilly and it includes such tools for on-line communication as instant messaging, chats, weblogs (or blogs), wikis, social network services, social guides, social bookmarking and virtual worlds.

O'Reilly (2005) presented the web 2.0 as the second phase in the development of the web, describing it as an "architecture of participation" in which collective intelligence generates a "network effect" directed at web pages that acquire more value as more and more people participate in them (O'Reilly, 2003). For authors such as McGee and Begg (2008), the "Web 2.0 is a set of user-centred web technologies that actively change and evolve with the participation of the users". The web 2.0 is a technology (Franklin & Van Harmelen, 2007) but, at the same time, it is an on-line platform created by communities of users or more of an attitude than a technology (Downes, 2005).

Web 2.0 technologies are having a highly significant impact on the way in which we communicate both personally and professionally. Mejias (2005) states that most social software products are providing pedagogical strategies with considerable challenges. "With respect to ICT, we are witnessing the rapid expansion and proliferation of technologies that are less about "narrowcasting"

and more focussed on creating communities in which people come together to collaborate learn, and build knowledge" (McLoughlin & Lee, 2007).

The Enterprise 2.0 model involves making workers, suppliers and clients use social software (or web 2.0 tools) as instruments for more efficient collaboration. In this regard we find environments such as Facebook that are already being used as an instrument of collaboration to increase innovation and productivity, or initiatives such as IBM Web 2.0 that seeks to help companies achieve competitive advantages. This means that it is now dangerous for organizations to ignore the power of the web 2.0 but, to harness this power, they need professionals with the appropriate skills to make the best of this new business model.

3. Web 2.0 And Social Software In The Catalan Third Social Sector.

In Spain, institutions such as the Observatory of Telecommunications and the Information Society, the Orange Foundation and the Telefónica Foundation annually publish general reports that make a thorough study of the transformations that the new technologies are causing in society. Nevertheless, their application in the third sector and the third social sector has been subject to scarcely any scrutiny.

The third social sector is part of the so-called third sector, a concept that defines the non-governmental and non-profit sector of society in contrast to the first or public sector (governmental and non-profit making), and the second or private sector (non-governmental and profit making) (*Mesa de Entidades del Tercer Sector Social de Cataluña*). It is made up of a group of organizations that work in the interests of society and which are non-profit making.

In the present communication we shall focus on the third social sector in Catalonia. It is a cluster of about 7,500 entities with 250,000 volunteers and 100,000 people under contract which provides assistance to more than 1,700,000 people. It represents 2.8% of the gross national product of Catalonia. It is for this reason, among others, that the third sector has become a key element for our society and is becoming increasingly important for the public authorities in their commitment to provide for people. What is more, it is currently coping with the new challenges that have been generated by the economic crisis and the development of new social laws in our country.

The Committee of the entities that make up the Third Social Sector of Catalonia was set up in 2003. It is a group of 27 federations of more than 3,000 non-profit entities that act in the social field: associations, cooperatives, foundations, work placement companies, and special work centres (*Mesa de Entidades del Tercer Sector Social de Cataluña*).

The web 2.0 and social software are a characteristic and indispensable feature in a society such as ours, which has been categorised, as we have mentioned above, as the Information Society. It is now impossible to refute the importance of these tools in the growth and development of the organizations of the third sector but, rather then focus on the use that is made of technology in these entities, what needs to be done is analyze how the ICT can improve services that provide people with assistance. If the ICT are regarded as a set of services, networks, software and devices whose purpose is to improve the quality of life of people and organizations, they can make a significant contribution to the assistance that is provided to the most vulnerable groups (*Mesa de Entidades del Tercer Sector Social de Cataluña*, 2009).

We also consider that it is important for third sector entities to use 2.0 tools because they put into practice a series of principles such as the democratization of content, interactivity, participation, collaboration, etc, which coincide with the way that many activist and social movements work, and they can clearly help improve the management of knowledge, volunteers, external communication, etc. In turn, the ICT have considerable potential in management of organizations of the third social sector.

It should be pointed out that the web 2.0 tools have enormous potential in "activism" on the net: they can make causes visible, act as a voice for people or groups that have had none in other media, propose action, create networks with other similar organizations that have the same aims or denounce unjust situations. These tools can also be used to raise awareness, mobilise and denounce (Fundación Chandra & Centro de Estudios Económicos Tomillo, 2009), which can help organizations carry out their social mission and improve their public image. In short, these tools can be used to promote a participatory and collaborative culture in entities in the third social sector.

The third sector is now regarded as another social agent, part of a system of relations in which it interrelates with other leading agents, from a perspective of co-responsibility with issues of public interest, to achieve the desired impact. This inter-relation takes the form of networking and collaborations both within the sector itself and with other agents such as the public administration, the media or the world of business (Mesa de Entidades del Tercer Sector Social de Cataluña, 2009).

In this relational area, then, the web 2.0 tools are making an important contribution to establishing links between social organizations and other entities from the rest of the country and abroad. In short, they are helping to create and promote this relational capital. The instruments connecting the third social sector and the public administrations need to become more stable and they need to work together as strategic partners in the public interest. The third social sector has to be the government's principal ally as far as social policies are concerned (Anuario del Observatorio del Tercer Sector Social, 2009).

As has been pointed out by Albaigès (2007), the third sector has grown considerably in recent years, taking on professional functions that traditionally it has not had (for example, communication, quality, human resources, etc.). Nevertheless, the ICT are not being sufficiently used in the daily life of the sector. A great many resources have been invested in quality (procedures, audits, certificates, etc.) but the ICT are not regarded as a fundamental tool. Priority has been given to communication, among other reasons because it is the way of becoming known and raising funds, yet there is little awareness that the ICT can help to reduce costs and, therefore, reduce the need to raise funds.

Apart from their most obvious uses, the role of the ICT in many of the organizations in the third sector is anecdotal. They are still not regarded as a strategic asset. These tools, however, should be used by organizations to achieve more objectives more efficiently and, if this is to be the case, they need to become an integral part of the strategic planning of organizations, and each and every project, process and activity (Proyecto SocialGNV, 2009; Albaigès, 2007).

In this environment, society warns against the risks of the digital exclusion of some groups and organizations are trying to combat this exclusion, so far with quite positive results. Even so, the main obstacles to incorporating the ICT into an organization's strategy are lack of training, lack of knowledge and lack of funding (Fundación Chandra & Centro de Estudios Económicos Tomillo; ProyectoSocialGNV, 2009; Albaigès, 2008; Cabrera, Rubio & Fernández, 2006).

4. Empirical Evidence On The Use Of Web 2.0 Tools In The Catalan Third Social Sector

The empirical study was carried out by analyzing the web pages of the *Mesa de Entidades del Tercer Sector Social Catalán*. Between 1 October and 30 November 2009, a total of 263 web pages belonging to 23 federations of third sector entities. Although the Mesa consists of a total of 27 federations, we were unable to access four of them, either because we could not locate their web page or because the link was not working. The table below contains the information about the web pages of the federations reviewed and the number of its entities whose web pages have been studied.

(*) The (1) beside the name of the federation means that we have been unable to access the federated entities or that the web pages of the entities were identical to the web page of the federation.

Our first analysis of the 263 web pages that make up the universe of our study revealed that they had more web 1.0 features than web 2.0 features. We consider web 1.0 sites to have been designed mainly to be read. They are static and the user merely consumes information. Web 2.0 sites, on the other hand, are designed for both reading and writing, they have dynamic pages with open content, and the user plays the roles of consumer, producer and creator.

By basing the distinction between web 1.0 and web 2.0 on interaction and collaboration, we find that we need to establish an intermediate link between the two types of models so that we can classify the vast majority of the web pages that we analyzed from the Catalan third social sector. For this reason we have established the following conceptual framework:

A) Web 1.0. Web pages are static and most content is static and never—or hardly ever—updated. We would assign to this category those web pages that started to be found on Internet between 1993 and 1997.

B) Web 1.5. Web pages are dynamic, and are constructed from one or several databases. Content is updated and the sites are modified, but usually by the webmaster. This type of web page was most common between 1997 and 2003.

FEDERATIONS (*)	WEB ADDRESS
COCARMI - Comité català de representants de persones amb discapacitat (7)	http://www.cocarmi.cat/cocarmiweb/Home.aspx
Caritas (10)	http://www.caritas.es/
Coordinadora de tallers per a persones amb discapacitat psiquica de Catalunya (21)	http://www.lacoordi.cat/
Cruz Roja (1)	http://www.cruzroja.es/preportada/tv/index.html
ECAS - Entitats Catalanes d'Atenció Social (71)	http://www.acciosocial.org/ca/
FACEPA - Federació d'Associacions Culturals i Educatives de Persones Adultes (8)	http://facepa.org/facepa/
FAFAC - Federació d'Associacions de Familiars d'Alzheimer de Catalunya (13)	http://www.fafac.info/
FATEC - Federació d'Associacions de la Gent Gran (3)	http://www.gentgran.org/
FCVS - Federació Catalana de Voluntarial Social (1)	http://www.federacio.net/ca/
FEATE - Federació d'Entitats d'Assistència a la Tercera Edat (10)	http://www.feate.org/
FECEC - Federació Catalana contra el Càncer (12)	http://www.fecec.cat/home.aspx?lang=cat
FEDAIA - Federació d'Entitats d'Atenció i Educació a la Infància i l'Adolescència (1)	http://www.fedaia.org/
FEDELATINA - Federación de Entidades Latinoamericanas de Catalunya (1)	http://www.fedelatina.org/
ECOM (63)	http://www.ecom.cat/index.php
FEPA - Federació d'Entitats amb Projectes i Pisos Assistits (29)	http://www.fepa18.org/
FOCAGG (Federació d'Organitzacions Catalanes de Gent Gran) (1)	http://focagg.entitatsbcn.net
Fundació Catalana l'Esplai (5)	http://www.esplai.org/index.htm
Fundació Escolta Joseph Carol (1)	http://www.josepcarol.org/frontoffice/fjc/index_.php?opcioninicial=0&noticiainicial=-1
Fundació Pere Tarrés (1)	http://www.peretarres.org/wps/wcm/connect/peretarres_ca/peretarres/home
Fundació Sant Joan de Deu (1)	http://www.fsjd.org/cat/index.php
Minyones, Escoltes i Guies de Catalunya (1)	http://www.escoltesiguies.cat/
Cooperatives de Treball de Catalunya (1)	http://www.cooperativestreball.coop/
Moviment Laic i Progressista (1)	http://www.mlp.cat/index.php

C) Web 2.0. The distinguishing feature of these web pages is that they are collaborative: the users are contributors who publish information and make changes. They first emerged in 2003 and are still in existence. And they will remain so until the web 3.0 comes along.

By adding an intermediate level between web 1.0 and web 2.0, we make it possible for us to study the web pages of the Catalan third social sector because in most cases they allow access to content and information that is regularly modified and updated, although they are not designed for users to make contributions.

The table below shows the percentages of the items analyzed for each web page. These data confirm that one of the priorities of the web pages analyzed is access to content and information, because of the high percentage of material that is provided by the web page. Although text is predominant, it is by no means unusual to find access to mp3 so that users can listen to radio programmes in which representatives of the entity have taken part or watch videos of interviews with members and collaborators.

One of the most surprising facts is that the web pages are accessed very little, particularly if it is borne in mind that they are designed for elderly people, people with some sort of handicap, etc.

Since the web pages are relatively simple, they require neither web maps nor search functions, which explains the low percentages of these items.

Items analyzed	Percentage
1. Links to other entities	76.19 %
2. Access to material on the web page:	
2.1. Text (pdf, Word, etc.)	76.23 %
2.2. Audio (music, radio programmes, etc.)	14.29 %
2.3. Powerpoint presentations or similar	9.52 %
2.4. Photos	23.81 %
2.5. Videos (or shortcuts to Youtube)	33.33 %
3. E-mail contact	95.24 %
4. Web map	38.10 %
5. Web page search function	33.48 %
6. Accessibility (WCAG – Development of accessibility guidelines)	9.52 %
7. Auditing (web page optimization)	9.52 %
8. Legal notice and web page copyright	38.10 %
9. On-line shop	9.52 %
10. Hit counter	4.76 %
11. Facebook space	9.52 %
12. Twitter space	*0.00 %*
13. Yahoo flickr	*0.00 %*
14. Spip (access to multilingualism)	*0.00 %*
15. Use of Creative Commons	*0.00 %*

The data show that the web pages of the entities of the Catalan third social sector largely:

a) Make information and a great deal of content available (mainly text—news, statutes, legislation and in some cases an entity's journal—and photographs—events organised by the entity or in which its representatives have taken part).

b) Frequently update the web-page content. Information had been recently posted on the web pages of nearly all of the entities, basically news about activities but also reports and publications.

c) Restrict contributions by users, who can only contact the entity by means of the e-mail link or, in some cases, by accessing the private space for members and collaborators (which we have not been able to analyze but which was not the object of the study).

In the light of these three characteristics and the theoretical division that we have made between web 1.0 and web 2.0, it can be said that the web pages of the entities of the Catalan third social sector can almost all be assigned to the category of web 1.5, which means that at the present time they cannot take full advantage of their web pages.

We believe that the type and mission of many of the entities make them particularly suitable for blogs, where the relatives of people with Alzheimer, the elderly or drug addicts, etc. could make their contributions and responses and opinions could be given by members of the same group. Not only would this make the web page dynamic and collaborative, it would also make it possible for users to have access to real situations recounted by the protagonists themselves and to solutions put forward by people in the same situation.

After a time, the blog may possibly lead on to joining a social network where the members of a particular group could keep in touch, and photos and videos of common activities could be posted. The participation of individuals in blogs and social networks would provide a sort of group therapy between people who are often at the risk of social exclusion.

5. Conclusions

The ICT have transformed current society and the way of managing all sorts of organizations, whether they are public, private or non-profit. They not only enable information to be acquired and shared in real time but they also break down communication barriers by facilitating access to all geographical areas, which increases the effectiveness and the efficiency of the organizations that use them.

For non-profit entities, the ICT are a real opportunity. On the one hand, these tools make it possible for them to manage available resources more efficiently, which is absolutely fundamental because they are increasingly being required to be more transparent in their management of the resources entrusted to them by society. On the other hand, the ICT can be used to attract new resources because they facilitate communication with the people and institutions committed to the organization and with those that may be interested in providing support. In short, the ICT enable organizations to be more effective, to improve their management, to fulfil their objectives and to get results.

Web 2.0 tools promote interactivity, enable participatory spaces to be set up for all the groups of people connected to the entity (volunteers, workers and end users of the services provided) and facilitate the exchange of experiences and resources among social entities that work on similar issues.

Since the ICT and web 2.0 tools do not require a large economic investment, they are increasingly becoming a heavily used communication channel. They are also beginning to acquire a presence in entities belonging to the third social sector, although it should be said that the use of web 2.0 tools is not very common in this sector (Albaigès, 2007). It should also be pointed out that not all the groups with which the social entities work have access to these tools, which could lead to the exclusion of some of the most vulnerable groups. There is, therefore, a need to keep working in this direction.

Aware of the advantages of using web 2.0 tools, we believe that they should be put to greater use in the third social sector. Its members should be trained to use them and funds should be made available so that they can be provided.

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TRANSFORMING HIGHER EDUCATION IN THE CONNECTED SOCIETY: A WEB 2.0 APPLICATION AT ROVIRA I VIRGILI UNIVERSITY

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Abstract

In the present landscape of technological change there is increasing awareness of the need to support the acquisition of digital competences. In this paper we address how digital competences can be developed through formal learning. We show how to design a web 2.0 learning experience that was undertaken at Universitat Rovira i Virgili and which developed both digital competences and management knowledge. Our final reflection is that higher education academics should continue to expand their awareness of web 2.0 applications and the role they can play in optimizing learning and knowledge creation among students, the digital workers of the future.

1. Introduction

Information and communication technologies (ICT) are currently playing a key role in the education arena, from primary school to higher education and adult learning. This development was labelled under the now commonly accepted term e-learning, which is evolving to new models such as mobile learning.

The European e-Learning Action Plan 2001 (European Commission, 2001) defines e-learning as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration. This requires new e-interaction and e-communication competences and a reorganization of e-learning structures. The components of these structures include content delivery in multiple formats, learning management, and a networked community of learners (Gunasekaran, McNeil, & Shaul, 2002). Internet/World Wide Web have meant that opportunities have been identified for developing distance learning activity into a more advanced online environment known as Virtual Learning Environment (VLE). Higher education institutions devote substantial resources to providing students with access to internet-based information, VLEs and other forms of e-learning. These efforts are predicated upon the assumption that ―university students are inherently inclined towards using the internet as a source of information within their day-to-day lives and, it follows, disposed towards academic use of the internet" (Selwyn, 2008).

In a fast moving technological environment, the traditional approach to e-learning is currently changing from the use of VLE to learning 2.0, an approach that combines complementary tools and web services—such as blogs, wikis, podcasting, videoblogs, and social networking tools—to support the creation of ad-hoc learning communities. In this context most of the current research tends to be concerned with the potential of the worldwide web and other internet applications to accelerate university students' learning and knowledge-building, and support interactivity, interaction and collaboration (Selwyn, 2008).

This paper aims to provide an introduction to the application of web 2.0 tools and social software on the learning process. Social software has emerged as a major component of the web 2.0 technology movement. But, how can social software play a role in higher education? To answer this question, this proposal focuses on the role of web 2.0 technologies in promoting learning and the development of digital competences among students. A pedagogical application at the Rovira i Virgili University (URV, *http://www.urv.cat/*) which stems from the provision of collaborative knowledge discovery, is discussed in depth. At the same time, the paper explores the concept of digital competence from the perspective of the competence needs of the labour market and, the role that social software plays in the learning process. Finally, conclusions and some suggestions are made for future research in this field.

2. Background

2.1. Social software and learning 2.0

The term social software includes a large number of web 2.0 tools used for online communication (instant messaging, weblogs, wikis, social network services, virtual worlds, etc.). O'Reilly (2003) describes web 2.0 as an "architecture of participation'' in which collective intelligence generates a "network effect'' leading to websites that become more valuable as more people participate. For McGee and Begg (2008), web 2.0 "represents a group of web technologies with a user-centric focus that actively change and evolve with user participation."

The educational potential of these changes require a "thorough rethink of both the individual and collective dimension of the teaching-learning processes, rhythms of learning, new ways of structuring information for the construction of knowledge, and the tasks and competences of teachers and students " (De Pablos, 2007). The use of Web 2.0 tools and social software at the University is a strategy for a change towards the continuous improvement of education and a new culture sustained on the connectivism developed by Siemens (2004), in which knowledge is generated by means of a participatory culture or 2.0 learning. 2.0 learning takes place within a sociocultural system in which people use technology to interact and learn collectively bargaining, thus encouraging lifelong learning.

In short, as Maenza and Ponce (2008) point out, these new environments are contributing to an educational transformation which implements, with no major problems, Piaget's concepts of constructivism and Vigostsky's social interaction: permanent, collaborative and active learning, in which learners are responsible for their own learning. The new technologies make a new university model possible which promotes 2.0 learning.

Esteve (2009) expressed himself in similar terms and pointed out that the Spanish university, in the middle of the process of adapting to the European Higher Education Area (EHEA), should continue to renew its educational methodologies and, ultimately, continue the process of change of the educational paradigm. The driving force of the ICT and the revolution of the social tools are somehow reshaping the personal learning environments of the students and generating new horizons for the development of new competences of future graduates.

As is well known, the EHEA places the student at the centre of teaching-learning process. This shift in the educational paradigm is related to a methodological change that stresses the student's active role, initiative and critical thinking. In this new context, which focuses on the student and the attainment of competences, as we have already pointed out, the information technologies play a key role, providing new contexts and possibilities for the development of these skills. In this paper we shall explain how to carry out these processes of educational innovation and develop digital competences.

2.2. Exploring the concept of digital competence in the digital era

All the changes involved in the information society make new demands of individuals, because they need to acquire competences that are qualitatively different from those required just one decade ago. The information society requires new knowledge, new skills and, above all, new attitudes, which can be grouped under the term digital competence, and it also requires individuals to be able to use technology interactively. As stated by the OECD's Definition and Selection of Competences (DeSeCo) Project

(http://www.oecd.org/edu/statistics/deseco) the interactive use of technology requires an awareness of new ways in which individuals can use technologies in their daily lives. The twenty-first century must prepare graduates for the technology-enabled communication that has transformed the world into a global community, with business colleagues and competitors as likely to live in India as Indianapolis (Partnership for 21st Century Skills, 2003).

The "*Key Competences for Lifelong Learning European Reference Framework*" (European Parliament and Council, 2005) defines a digital competence as the "the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet."

Obtaining, evaluating and using information are the basis for students to demonstrate creative thinking, construct knowledge and develop innovative products and processes. They are the competences that allow students to use digital media and environments to communicate, and work and

learn collaboratively. They enable students to use the skills of critical thinking to plan and manage projects, solve problems and make informed decisions with the appropriate digital tools and resources. In short, digital competence is the ability to understand and express by making analytical, productive and creative use of the information technologies and social software to transform information into knowledge.

In a society of increasing individualism, social networks are providing a communication fabric that allows people to interact with great intensity within their organizations. In a survey conducted by the Economist Intelligence Unit and sponsored by KPMG International, executives from different sectors agreed that the adaptation of Web 2.0 tools could offer benefits in key areas (Matuazak, 2007): greater collaboration, innovation and improved productivity.

Undoubtedly, Web 2.0 tools and social software can increase the commitment of the members of an organization (Dawson, 2009). Working in the digital age means that, more than ever before, it is necessary to understand how organizations make use of 2.0 tools and social software in the various areas of their activity. In 2007, the survey *Enterprise 2.0* of KPMG International revealed that sales and marketing, information and research, information technology, customer service, and strategy and business development are the areas that make most use of Web 2.0 tools. Present-day companies have to be aware that the Internet can destroy a brand, so they have to be a part of it to defend their products. And they can be a part of it by participating in the Web 2.0. All these initiatives depend on the professionals who work in companies and this is where the importance of being a 2.0 professional lies.

These new demands of the labour market mean that the processes for evaluating the competences of higher education institutions need to be adapted to include digital competences in a framework of general competences and independently of the particular qualification. It is on the basis of these ideas that the teaching innovation experience summarised below was planned.

3. A case study at the Rovira i Virgili University

3.1. Adapting the URV competence framework for digital competence assessment

Organizations are using competence models to "clarify organization-specific competences to improve human performance and unify individual capabilities with organizational core competences" (Rothwell & Lindholm, 1999). Competence models can be used as a recruitment and selection tool, as an assessment tool, as a tool to develop curricula and training material, as a coaching, counselling and mentoring tool, as a career development tool, and as a behavioural requirement benchmarking tool (Yeung, Woolcock & Sullivan, 1996).

The EHEA is an education model with a competence-based approach, which aims to ensure that the competences taught are those that are required in the workplace. Thus, the goal of any competence-based education is to ensure that learning is transferred to the workplace. In this context, the ability to choose and use appropriate ICT and social media is becoming a necessary competence for academics.

A deep understanding of what is required by the labour market needs to be matched by a common understanding of the learning outcomes achieved in different courses and degrees.

The URV competence framework is a key step towards increased transparency in the competence market. Competences, which enable student to succeed and to have a university degree, will also enable them to prosper throughout their professional careers. The development of competences must be maintained and reinforced by higher education institutions.

The URV competence framework was first implemented in the academic year 2003/04 to adapt its curricula to the EHEA. The proposed competence framework divides student's competences into three different types: specific (A); transverse or transferable (B), set of competences related to attitudes and values, "*knowing how to be"*, and procedures*, "know how"*; and nuclear or core (C), set of basic competences required by all URV students, which may be knowledge, attitudes and procedures.

Within each competence, various levels of mastery can be formulated. These levels express the degree of achievement of a competence throughout a degree, a course or a planned activity.

As an initial working proposal, the URV has established the core and transferable competences for a variety of disciplines, as is described in the document "Guía para trabajar y evaluar las competencias transversales/nucleares en las titulaciones de Grado" ("Guide for developing and evaluating the transferable/core competences in bachelor degree qualifications") (Rovira i Virgili University, 2009).

Once the competences to be developed in the academic curricula of the various degrees have been agreed on, learning outcomes must be determined as an explicit statement of what students must have achieved by the end of the teaching-learning process. Students will be evaluated on the basis of these competence-based learning outcomes. These procedures, attitudes and knowledge are defined by the demands of the labour market and the new competences required of the workers of the digital age.

The experience described here has focused on developing the digital competencies related to competences C2 (Advanced user knowledge of the information and communication technologies), C4 (Ability to write and speak correctly one of the two official languages of the URV), and B5 (Ability to work cooperatively as part of a team and sharing the responsibility).

In this regard, it is important for students to have advanced user knowledge of ICT, to know how to adapt their communication style to the new technological environment and, at the same time, be able to work collaboratively in virtual teams. The EHEA prioritises collaborative work as a transferable competence in order to promote independent, committed learning that is in tune with the changing needs of businesses today.

3.2. The added value of "Quadratonics, SA" as a 2.0 learning experience

Using the competence framework described, we present a Web 2.0 learning experience carried out at the URV. The course, entitled "The Development of Professional Competences for Professionals of the Digital Age: Use of Social Software and 2.0 Web Tools" was taught completely in digital format and was held in July 2009. The students who participated in the experiment had specific learning targets about the world of management and they used ICTs and social software as support tools to create knowledge.

This experiment in teaching innovation arose out of the idea that this teaching methodology solves two basic problems: firstly, it helps students to learn about the world of management and, secondly, it enables them to develop the skills they need to work in the digital age. The result of this process is that students create social capital and become digitally literate in Web 2.0 tools and social software.

The multimedia case that was studied in the summer course, from the point of view of management, was equal opportunities in labour relations at a fictitious company created for this purpose, Quadratonics SA (available at http://quadratonics.awardspace.com/.).

Moodle (http://moodle.org) served as the online learning environment. The course was divided into three learning modules (Learning about web 2.0 and social software, Enterprise 2.0 and, Labour relations 2.0). All the theoretical and conceptual aspects presented and the instructions about the work that had to be done were posted on Moodle at the very beginning of the course.

The forty students of the online course worked in virtual teams and had not met each other before the course. The members of the team of instructors all had different backgrounds to maximise the mutual learning experience. The final project report required teams to present their results using a blog.

The methodology used to achieve the overall aim of the project was based on social interaction, and in particular collaborative learning. At the same time, knowledge was constructed using the constructivist approach. Among the basic tools provided by Moodle, e-mail (the internal messaging service) and forums (for interactive discussions and conversations) were used for the purpose of constructing and transferring knowledge.

Alongside these objectives, this course was used as a base for developing a new learning resource (Quadratonics SA). The pedagogical criteria for evaluating Quadratonics, SA as a social networking environment were: use of technology, versatile use, flexibility, interdisciplinarity, social connectivity/e-collaboration, real-world application, personal identification, and learning model. They are based upon the previous work of Bower (2008); Hart (2008); and Storey Phillips, Maczewski, & Wang (2002). The technologies exist to facilitate social networking for learning and social capital. Now we just have to learn how to use these technologies to continue learning and become true professionals in the digital age.

3.3. "Quadratonics, SA" learning outputs

The work that students had to do to be awarded the certificate for having satisfactorily completed the summer course consisted of two parts. In the first part, students were expected to be able to handle Web 2.0 tools and learn to work cooperatively, especially with the group to which they had been

assigned to carry out the task. In the second part, students were asked to analyze the situation of equality in the company to be studied, Quadratonics SA, following the instructions provided. To solve the equality problems found, students had to use Web 2.0 tools provided by the Quadratonics SA website. The results were evaluated by a total of 7 teachers who took part in the evaluation project.

The figure below (figure 1) summarises the learning outcomes achieved by students for each of the competences studied, which enables us to evaluate the students‘ learning. In turn, the figure reveals the extent to which competences have been acquired by means of a score that evaluates the level of mastery on a scale from 1 to 3.

In particular, we note that the core competence e-communication (C4) has the lowest mean score (1.73). Accordingly, on average, students have most difficulties in achieving the learning outcome: "producing a written text appropriate to the communicative situation”. That is to say, they find it difficult to produce a blog with a written text on the issue to be analysed (equal employment opportunities in Quadratonics SA).

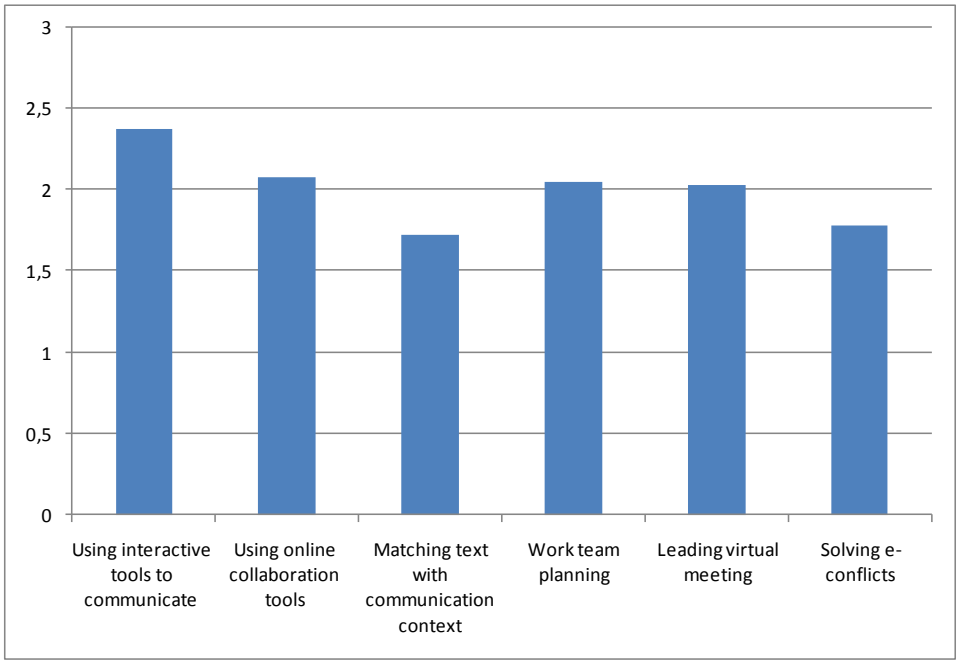

Figure 1. Average score for digital competence among URV students

We should also point out the results obtained in the transferable competence of e-collaborative work (virtual team environment, B5), and with regard to the third level of mastery analyzed: ―Abiłty to work cooperatively as part of a team and to share the responsibility”. In this case, students fail to acquire a satisfactory level of mastery for "Facilitates the positive management of the differences, disagreements and conflicts that emerge in the virtual group” (score: 1.78).

The results of the other two levels of learning are satisfactory, as are those for the core competence "Advanced user knowledge of the information and communication technologies” (C2). The area of competence C2 that deals with the use of "online communication software: interactive tools”, was divided into two parts to differentiate between those students who use interactive tools other than e-mail, and those who use online collaborative work tools. If we analyse the use that students have made of Web 2.0 tools throughout the summer course, we should point out that, in general, students have used g-mail for e-communication. Likewise, we should also mention that Google Docs was largely used as an online office tool, and that the Moodle forums were used by students to communicate with one another. The conclusion is that the competences that were being evaluated have been satisfactorily acquired and that the students have sufficient knowledge to use Web 2.0 tools in a work environment.

4. Conclusions and future trends

The new student generation has grown up in an environment where ICT has opened up opportunities of social interaction. The emergence of web 2.0 technologies and social software has enabled students

to connect, collaborate and create new knowledge through computer-mediated communication and online communities. The influence of constructivist ideas on learning has led educators to implement more motivating environments, in which learning takes place in settings closer to real-life scenarios, such as the one we have described in this chapter. Web 2.0 fits not only into a constructivist model of learning but into a connectivist model.

The Quadratonics' learning experience is much more than simply adding technology to the learning process. Quadratonics SA is a learning experience for the connected society. The learning dynamics and knowledge creation that take place in virtual communities like Quadratonics SA have clear similarities to the dynamics and knowledge creation in a learning society. Finally it is important to remember that —when staff move their on-campus teaching to more off-campus and blended environments, professional development is invaluable" (Samarawickrema & Stacey, 2007). Teaching experiences, such as Quadratonics SA can encourage academics to adopt ICT thus increasing the human capital value of higher education institutions.

A range of subjects need to be explored in detail to step up research in the field of learning 2.0 and in the use of web 2.0 tools and social learning in higher education:

- Special attention needs to be paid to using emerging technologies for the development of innovative applications in education and training. The question of how to motivate and socialise students as active learners also needs to be raised.
- In the near future, portable and personal technologies will provide new opportunities for connecting people and creating new e-learning 2.0 environments. We are only just beginning to understand the opportunities that mobile technologies and social software provide for learning.
- Better digital competence rubrics and indicators need to be developed to monitor progress in the use of Web 2.0 in formal education for digital competence development and to certify the degree of student competence.
- Another key issue for future research is to explore what forms of knowledge students obtain from social software and how students use such knowledge.
- The concept of virtual networks for collaboration needs to be revisited. We need to understand how these communities are formed and the ways in which they can facilitate the contribution of cybersocial networking to the learning and engagement of students and teachers.
- E-learning Web 2.0 may be able to reach learners who are disadvantaged by the digital divide. It is also important to take into account individual differences in learning, and special needs education so that the potential of web 2.0 technology can be exploited to provide remedial measures in the case of disability, exclusion or difficulty in gaining access to learning, or where conventional education does not work.

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TECHNOLOGY USE IN REPORTING TO PARENTS OF PRIMARY SCHOOL CHILDREN

Eva Turner

Abstract

The British Government emphasises the involvement of family and parents in children's education. In parallel there is a rapid increase of computer technology in schools. Primary school teachers are required to present parents with an end of year school report, which often represents the only real information parents receive. While the government assumes that teachers' communication with parents can improve through the use of computerised systems and report writing software, the evidence appears to point to primary schools and parents rejecting the use of technological communication as insufficiently personal and informative. The Government assumes that schools will implement highly sophisticated technology while it presumes that parents and teachers approach their communication from a level power base and equal technological ability. Thus the school systems reinforce social and class differences.

1. Introduction

This paper reports on the process of the introduction of specialised report writing software to primary schools for teachers to inform parents about their children's educational attainments. It compares the British Government's attitude to using technology for school-home communication with the actual experiences of teachers and parents. I carried out in depth interviews with four teachers, two school heads, one foundation years educational advisor and four parents. I also did short interviews with six primary school teachers, one Local Education Authority (LEA) Primary School Consultant and received questionnaires from teachers in 9 primary schools, all from East London.

Most parents of primary school children in the UK await the end of year school reports with a set of expectations. These are varied and depend on the parents' own education levels and school experiences, cultural backgrounds, the type and level of their own involvement in their children's education and with their school. They want to know what their children have learned during the preceding academic year and, importantly, they also want to know how their children socialise, whether they are happy at school, whether they are funny or sad, assertive, outgoing, un-collaborative, difficult etc (C^2, M^3).

Primary school teachers spend a considerable amount of time with each child and are in a position to acquire a depth of knowledge and understanding of each child's learning processes and achievements and also each child's attitudes to learning, to their peer group and wider school community. My research confirms that primary school teachers are deeply involved in writing their pupils' end of year reports to parents. The great majority of them care deeply about how they portray each child to the parents in a message which remains individualised and appropriate and on the whole positive and supportive.

Primary School reports to parents have always played a major part in the parent-teacher dialogue. Pre ICT reports were hand written into pre-printed forms and contained mostly a personalised, individualised assessment of each child's achievement. Apart from English and Mathematics, subjects were generalised into overall learning attainments. While inevitably teachers re-used statements, the reports – particularly the early years - concentrated on children's orientation in school and their social skills. The primary curriculum was integrated and there was primarily a one way teacher – parent process of engagement. Only at some schools parents had an opportunity to discuss reports with the teachers at an open evening. In J^1's school with almost 100% of children from a minority community this meant organizing meetings at parents' convenience – e.g. fathers could attend in the morning. From the 1980s Local Educational Authorities allocated funds to schools to actively encourage parents into schools as the idea of parents' conferencing began to be developed. The process was often "one way" with parents being "respectful" and not challenging to teachers, who were seen as experts (J^1).

With the increased use of ICT in schools in the 1990s, the writing of school reports became digitalised, however the above described process and attitudes of teachers to the reports have not changed. The pre-printed report forms were computerised and in some cases the teachers and/or schools have created their own statement banks for repeated use.

The major change in the process of primary school report writing was caused by two events. The first was the introduction of the National Curriculum in 1988 to ensure that all state schools provide a common curriculum to all children and a consistent, measurable and comparable level of teaching and learning (Teacherstalk 2006). The many subsequent changes to the Curriculum emphasised individual subjects even for very young children. The second (late 1990s and early 2000s) was the development of specialised, statement banks based, report writing software (e.g. Report Assist) and Schools Information Management Systems (SIMS), which were seen not only as helping school organization but as the best tool for communication with parents.

2. The British Government and School – Parents Communication

The British Government's drive to introduce ICT into schools has been very strong for a number of years now. The Department for Children, Schools and Families (DCSF) and its subsidiary organisations have published a number of articles, reports and assessment reports about the use and the role of ICT in Primary Schools. National Grid for Learning policies were designed to increase the role of ICT in schools, and resulted in a large number of computers and systems being bought by schools. It was the stepping stone to today's policies of parental on line access to the school environment and children's attainment. While worrying about issues of privacy, surveillance, copyright, defamation and much more, the Government has encouraged the computer industry to have a key role in the computerisation of schools without controlling this technological development (Scanlon & Buckingham 2003). British Educational Communications and Technology Agency (Becta) is the government agency —leading the national drive to ensure the effective and innovative use of technology throughout learning". In Becta's remit (2009) Ed Balls, the Minister of Education, stipulates that in 2009/10 he expects Becta to provide leadership in the use of ICT systems in tracking learner progress, in —raising expectations of parents" and in increasing —the number of authorities using online reporting systems to engage with parents".

Stephen Crowe (2009), the chief executive of Becta reports that one of Becta's achievements for 2009 was the equipping of —every school for online reporting to parents", while helping teachers, parents and pupils to develop digital skills to use online services. So Becta is a Government arm which has a direct input into the way individual schools make decisions (educational, financial and technological) about ICT.

Becta, Schools and ICT Policy

In 2007 Becta commissioned a survey exploring the uses of ICT in Primary and Secondary schools (Kitchen, Finch and Sinclair 2007), which reported the following:

Almost all primary schools in England wrote a strategy for ICT. In most primary schools the head was involved in the purchasing decisions and primary schools were most likely to purchase their hardware and maintenance through the local authority. 47% of primary schools expected a rise in ICT expenditure. 72% of primary schools had a website and 70% of schools also used emails, while paper communication remained the predominant form of communication with parents.

However, while most primary heads cited using ICT for recording pupil progress and improving independent learning as a high priority, most heads of primary schools did not cite ICT as a tool for improving the communication with parents as a high priority (Kitchen, Finch and Sinclair 2007, pp.5-31). 5% of primary teachers said they produced handwritten reports only, 49% of primary teachers modified or re-used electronic templates that had been pre-prepared and 27% created their own electronic templates. The remaining 19% of primary teachers used a combination of these approaches to produce pupils' reports (Kitchen, Finch and Sinclair 2007, p.91).

Kitchen, Finch and Sinclair (2007) do not mention report writing software anywhere in their rather extensive report. However in their research teachers report ICT use as a time saving tool for lesson preparation and delivery in particular (p.96). This seems to be in direct contradiction to my research into time spent using technology in writing reports for parents, which indicates disproportionately

longer time. Their report also suggests that maths and science teachers are more likely to agree with positive statements about the use of technology in teaching (p.109), which suggests that these teachers may have had higher levels of ICT literacy then others subject teachers. This report does not analyse the gender or age of teachers or heads, nor their ICT abilities or literacy. The respondents appear to be self selected, which suggests that a particular group of teachers who have a knowledgeable, possibly positive, relationship to ICT would respond to such a survey.

In March 2009 Becta wrote an implementation plan outlining the DCSF's strategic ambitions for technology (Becta 2009). This report maintains that there is a strong demand among parents for sharing online information and communication, which is not being met by schools (p.11). Becta's approach to improving the communication is to strengthen the role of technology and improve its capacity. The adoption of information systems and on-line tools, it is explained, will strengthen the relationship between families and schools. An example for this statement comes from Assistant head, Djanogly City Academy (p.13), who explains that real-time up to the minute reporting enables parents to construct a meaningful dialogue with the school. Unfortunately this example is not supported by any actual examples or comments from parents. Becta recognises the need to improve parents' understanding and expectations of the opportunities and benefits of technology. It recommends the promotion of Home Access grants and support for local authorities in their approach to schools' provision of on-line information to parents and families. This, Becta suggests, should be done by appointing additional consultants (p.26).

Becta's approach to the employment of computer technology for school-parents communication appears to strengthen the power position of the technology experts. Be they the technology teachers or external technology consultants. They do not suggest a consultation process with teachers or heads, nor possible technological and, importantly, technology related social training of teachers and parents.

Another Government site, which publishes advice, resources, articles and guidance on good practice for teachers, is Teachernet. This site categorically states that there is overwhelming evidence that —parents' engagement in their child's learning is the most important influence on its attainment, wellbeing and life chances" (Teachernet 2009). This site contains case studies of secondary schools developing ICT based parental access to student information via a username and a password protected access to student records. The qualities they quote are reduced workload for teachers and better —quality of product" (report) to parents. However, no such case study is reported for a primary school. It appears that these reports have not really been chosen for their critical element, or their discussion on the meaning of —quality of product".

In 2009 Becta published a new report entitled Schools and Parents: A new partnership. This is a piece of research conducted with 2000 parents and 1000 teachers exploring parents' relationship with schools through the uses of ICT. While maintaining that good parental engagement is extremely beneficial to children's academic attainments, the report also found that most parents do not contact teachers very often. Many feel that they would encroach on the teacher's time, lack the confidence, feel that schools' education is up to the teachers only or are being dismissed by the teachers as being too inquisitive or intruding. The teachers, on the other hand, feel that they lack time to spend on frequent parents' consultation or that parents are too busy themselves. Thus, the research concludes, teachers are seeking more effective channels for parent – teacher communication through uses of a variety of technological tools, and that the majority of parents believe that technology can help them to communicate with schools more effectively. While 55% of teachers indicated some form of digital communication with parents, this report also maintains that 80% of households with children age 5-17 have access to the Internet.

In this report the Government promises primary school parents secure online access to information about their children's learning by 2012 as well as increased family access to the digital world through the Home Access programme. The most preferred communication channel for the future appears to be via secure websites. In order to help children to learn, such media will enable parents to view all children's work, results and reports and the schools' activities. It will enable parents to have an ongoing communication with the school. As with other Becta reports the sources of the data here are not specified and there is no indication of the parents' class, educational background, or any other social indicator. Missing is the analytical approach to the meaning of communication between parents and schools, or what such communication should achieve (except the generalised goal of improved children's attainments). Also missing is an analysis of primary schools' ability to construct and

maintain sophisticated technological systems, or any commitment to future financial support for such systems.

In the Next Generation Learning campaign (Becta 2009) school technology and its use is explained to parents who are invited to support the campaign for greater involvement of ICT in the learning process. The same campaign then invites schools to see, through examples, how best to use Schools Information Management Systems (SIMS) to communicate with parents. Yet it appears to recommend to schools to consult with parents what technology they would like the schools to implement.

The whole approach of Becta to ICT and to the use of ICT for communication with parents appears to be full of contradictions. It seems to support the role of the technology experts and is missing any face to face contact. It is very technologically deterministic (MacKenzie and Wajcman 1999) in its approach to ICT and the success which, it maintains, ICT will bring to parent – teacher communication. It appears to imply that the current ways of communication are inadequate and that the only way parents can improve their help to children to obtain better results is through the use of ICT. There is an underlying assumption that through the "neutral" technology parents can become engaged with the school, become informed and automatically supportive of what the school is attempting to achieve in terms of their children's education. Meaningful dialogue between schools and parents will be improved by this "socially independent" technological change.

Defending Becta's approach Millwood (2009) argues that too often negative and prejudicial social attitudes to ICT are not recognised for their knock-on effects on education. Such anti industry prejudices can demonstrate themselves as anti-education, thus limiting teachers in their ability to creatively use technology. He also argues that thinking of ICT as "just another tool" (p.19) which follows learning means missing the possibility of new "symbiotic" human-tool learning environments. He differentiates between "teaching factories" and "learning communities" in which he includes parents. His paper however does not deal with parents' involvement in these technological learning communities.

Contrary to Millwood, Smedts (2008) argues that while teachers are becoming the tools of this technological dominance, parents too are expected to learn the technology in order to become socially accepted as good parents. She argues that the notion of "being a parent" is being undermined by the pressure to use the Internet. She contrasts two ways in which parents are involved with their children: one in which parents question the tools of parenting (i.e. the technology) and the other in which they solely respond to instructions (often on the Internet) of experts, be they educational or technological.

The on-line communication of parents with schools will inevitably change the relationship parents have with teachers and possibly with their own children, accepting the specific realities as portrayed to parents through the technological medium provided by the technological and the educational experts. There appears to be a grave contradiction between the government portraying parents as partners in their children's education, and the government technologists expecting parents not to question the means through which that partnership is put into practice.

Parents and Teachers and Report Writing Software

It is a statutory requirement of UK schools to provide parents annually with a written report covering each pupil's achievements related to the national curriculum, general progress and attendance, results in tests and information on consultation periods (Community Legal Advice information Leaflet 20 2008, p.9.).

It would be reasonable to expect that when inspecting schools, the Office for Standards in Education (OFSTED) would be looking at the end of year school reports as a major source of parents' information about their children's educational attainments. In their newest remit OFSTED (2009) maintains that the inspections themselves must inform parents as well as the Secretary of State for Education about the schools' overall performance to enable parents' choice. Among the principles of inspections the interests of children, young people and parents are the most important. In reporting on the effectiveness of management and leadership, schools' engagement with parents is examined. Such an engagement is evaluated through end of year questionnaires returned by parents and through OFSTED inspectors talking directly to parents. The OFSTED's questionnaire has one question, which asks parents to express the strength of their feeling in a 4 point scale: "The school informs me about my child's progress" (OFSTED 2009).

The end of year school reports to parents are not mentioned anywhere in the OFSTED material. Inspectors do not appear to want to see them or ask parents about their quality or meaningful messages about their children. All of my interviewees and questionnaires reported that no OFSTED inspection ever looked at or discussed end of year reports with teachers. In view of Becta's allegations that most parents do not visit schools, it is remarkable that the Government does not want to be informed about the only reliable and compulsory way in which schools inform parents about their children's educational progress.

In relation to the above legal requirement, most computerised report writing packages used for Primary School reports assume that parents need to be informed about a range of subjects. Thus the software report blueprints and statement banks are arranged in paragraphs headed by each Curriculum subject. However for 5-7 year olds the emphasis is on developing literacy and maths skills (Directgov 2005), the delivery of which is tightly controlled and streamlined. The way in which the other subjects are delivered is left to individual schools (BBC 2009).

It became clear during an interview with a LEA Foundation Years Advisor (pre Key Stage 1) and from the Qualifications and Curriculum Development Agency (QCDA 2008) website, that there is a need for communication between primary school teachers and foundation teachers about the levels of attainment with which children enter into their first year of primary school. Both, the advisor and the DSCF stress the importance of an educational dialogue between particularly KS1 and foundation teachers to best utilise early years learning and parental involvement in children's schooling. The emphasis of Early Years Education is on areas of personal development, on which the KS1 teachers build their teaching, mainly social and emotional development, language, numeracy and knowledge and understanding of the world (QCDA 2008).

However, the report writing software statement banks available to primary school teachers do not allow for comments on such personal development of children. Many parents would prefer the broad extent of foundation reports to be maintained in the end of year reports. C[2] characterised it as follows:

> *Initially I took a very long time looking for phrases and matching them to children…. At the beginning the statements one after the other did not read well, the language was too bland and did not tell enough individually to parents about their children…"*

J[1]explained how she used each child's photograph in order to write personalised reports. With the report writing software the reports became

> *…technically accurate of the attainments records achieved…* but… *had no flavour of the real child…*

In an interview with LEA Primary School Consultant I was informed that their role is to teach teachers about their specialist subjects, not about how to report on them to parents.

The Labour Government's Every Child Matters agenda puts parents at the centre of children's wellbeing, emphasises the communication of schools with parents and appears to conflate parental responsibility and parents' choice. It assumes that equality exists between parents and teachers and places high levels of responsibility on parents. It assumes that such a balanced partnership relies on shared systems of communication which prevents misunderstanding (Argent 2007). Despite the onus of responsibility on parents the government assumes that schools will initiate the consultation process. In her paper Argent (2007) collects evidence of breakdown of school-parent communication and of schools' fears of —parent power". In my research these fears appear to be unfounded in areas of high minority populations and low levels of education families, where the teachers' professional status remains unchallenged by parents. Argent (2007) also reports on attitudes of the educational profession which display the power inequalities between educationalists and parents and on unreasonable expectations that are placed on parents in terms of their children's education.

With respect to the end of year school reports, this was confirmed in the analysis expressed by all my interviewees. The jargon and strict language reference to the National Curriculum and attainment targets makes reports difficult to comprehend for parents and places teachers in a position of power. All confirmed that the parents' own level of education, their own educational experience, their cultural background and whether English is their first language, play a huge role in what they expect from the reports and how they react to it. Cultural backgrounds are formed by a variety of social aspects. These inform the expectations parents have of their children's education, and influence the communication process between parents and teachers. For such a communication to be meaningful, teachers need to understand the cultural backgrounds of their pupils as well as their own (Joshi, Eberly & Konzal 2005).

The East End of London is very multicultural and almost all schools have pupils with a huge variety of backgrounds, cultures and languages. This is not always the case for the schools' teachers. J[1] describes her school being in the heart of a minority community, where a number of parents did not speak English and the school often relied on interpreters. The end of year reports presented a particular problem in their communication and needed to be structured in a way which not only the parents but often the interpreters understood.

End of year school reports are often the only link parents have to their children's education and the major source of information about their children's attainment. All teacher participants in my research have agreed that only well educated and assertive parents challenge school reports or ask for further explanation. These are also likely to be the parents who return the OFSTED questionnaires. They confirmed that not all parents attend parent evenings and some parents are only interested in knowing how their child fares in comparison to her/his peers. Teachers feel that the most appropriate way of reaching parents is to write personal and understandable reports which describe not only children's attainment levels but also their children's school life in social and community terms. What parents of primary school children are interested in is to know that their children have fitted in, are happy, are learning, are socialising etc. They skim read the reports as most of what is in them is of no use to them (M^3). As an educated parent M^3 had to consult the National Curriculum (to which she has, as a teacher access and of which she has intimate understanding) to understand the end of year report for her KS1 child. The report was produced using a statement bank report writing software. Other parents, who did not have M^3's understanding of the National Curriculum, confirmed this experience.

$C^{2,}$ M^3 and D^5 describe the process of the report writing software adoption in their respective schools. In all cases the software was introduced with insufficient consultation by senior management. The teachers were given some basic training and were allowed a personal copy of the software. However no formal discussion on the effect of this report writing process had taken place and it was the teachers' own initiative and a high level of technological knowhow, that brought about changes to the software which enabled them to personalise the individual reports. In the words of C^2:

> *I felt confident about writing the reports* (by hand/Word) *and had a system for doing lots of them. ... but I got overtaken by the technology…*

Less conscientious or experienced colleagues resorted to copying and pasting statements without a sufficient depth of understanding

> *…clicking anything to make up the bulk. You start being ashamed of yourself as a teacher…*
> says M^3.

All teachers describe how using report writing software had taken considerably longer because they aspired to create individual and personalised children's reports. The initial adoption was apparently aimed at shortening the time teachers take writing the reports and standardising them to make then comparable across the school. It appears that the total process of learning the new technology, understanding the statements contained in the statement banks and then adapting the technology to enable teachers to personalise individual children's reports increases considerably the report writing time compared to time actually allocated. It is a reductionist process which does not appear to support the Government's aims of involving parents in parent teacher communication.

The interviews with parents revealed their lack of understanding of the curriculum related statements, their surprise to find that their child's report reads almost exactly the same as other children's and their astonishment in learning that a computer program with generalised statement banks was used to create the report.

The primary schools in which the discussion about using a report writing software had taken place appear to have opted for not adopting the specialised software. These schools have chosen an agreed template for the reports and some a statement bank which they created themselves using a word processor[6]. M^3 pointed out that there is considerable expense and time that is invested in purchasing and learning specialised software. Schools remain committed to purchasing updates of the software and would therefore be reluctant to reverse back to a word processor.

When asked about the difference between using the report writing software and a Word template J^1 explained that

> *it is the difference between a multiple choice questions and an essay. Multiple choice demonstrates the knowledge, but not the actual process. It does not communicate properly what needs to be improved.*

3. Conclusion

The British Government through its Department for Children, Schools and Families and its subsidiary and affiliated organisations promotes parents‘ participation in their children‘s education, continuous and meaningful dialogue between parents and teachers and overall much greater involvement of parents with schools. This drive for parents‘ involvement is intended to help children obtain higher attainments which could be measurable by individual subjects even in the very youngest children. The main tool promoted by the Government for this teacher-parent communication and parents‘ involvement is the use of School Information Management Systems and the Internet. Part of this technological drive is the introduction of the end of year report writing software which uses predefined statement banks and is supposed to help teachers to write standardised subject based reports for parents in a substantially shorter time. The understanding of the role of primary school children‘s reports differs between parents and teachers and the Government. There is no discussion about them between the three parties, nor are they included in any OFSTED inspection process or technological debate.

My research indicates that while there is no saving of time for the teachers, the desired effect in these technologically produced reports are not fulfilled. Teachers reject the software as it does not enable them to write sufficiently personalised and meaningful reports. Parents reject them as incomprehensible, as the jargon of the statement banks relate to the educational jargon of the National Curriculum. Schools reject them as the expense of introducing the software may be too high or because management affords their staff the choice to reject it. For many parents the end of year report is the only comprehensive information about their children, and only parents from certain classes, or with particular cultural or educational backgrounds will challenge or further question them. The overall drive to technologise parent-teacher communication assumes technology has a neutral social role and does not take into account the power relationships between all the players involved in this process (technologists, teachers, parents, the Government, LEAs etc). There is an implicit assumption that the technology alone will improve the parent-teacher communication. Such an assumption overlooks the determinants of good communication, in particular those related to class, ethnicity, education and use of English. Thus schools‘ technological systems reinforce social and class differences.

Notes

[1] J has 31 years of primary school experience, 6 years as a head and 5 years as a deputy head of a bilingual inner city school.

[2] C is a primary school KS1 teacher in East London with 20 years teaching experience. She has been involved in using the Report Assist software since it was introduced in her school in 2004.

[3] M is a KS2 teacher in East London and KS1 parent who has extensive experience with report writing and with using Report Assist software since 2004

[4] N is a KS1 teacher in East London with many years teaching experience and was involved in the discussions of the adoption of report writing software in her school

[5] D is a lecturer in Education and an experienced primary school teacher

[6] This was revealed from 2 interviews with deputy heads of 2 primary schools in East London and a set of questionnaires returned from primary school teachers.

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A DEFENSE OF PROGRESS

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Abstract

A general defence of progress is presented that avoid the pitfalls of historicism and prophecy. Once it is clear that progress has to mean the progress of various particular technologies rather than being the progress of some obscure holistic notion of "humanity" or "society," an overview of adaptationist thinking in biology reveals grounds to expect technological progress. Such progress results from leveraging the power of selection algorithms in the context of a free and open society. While the defence of progress does not specify how the future will turn out, it points us to the importance of understanding and maintaining the circumstances that set up the selection algorithms that issue in progress.

Keywords: progress, evolution, adaptation, market, natural selection, historicism, forecasting

1. Introduction

The theme of Ethicomp 2010 is inspired by Alvin Toffler, who writes, "change is non-linear and can go backwards, forwards and sideways." To some ears, this may sound like a shocking admission from a well-known futurist and techno-enthusiast; it may seem that admitting the inevitability of set backs and missteps along the way is a retreat from the "practical optimism" expressed so often by Toffler and his ilk, an optimism summed up neatly in the title of a 1998 *Wired* montage, "Change is Good." To critics, the view of inevitable progress has seemed Panglossian and even dangerous. They have worried on the one hand that futurists and enthusiasts make predictions that cannot be justified (e.g., Horner, 2004), and on the other hand they accuse the proponents of technological progress of a crude "technological determinism" which is understood on the model of the vulgar Marxism wherein all culture is but an epiphenomena dancing atop the deeper material reality (e.g., Winner, 2002). But the defence of progress is in fact much more nuanced and compelling than many critics have imagined.

As I will show, there is excellent reason to believe that *on balance* change is good. The argument in no way supposes or implies discovery of a deep dialectic of History, or the ability to see the future in any way that transcends the epistemic limits of good science. While there is good reason be suspicious of any particular forecasts or predictions, and while there is good reason to wonder what progress means when the term is used to modify a whole culture or society, an understanding of the selection process that governs cultural evolution as an algorithm for the discovery of clever solutions to the problems we face reveals that there is excellent reason to believe we will find the best solutions to our problems, whatever those problems are. That is progress.

The account leverages an algorithmic description of Darwinian adaptation to show that a technology will tend to evolve to suit its environment. If the environment is such that the technologies that are better for us enjoy a fitness advantage, then the evolution of a technology will constitute progress. We determine the environments that determine the fitness of technologies, so there is good reason to expect our technologies will advance, unless humans are systematically unable to understand and choose appropriate environments for technological evolution.

Since the defence of progress is too abstract and procedural to permit the particular predictions favoured by futurists and other readers of tealeaves, it speaks against any policy analysis that supposes we already know what the process has yet to reveal. At the same time, the defence of progress reveals the sorts of policies that are crucial to the well functioning of the process that warrants our expectations of progress. While the institutions of the open society warrant an expectation of progress, it is not automatic or inevitable that these institutions will be maintained, let alone that they will be maintained in a way that best facilitates progress, especially in the face of technophobia, xenophobia, or the resistance of vested interests. The future is for the better, but it still has its enemies. Proponents of the future need an awareness of the sources and limits of the defence of progress if they are to advance their projects.

2. What is progress?

Perhaps the most difficult part of defending progress is coming to a precise view of what it means. Nisbet (1979) indicates the difficulty when he says, "The essence of the Western idea of progress can be simply stated: mankind has advanced in the past, is now advancing, and may be expected to continue advancing in the future. But what, it will be asked, does 'advance' mean?" Even more troubling, however, we need to ask, what exactly does it mean for "mankind" to "advance"? And towards what does it advance?

Although progress is generally associated with Enlightenment thought, a little investigation reveals an idea going back to the ancients. Aeschylus, Hesiod, Lucretius, and Seneca all describe general advances in arts and sciences. Even Plato does not always suppose corruption or degeneration from a Golden Age. While innovation is restricted to the class of philosopher kings in Plato's Republic, their active engagement in discovery is crucial to the success of the community. "There is thus envisaged, as essential to the working of Plato's ideal constitutions, the philosopher himself. He alone is competent to create, modify, and apply the rules, and upon his competence, progress in the future is dependent… (Plato) does envisage the possibility and the probability of change, and attempts deliberately to provide for the continuous guidance of such change in the direction of progress" (Lodge 1946).

For the ancients and moderns alike, the notion of progress is tied up with the fact that we should expect to know more tomorrow than we know today, and this will enable us to accomplish more. By the time of Condorcet's 1795 classic *Outline of a Historical Picture of the Progress of the Human Mind*, it seemed that progress follows laws of distinct stages, each culminating in scientific and political revolutions that spur even greater progress. "Everything points to the fact that we are verging upon the epoch of one of the great revolutions of the human race . . . The existing state of knowledge guarantees that it will be auspicious" (Condorcet 1795). Inspired by new discoveries in economics and biology, 19th Century liberals like Mill and Spencer also argued for knowable laws of progress and set stages of human development, while the dialectics of Hegel and those he inspired, including Marx, suggested that history itself was simply the working out of contradiction and confusion, progressing inevitably towards some ideal end state.

But there are excellent reasons to be sceptical of most of this. As Popper (1962, 3) convincingly argues, "sweeping historical prophecies are entirely beyond the scope of scientific method." Popper's claim is readily confirmed in the conspicuous failures of such prophecies. With respect to contemporary predictions, as Horner (2007) documents, "The record particularly of technological forecasting (but also social forecasting more generally) is dismal." As if this was news, a recent headline in the Wall Street Journal proclaimed, "Technology Predictions Are Mostly Bunk" (Crovitz 2009). The Journal's case against such predictions recounts notable failures, including Bill Gates' assertion that "No one will need more than 637 kb of memory for a personal computer" and British entrepreneur Sir Alan Sugar's 2005 claim that "Next Christmas the iPod will be dead, finished, gone, kaput." Roman engineer Sextus Frontinus declared in 10 A.D. "Inventions have long since reached their limit, and I see no hope for further developments."

Given its dismal record, one has to wonder why anyone takes futurist or dialectical forecasting seriously. Popper (1962, 5) indicates the root may be an attempt to evade the perceived burden of having to accomplish things for one's self: "historicism itself is, largely, a reaction against the strain of our civilization and its demand for personal responsibility." If it is inevitable that history will turn out a certain way, then one may be relieved of a great deal of effort. The quietism that results from historicist thinking was similarly criticised in Nietzsche's thesis that, "There is a degree of insomnia, of rumination, of the historical sense, through which something living comes to harm and finally is destroyed, whether it is a person or a people or a culture" (1873). If one's sense of history and human progress makes one proud of accomplishments one had no hand in producing, then such a sense of history may stand in the way of progress. On the other hand, historicist thinking may be used as an excuse to bypass the debate and inquiry that make real progress possible. As Winner (2002) argues, "From this standpoint, announcements that particular outcomes are 'inevitable' can be little more than attempts to hijack what might otherwise be a lively debate, excluding most people from the negotiations. A group of privileged actors proclaims: 'Good news! The future has been foreclosed! Your needs, dreams, ideas, and contributions are no longer relevant. But thanks for listening.'"

Whatever progress is, its defence must not be taken to establish the fait accompli of historicist prophecy, and the unilineal accounts of progress that have dominated so much discourse since the Enlightenment are problematic. On the other hand, it is hard to dismiss widespread belief in progress as merely an attempt to excuse ourselves from the effort to develop and evaluate better technologies and institutions. After all, when it comes to the particular technological artefacts we interact with every day, it is simply *obvious* that things get better and better. To take the most conspicuous example, the computers we use today are "insanely great" along just about any dimension when compared to those of just a few years ago. They are cheaper, faster, friendlier, more reliable, and even greener. When we contemplate upgrading our current machines, we routinely weigh the present benefits against the expected benefits of waiting for the next generation of machines, which we confidently expect to be even better. Perhaps this common sense notion of progress, which has much in common with the classical and modern notions of progress but without the unilineal and historicist elements of grand theory, can be understood as a pervasive feature of human history. In that case, we can discern a defence of progress that does not aspire to prophecy.

Progress in this narrower sense is not the progress "of culture" or "history" or "mankind" or anything so grand. Since "progress" speaks to the movement of something towards something, such grand notions were always a stretch. What exactly does it mean to say that "history" or "society" moves? Perhaps we should agree with Popper that "the idea of the movement of society itself—the idea that society, like a physical body, can move *as a whole* along a certain path and in a certain direction—is merely a holistic confusion" (1936, 300, emphasis original). Fortunately, an account of progress can be defended that does not stem from such confusion.

The literal meaning of progress relates the movement of something towards something. In a trip to Chicago, progress is simply every step that gets me closer to Chicago. Of course, steps that get me physically closer to Chicago while making my destination more distant in time do not count as progress in a relevant sense. Nonetheless, the main point is clear enough: Progress is relative to some standard or goal, conceived as a destination. One problem with grand theories of progress is that they suppose an uncontroversial, fixed and universal standard along which to evaluate the progress of mankind, or society, or history, or whatever, as if these "things" have destinations. Such an idea is highly contestable. Humans pursue a range of particular and incommensurable goods, defining themselves in terms of ways of life that cannot be readily aggregated or discounted relative to one another. To make the point clear by example, there is no way to represent what the ascetic values in terms that allow tradeoffs or aggregation with respect to the values that define the aesthete, at least not in any way that both could accept. Notions of the progress of "humanity" or "culture" will have to adopt a standard of evaluation that decides for or against one or both of these ways of life. Grounding a general account of progress on a particular conception of the good limits its appeal and prevents it from applying to our evolving standards themselves, since the conception of the good would have to stand outside the process as its standard.

In contrast, we will explore a more restricted and abstract sense of progress: For any particular technology one cares to name, there is reason for an arbitrary individual to expect that technology will be better in the future than it is today.

This notion of progress may seem too narrow to be of much interest, but it should be emphasised that "technology" is an expansive concept. In the most general sense, the sense in which it shares the root "techne" with "technique," technology includes not only gadgets, but also the procedures and methods we use to pursue all our various ends. It is in that widest sense of the term that progress refers to the progress of a technology. In this sense, the literal meaning of progress already indicates why the object of progress must be a technology; progress is a matter of getting closer to some end, and once we specify the end of some tool or practice we conceive it as a technology in the wide sense. So, if one wishes to speak of the progress of "society" one will be treating society as a technology, and putting it that way indicates the problem for grand theories of progress. While it is legitimate to conceive society as a technology, doing so assumes there are specific ends of society, which is in tension with the fact of "permanent reasonable pluralism." (Rawls 1995)

Since it applies only to particular technologies and does not support specific predictions about the future, the defence of progress does not commit the errors of historicism and does not encourage quietism. To the contrary, such a notion of progress informs and focuses attention on the conditions of progress. Articulating the grounds of progress contributes to establishing those institutions and

circumstances that promote progress. Whatever one's particular ends, one is presumably better off if the tools for achieving those ends are better, so there should be widespread support for progress in the relevant sense, especially when it is remembered that "technology" may include various institutions and social arrangements, assuming they are understood in terms of a clear end. If in fact there are circumstances in which *any* technology in the wide sense can be reasonably expected to get better, then anyone should favour cultivating such circumstances, including critics of "technology" in the narrow sense. Clearly, such a defence of progress does not end the discussion but only begins it.

3. Selection algorithms and defining what is "best"

The analysis draws on work in biological evolution, especially in defining the selection algorithm that moves evolution as an optimizing procedure searching nearby "design space" to discover peaks in a "fitness landscape," occasioning an equilibrium that forestalls further change unless and until some environmental variable is altered, such that the fitness landscape itself is altered, prompting anew the search for new peaks. The analogy with cultural evolution is deep, but invites significant misconceptions. To be clear: the view that the same algorithmic processes govern cultural evolution and biological evolution is NOT any version of so-called "Social Darwinism." Since the environment defines the fitness landscape that in turn defines design solutions, feedback between the environment and the results of cultural evolution indicates a huge difference between the two processes, even if they are implementations of one and the same algorithm. Specifically, in biological evolution the environment changes arbitrarily, so being "fit" has no legitimate normative sense for us; in cultural evolution, the environment is largely defined by our choices, which just are our variously expressed judgments of value, and "fitness" means revealed fitness to these ideal values, so the normative dimension of the process is not at all out of place (although it can be easily misplaced), and is itself subject to the selection process.

In the most basic and general sense, an algorithm is any description of a process that provides a series of simple steps that reliably yield a certain kind of result. A standard textbook example of an algorithm is a recipe, but any process can be described algorithmically given sufficient knowledge of the steps that make it up. While it is not always illuminating to consider the algorithmic description of a process, Dennett (1995) argues that such a description of the process of evolution through natural selection has profound implications. In particular, the algorithms of natural selection explain the pervasiveness of adaptation of organisms to their environments, and such adaptation is the most important part of the explanation of the designedness we observe in nature. If we understand how a distributed and mindless process like natural selection can produce such diverse engineering marvels as giraffes, sharks, and even humans, then we will have achieved a real breakthrough that will surely expand the horizons of our thinking about almost anything. Theology, sociology, engineering, and even politics and ethics are all subject to transformation under this influence. In that sense, Dennett calls Darwin's "dangerous" idea a "universal acid."

An algorithm is a sort of foolproof recipe that requires substrate neutrality, underlying mindlessness, and a guaranteed result. (Dennett 1995, 51) These features are instantiated, for example, in a tournament. The rules define a procedure whereby the contenders are pitted against one another in a series of competitions that are guaranteed to result in a winner. The abstract process defined by an elimination tournament can be implemented for whatever sorts of competition one likes, and the algorithm will flawlessly produce the guaranteed outcome—a winner—as long as all the steps are followed. It does not matter whether the game is tennis or coin tossing, the procedure will result in a winner who will have won x contests in a row, where x is a function of the number of competitors and the exact setup of the tournament. To illustrate the power of algorithms, consider that one can produce a person who wins ten consecutive coin tosses by simply setting up an elimination tournament of 1024 players. The winner will be whoever is lucky enough to win ten contests in a row.

Of course, there is not much of interest in this winner, and if the contests were run again it is highly unlike he or she would win again. Things are different in tournaments of skill. For many algorithms, including both tournaments and natural selection, the interesting result is not what they are guaranteed to do but what they are guaranteed to *tend* to do. "The power of an algorithm to yield something of interest or value is not at all limited to what the algorithm can be mathematically proven to yield in a foolproof way, and this is especially true of evolutionary algorithms" (Dennett 1995, 56-7). In a

tournament of skill, we are guaranteed a winner, but we are also guaranteed a process that *tends* to issue in a winner who is "best" in the sense of being most skilled. It is in unpacking this sense of "best" that we can start to get a handle on technological progress.

What goes into being the "best" tennis player? Serena Williams was recently eliminated from a tournament as a result of being penalised a point for verbal outbursts at a referee's calls. As it happens, proper decorum is part of the rules of tennis. However, we have to ask whether Williams might be the "best" tennis player despite having lost the tournament. After all, it may be that if we ran the tournament over and over—hundreds of times if need be—until the results stabilised into some statistical equilibrium, that Williams would emerge as the winner of the greatest proportion of the tournaments, and that would be grounds for maintaining that Williams really is the best player, despite her having lost this or that particular tournament. Let us call this the "revealed best," since running the tournament over and over until we achieve equilibrium *reveals* the best player in this sense. Since the skill in question is embedded in the rules that define the tournament, whoever wins the greatest share of tournaments repeated as often as necessary to produce a statistical equilibrium must be the one with the most skill, since that is all it means to have *that* skill. Notice that the particular tournament *tends* to issue in winners who are better in this sense, while repeating the tournaments to equilibrium will unfailingly *reveal* who really is best.

However, there is another sense of "best." Suppose one of the competitors was exactly like Williams in every respect except without the proclivity for verbal outbursts. In that case, this Stoic Williams would marginally outperform Serena Williams, which makes Stoic Williams the revealed best player. But someone might reasonably object that Stoic Williams is not the better *tennis player*, even if she is somehow nicer or more polite. If the rules did not include provisions that favour politeness, Serena would perform equally well as Stoic. The advocate of Serena may even want to change the rules to no longer favour politeness and only focus on the "best" tennis player. Let us call this the "ideal" sense of best. It is a matter worthy of real debate how far the present rules of tennis approximate our ideal sense of tennis excellence, which we will not try to settle here. Our purpose is simply to understand the semantics of "best." Whatever else we might want to say, there is a clear sense in which Stoic is a better tennis player than Serena, even as there is a more contestable sense in which they are equally good tennis players. We must not confuse these different senses in our discussion of progress.

It should be emphasised that the point of all this is semantic, not practical. It is not possible to run the exact same contests over and over. Not only will the players age and wear out as time goes on, but the competitive environment itself will change subtly with each iteration, as feedback from the previous round of contests changes strategies, tactics, and even abilities. (Williams will probably learn to hold her tongue in future matches.) In light of this, it is not actually possible to implement the tournament series in a way that actually guarantees a revealed result. Instead, we generally have to make do with what the algorithm *tends* to reveal about tennis excellence.

In the case of evolution by natural selection, however, the enormous timescales involved *sometimes* go a long way towards instantiating the nested algorithms of the series of tournaments. If the environment remains relatively stable over millions of years, the organisms that populate that environment will be exactly those who are most well adapted to that environment. But even here, every generation represents a subtle change in the environment, since the traits of the populations are themselves part of the environment, and that feedback loop can have unpredictable results. One example of this is the so-called "Red Queen Effect," in which selection pressure from the adaptations of other organisms require adaptive responses, such that every organism is "running in place" and acquiring new characteristics just to remain at the same fitness level relative to the constantly evolving environment (Ridley 1995). Even in the absence of such feedback loops, the environments that define the fitness functions of species (analogous to the rules of tennis above) are subject to arbitrary and even random change, such that there is little ground to expect that any arbitrary organism will be well adapted to its present environment. However, despite all this, we can explain the diversity and designedness of nature in terms of the tendency of more fit animals to outperform the less fit in a given environment.

We should expect natural selection to operate wherever the following three conditions are met: heritability—offspring resemble their parents; variation—offspring are not exact copies of their parents; and differential survival—whether an organism survives long enough to have offspring is a function of the traits it acquires subject to heritability and variation. If we define the design space of

possible organisms as all the possible ways of combining traits, then variation represents a brute force search of design space, differential survival weeds out good from bad design, and heritability conserves good design, in the revealed sense of good—i.e., relative to the demands of the environment that defines fitness. This is adaptation.

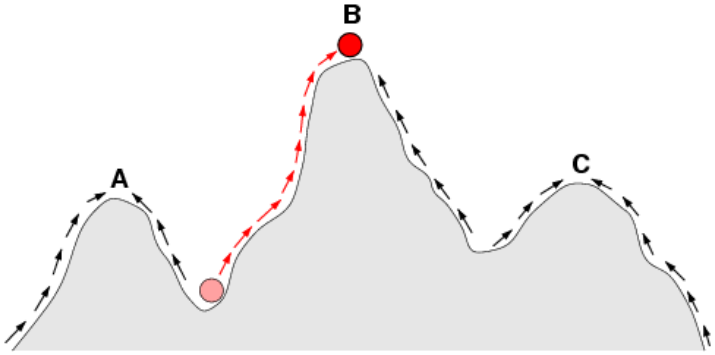

Figure One: A simplified two-dimensional fitness landscape (Wikipedia)

Adaptation can be illustrated in terms of "hill climbing" in a "fitness landscape." A more rigorous and sophisticated formulation is summarised in Nowak (2006), but the main idea is to represent design space such that some designs are more or less readily accessible from a present design, while the fitness of any particular arrangement is represented by its height. Since mutations can occur along multiple dimensions, the mathematics of actual fitness landscapes are multidimensional and quickly become very complicated, but a simple two dimensional graph illustrates adaptation as the tendency of a species to climb the landscape towards fitness peaks. The horizontal plane represents nearness in design space, so that fewer moves (i.e., mutations) are required to reach nearby designs than those further away, while the vertical plane represents fitness relative to a given environment. Figure 1 (borrowed from Wikipedia) illustrates adaptation as hill climbing. Any movement from a species' present location can either represent an increase (uphill) or a decrease (downhill) in fitness. By definition, the more fit members of a species will tend to outperform their less fit competitors in terms of reproduction, so whatever traits represent incremental increases in fitness will be selected for. Over generations, this search of design space will "discover" the peaks of the fitness landscape. If the scope of the search of design space is broad enough (such that, in the figure, it is possible for the offspring of a population clustered around peak A to be on the slope leading to peak B), the rate of mutation is suitable for hill climbing (instead of, for example, distributing the population all over the map more or less randomly), and the number of generations in a constant environment is great enough, we should expect the population to jump the valleys and climb to the highest peaks in the landscape. In that case, we can say that the process has revealed the *best* adaptations for the given environment.

There are a host of conditions and qualifications associated with adaptation as hill climbing, but if the analogues of these conditions are achieved with respect to the evolution of our various technologies, then we have good reason to expect our technologies will also become better adapted to the total environment that defines their selection. In that narrow sense, we can predict progress towards fitness peaks in design space, even without knowing the exact traits that characterise those peaks. Even more interestingly, if the selection pressures in question approximate the best in the ideal sense, the way we aspire to have the rules of tennis implement our ideal notion of tennis excellence, then we should expect progress in that stronger sense. Finally, if we conceive the environment for the selection of technologies as itself a technology subject to progress, then the resulting feedback means that even our standards of better will become better. That would justify belief in a rather strong notion of progress without anything like the arrogance of historicist or millenarian thinking. Even without knowing how it will all turn out, we can be confident that it will turn out for the better, if the relevant conditions are realised. We now turn to a preliminary investigation of whether and how these conditions can be met.

4. Towards implementing the algorithm in human society

While it may not be possible to assert definitively that all human technologies evolve towards peaks on a fitness landscape that represent their greatest possible value to us, there are excellent reasons to think many of our technologies are subject to real progress. There is even reason for optimism that our institutions are among the technologies that will improve as design space is searched and tested for incremental enhancements that will in turn improve upon the improvements of our other technologies. That is, it need not be the case that, as Thoreau (1854) laments, our inventions are "but improved means to an unimproved end." We should certainly expect at *least* improved means, but the process that improves the means may improve the ends as well.

The key conditions for adaptation on the model of natural selection are variation, heritability, and differential survival, and these conditions are plainly realised in the competitive marketplace that constitutes the environment that defines the fitness landscape of most technologies in the narrow sense. Companies try to offer innovative new products that outperform their competitors (variation), while conserving what has worked in the past (heritability), and the extent to which they are perceived as achieving the results consumers want determines their success and the success of any given product line (differential survival). This is enough to establish that products will become adapted to the revealed desires of consumers in a sufficiently competitive marketplace, insofar as consumer desire defines the fitness function of these technologies, but the stakes are even more interesting if we suppose that consumers are sufficiently rational and autonomous to make judgments about what is really good for them at a rate better than chance. In that case, the selection pressure of individual choices pushes technologies towards the ideal best in addition to the merely revealed best. That is, not only does the technology get better at doing what the environment is pushing it to do, but the environment is pushing it to do something we really should want our technologies to do.

Autonomy is the ability to think for one's self about the nature of the good and one's efforts to reach the good, and it has been a key background assumption of liberal theories of progress since before J.S. Mill's *On Liberty*. Mill's defence of freedom, and especially his defence of freedom of speech and thought, indicates that freedom will tend to generate an appreciation for truth and the good as long as individuals are liable to make decent choices for themselves about these matters. This is deeply like the hill-climbing analysis of evolution: if a given idea or way of life is true or good, then it is more likely to survive in the hearts and minds of men than if it is false or bad, so the best ideas and ways of life will be discovered in the extended search of design space that Mill calls "experiments in living," as long as those experiments are permitted to take place (Mill 1859). The sort of autonomy supposed by this analysis is not at all uncontroversial, but there are some reasons to think it is not an absurd assumption.

Notice that the autonomy relevant for technological hill climbing is incrementalist and situated. It does not involve the Sartrean absurdity of pulling one's self out of one's constitutive commitments and evaluating everything all at once. As Macedo (1991) argues, situated autonomy merely involves figuring out whether some particular corner of one's life could be improved in light of the rest. Situated autonomy implies that one can evaluate nearby alternatives at a rate better than chance, not that one can jump out of her skin to evaluate every possible way of life all at once. Under conditions of freedom, rigorous testing and exploration of design space will take place over the whole process of cultural evolution, so there is no need to build it into each person. While I have no rigorous proof that most people most of the time enjoy situated autonomy, the alternative view is highly paternalistic, and such autonomy is sufficiently modest that it should not arouse much suspicion in the absence of a specific argument to the contrary, despite our known limitations and faults.

There are limits to human rationality in practice. We have inherited a number of predilections and shortcuts to thinking that can lead us systematically astray. But we are also able to become aware of these limitations and build institutional and personal technologies to mitigate their effects. To catalogue just a few limits and some strategies for transcending them: If I overvalue avoiding losses relative to gains, or vice versa, I can offload my particular day-to-day investment decisions to a trained professional or subject myself to a specific regimen of double-checking my gut judgments. A tendency to rash conclusions based on the framing of an issue can be corrected in the context of a robust debate that presents information to me in a variety of frames. Emotionally charged decisions can be deferred until one has cooled off, and enforceable commitments to such strategies can be devised in legal and

social institutions. Pinker (2007) provides an extended discussion of some of the limits to human rationality built into our biological and linguistic inheritances, along with strategies for overcoming these limits. In general, limitations that can be known can be remedied by application of some technology, since knowing the limit presumably entails some idea of what it would be to operate without the limit. So, the limits of our autonomy are not as great or as permanent as they might seem. Our rationality is a condition of progress, but it is also subject to progress.

Of course there are other potential pitfalls along the path of progress. If vested interests enjoy a monopoly or near monopoly in the marketplace of goods and services or the marketplace of ideas, then the environment is such that the fitness functions of competitors do not track the ideal best. Alternatively, there may be incentives in the environment that create coordination problems, such that each of us has reason to choose something that each of us would acknowledge as worse than some alternative if only we could get together on a better solution for all. Like the limits of our situated autonomy, however, reflecting on the biological, institutional, and social facts that define the environment can point towards technological solutions to these problems. For example, coordination problems like pollution or overharvesting resources are solved by "internalizing the externality"—i.e., creating a market cost for these behaviours, perhaps by assigning property rights or otherwise distributing benefits and burdens in enforceable agreements so that coordination becomes the best strategy for each. In general, if we understand the evolutionary processes at work, we can devise strategies for fixing the machinery when it fails.

In all these cases of failure, the algorithmic process of evolution fails to deliver an ideal good because it is less sensitive to certain sorts of information than it could be. However, since we are in a position to construct the institutional and other frameworks that create the environment to which our technologies must be adapted, as long as we can conceive the trouble we are in principle in a position to resolve it. This is not an automatic or inevitable process, but any time we notice there is relevant information that is not being processed in the marketplace of goods and services or the marketplace of ideas, we are in a position to revise our institutions so they are made sensitive that information. At the same time, we should be wary of any reforms that would tend to create their own bottlenecks and blindsides with respect to all the available information. This means especially that we must not decide we already know once and for all what the outcomes must be. We must not establish institutions that rig the results if we want to *discover* what is best in light of all the relevant information. Rather, the process should be able to search the whole of design space, or at least as much of it as possible, and glean the results of all these experiments without obstruction. This is ultimately what we mean by an "open society" characterised by a "free market." It is like the freedom of a weather vane to turn in the wind and do its job of gathering, processing and communicating information, and it is an empirical question to determine what sorts of regulation and maintenance this machinery will require.

While this analysis in no way permits us to peek around the corner of history to predict exactly what shall be, and it is by no means a deductive *proof* or *guarantee* of progress, especially not along any particular timetable, and emphatically not in any particular direction, the argument provides warrant for the expectation that our future will be better than our past, in a sense of better that is itself better than our present conception of what counts as better. This is just one more dimension of progress to be discovered by the algorithm itself. "Evolution is cleverer than you are." (Dennett, 1995)

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ETHICAL ISSUES OF THE USE OF SECOND LIFE IN HIGHER EDUCATION

Matthew Croft Wake and Bernd Carsten Stahl

1. Introduction

The development and use of information and communication technology (ICT) can raise a host of unforeseen ethical issues, particularly when a technology is used in a manner for which it was not originally designed. In this paper we explore such a situation by looking at the ethical issues arising from the use of an online virtual world for teaching purposes in higher education. The case we investigate is that of Second Life (SL), a widely known and used virtual environment.

The paper starts by discussing ethical issues that can arise from ICT use in higher education in general to provide an analytical framework. It then progresses to a detailed discussion of the way SL is organised and can be used for educational purposes. This leads to an application of the ethical framework to second life, which allows the identification, classification and discussion of ethical issues as they arise from the use of SL. The paper concludes by suggesting ways in which the issues found can be addressed.

2. Ethical Issues of ICT in Higher Education

The relationship of ethics, ICT and education (including higher education) is complex and involves a number of disciplines and discourses. Figure 1 gives an indication of the discourses involved.

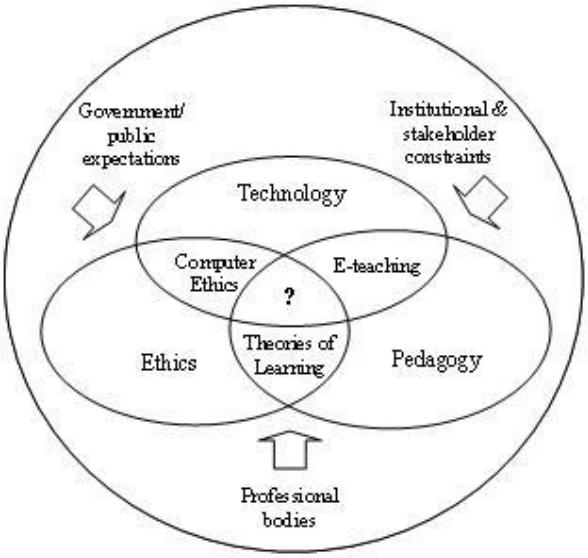

Figure 23 Relationship of Technology, Ethics and Pedagogy, adapted from Jeffries, Stahl & McRobb (2007)

It is clear that a simple conference paper will not be able to do justice to all of these issues and angles. The present paper therefore draws on prior research on e-teaching by the authors (McRobb & Stahl, 2007; Stahl, 2005; 2004), in particular Stahl (2002a/b).The principle theoretical framework is summarised in table 1.

This framework works with the distinction of three different levels of actors involved in education: micro, meso, and macro. The micro level is the level of the individual participant in education, typically students but also teachers, administrators and others less directly linked to the educational process. The meso level is that of the organisation. In higher education meso level actors can be universities, colleges, or other education providers. The macro level, finally, is the level of society and

governments where high level decisions and strategies are decided. It is easy to see that these three levels are interlinked and influence each other and that all of them are important for understanding the overall phenomenon of higher education. A more detailed stakeholder analysis might be possible or even desirable which distinguishes more clearly between the different views and requirements of different actors. Such a more detailed analysis would, however, would also raise a number of recurring issues. The current level of granularity is sufficient for the present paper.

	Theoretical problems	**Practical problems**	**Ethical problems**	**Moral problems**
Macro level	Why e-teaching? Role of education	Infrastructure Access Technical Training	According to which theory should goods be distributed? When is a social decision legitimate? What is the purpose of education?	Distribution Social Justice Economic questions
Meso level	Introduction of e-teaching?	What system? Organisation of introduction? Distribution of costs?	What is the purpose of the organisation? What are students' and teachers' rights?	Distribution of costs How should e-teaching be organised?
Micro level	Opportunity costs	Use of the system Who trains users? Will teachers or students be forced to use the system? Technology / content problem	Do I agree with the organisation's definitions?	Students: • Honesty • Participation Teachers: • Privacy • Surveillance

Table 1: Framework for the identification of ethical issues in e-teaching (from Stahl 2002a)

In addition to the different types of actors, the framework in table 1 also provides a classification of types of problems. The first distinction is between theoretical and practical problems. Theory and practice here refers to the use of ICT in higher education. Theoretical issues are related to the conceptual underpinning of education and thus relates to questions such as what is the overall purpose of education and how can it relate to ICT use. Practical issues are those that arise from the use of ICT in education.

Related to these theoretical and practical issues but more pertinent to the overall topic of the paper is the distinction between ethics and morality. This distinction is widely used in much continental philosophy which is why we follow Stahl (2008) in calling this the "German" tradition. The principle behind this distinction is that norms that affect human behaviour and that are subject to social science research are covered by the term "morality". The reflection and justification of such norms is called "ethics". Many of the normative problems arising due to ICT use, according to this distinction are moral norms. When individuals perceive something as good or bad, wrong or right, this supposes moral judgments. Ethics, on the other hand, is the reflection of this morality, its justification and discussion. To use some of the examples of the framework in table 1, issues of privacy or surveillance might be classed as moral issues because they infringe what students think is right behaviour. Such moral evaluations are factual and they are independent of the underlying ethical theory. Privacy, for example, can be seen as a moral value for a number of reasons, e.g. because it facilitates collaboration, because it is a human right, or because it represents respect for others. ICT raises moral concerns but

these can only be truly appreciated if they are viewed in conjunction with their ethical background. The problem here is that ethical backgrounds are not always subject to research.

The fields of table 1 indicate further examples of ethical, moral, theoretical and practical issues that may arise for the different types of actors. Having now provided a theoretical grid, the next section provides a description of SL and its use as a learning platform.

3. Second Life as a Learning Platform

Created in 2003 by Linden Lab (Rymanzewski, 2007), the SL is a persistent virtual environment with terrain, buildings, businesses trading using the real-world transferrable Linden Dollar (L$), people (in the form of heavily-customisable avatars), split into 16 acre sections known as islands. The world is hosted, managed and maintained by Linden Lab, Second Life‘s creators.

In addition to providing the world itself however, Second Life differentiates itself from others by allowing users to buy land in-world, then create objects, from handbags to buildings to vehicles to entire theme parks and communities, and add scripted behaviour to them. It is this ability to customise that makes Second Life attractive for educators, and a report in May 2008 from Eduserv (Kirriemuir, 2008) states ‗as a rough estimate some three-quarters of UK universities are actively developing or using SL, at the institutional, departmental and/or individual academic level‘.

3.1 Architecture

The Second Life platform, referred to as 'The Grid', is hosted on servers at Linden Lab. The Grid stores the islands, which users can visit and interact with using the Second Life Viewer, client software installed on the user's own computer.

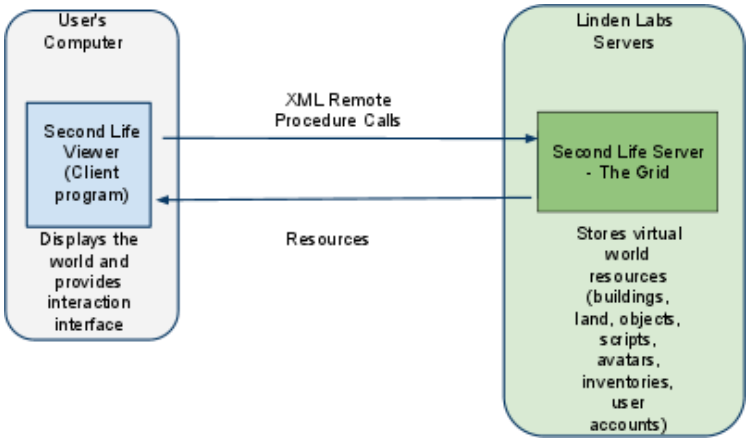

Figure 24 The Second Life Architecture

3.2 Navigation and Scale

The SLurl website (http://slurl.com) provides a 'Google Maps' for Second Life, with the option to teleport the user's avatar to the desired location. With each tiny block in Figure 3 representing a single 16 acre island, the sheer sise of Second Life becomes apparent, especially as this is only a partial view. Links using the SecondLife:// protocol, once clicked, will open the Second Life Viewer and transfer the user's avatar to the selected location.

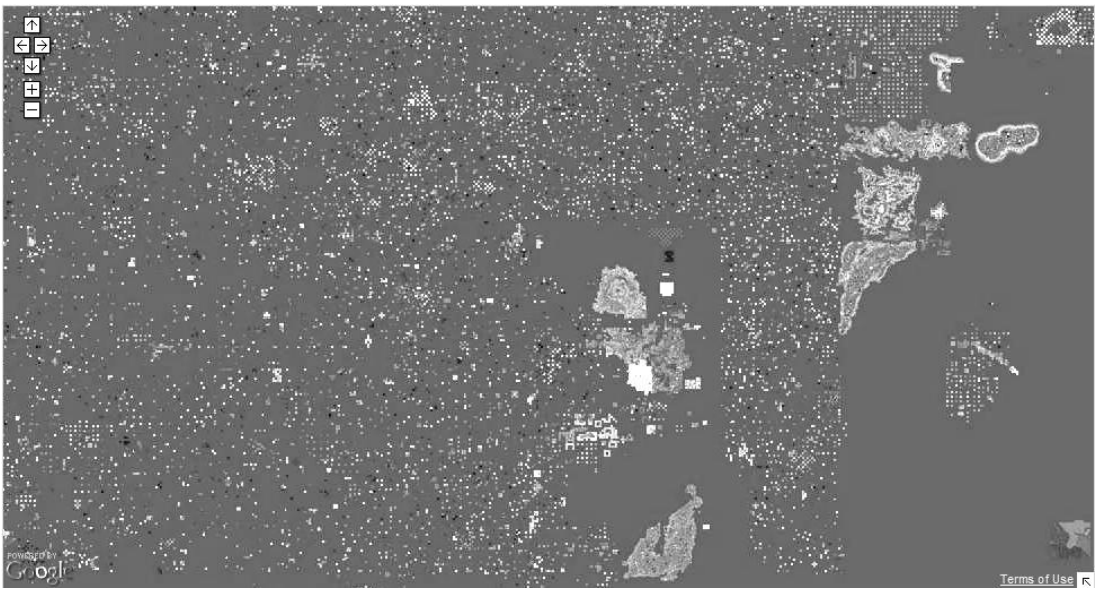

Figure 25 Screenshot of http://slurl.com, showing islands in Second Life

3.3 Permissions

Owning land in Second Life gives a user control of the actions which can be performed on their island, such as building objects, and which avatars may enter the island. This allows the island's owner to control, to some extent, the activities taking place on their land, and eject users who do not abide by the rules.

Additionally, a central online abuse reporting mechanism allows individual users to report others for infractions, with penalties ranging from temporary suspension to permanent deletion of accounts. The Terms of Service (http://secondlife.com/corporate/tos.php) and Community Standards (https://secure-web40.secondlife.com/corporate/cs.php) govern what constitutes acceptable behaviour in SL.

3.4 Second Life in Higher Education

A simple web search leads to numerous hits of universities developing SL presences. The universities that employs the authors of this paper has also attempted to do this on several occasions. It seems that SL in higher education peaked in 2007/8. There was much media hype around it at the time, which has now slowed considerably.

The question why universities engage in SL is probably related to the one concerning the activities they engage in. The two examples in the figures above indicate rather traditional university settings. In this vein, the first online lecture in second life was announced by the University of Cambridge in September 2007. While such attempts to transfer offline activities into SL abound, there are also numerous reports of more innovative uses of technology in HE. This includes the use of SL as a learning repository or a way of facilitating student interaction. Edinburgh University has even been reported to host its graduation ceremony in SL for distance students.

SL in many ways seems to be (or have been) a focal point which allowed universities to experiment with the projected benefits of ICT. This is an ongoing discourse whose theme was nicely summarised by a recent email of the UK's JISC (Joint Information Systems Council) which announced in a news release on 11 February 2010 "Universities to achieve business goals through technology".

It is not the purpose of this paper to discuss these issues in any depth. It suffices for this section to demonstrate that there is, or at least has been, substantial interest by the HE sector in SL. Given the ethical framework developed earlier and the problems of SL, we can now combine these and ask which problems arise from SL use in HE.

4. Potential Issues

Having now introduced SL as a virtual environment and outlined its use in higher education, this section provides a discussion of possible issues that users may face. These are partly grounded in the particular technological constellation of SL and partly related to the specific requirements that result from the needs of higher education.

4.1 Client/Server Security

A presentation for the 2007 Black Hat Conference (Thumann 2007) detailed a number of serious security flaws with the Second Life client, server and architecture. From these, of greatest concern is the ease with which a man-in-the-middle attack can be performed, first highlighted in a blog post on GNUCITIZEN (Petkov 2007). The SlUrl service, using the SecondLife:// protocol, has a parameter, ‗loginuri', which can be added to any HTML link, instructing the SL viewer to send poorly-encrypted login credentials to an arbitrary URL. The method is outlined below in a modified version of Figure 2.

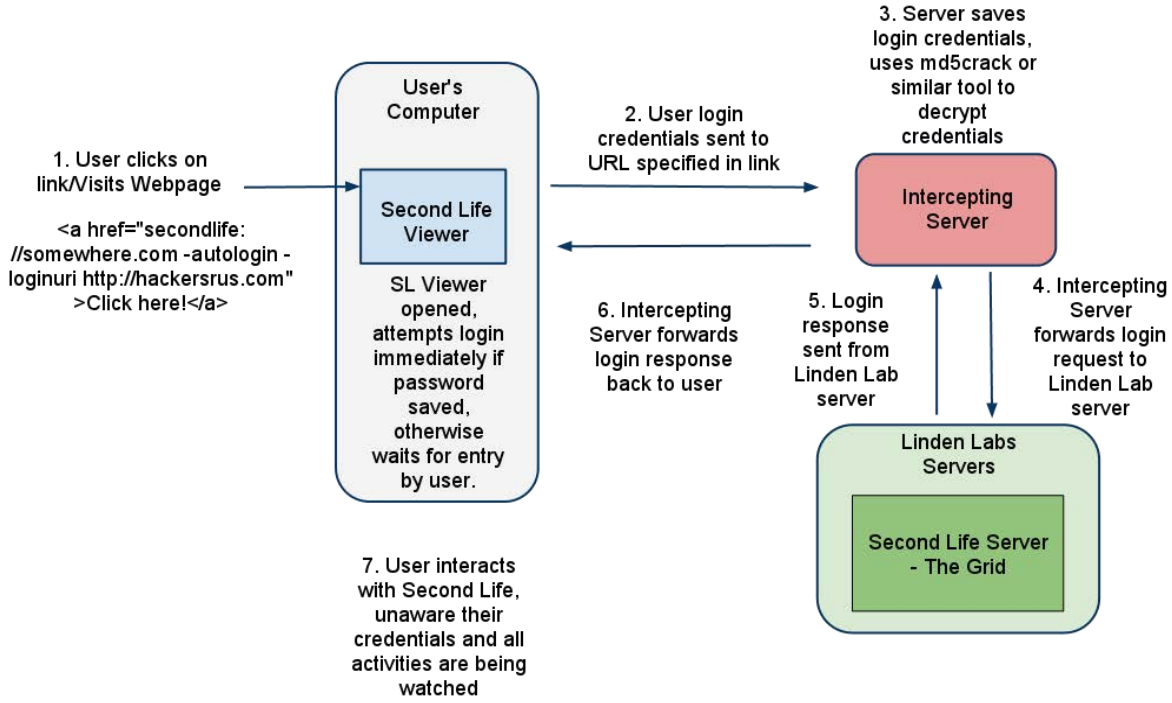

Figure 26 Anatomy of a man-in-the-middle attack on Second Life

As the MAC address of the connecting computer is used in the process of encrypting the user's login credentials, it is likely that these details would become available as a result of intercepting and decrypting the login request. As the MAC address is a commonly used access control mechanism in many institutions, with the network refusing access to unknown network cards, and the ease with which a network card can be configured to spoof a different MAC, this could allow a more serious security breach of the institution itself.

4.2 In-world Abuse/Misuse

The SL Wiki contains an in-depth user-submitted article on a number of ways for so-called ‗griefing' attacks to be perpetrated in-world (‗Paine' 2009). Attacks are categorised as follows:

- **Abusive Language** As Second Life incorporates both instant messaging and voice chat, both represent avenues for abuse.
- **Pushes and Hits** As SL objects and avatars obey Newtonian physics, being pushed or hit by an avatar or object will cause the struck avatar to be moved. In the case of fast-moving objects, this can significantly displace an avatar.

- **Invisible Objects** Objects with transparent textures are invisible, and can easily conceal traps such as cages and orbiters, activated when an avatar approaches.
- **Particle/Texture Spam** Particles are rendered by the SL viewer, and as such their effects are not restricted by building permissions in the same manner as objects. Excessive particle and texture spam can crash the SL Viewer, although recent changes have added controls to prevent this.

Figure 27 Texture Spam (Super Mario) in Second Life

- **Cages** Cages trap an avatar in a literal ‗cage', preventing movement
- **Orbiters** Orbiters force avatars to altitudes within the virtual environment from which they cannot return without teleporting
- **Deformers** Deformers alter the appearance of an avatar, using either booby-trapped objects or a fake avatar ‗hug' which drastically alters the appearance of the target. A Google search shows several such items available to buy for L$.
- **Spoofing** Giving an object the same name as an avatar, and using it to broadcast chat messages over the inbuilt instant message client in SL could easily land the intended target in trouble, as the chat window would display the name of the avatar (which is also the name of the object) as the originator of any message which the object's owner chose to send.

All of these attacks are possible regardless of the permissions set in an island, and many require victims to have specific knowledge to avoid, rectify or prevent.

4.3 Technical Constraints

4.3.1 Server

While using Linden Lab servers to host virtual environments removes certain technical requirements for setting up a presence in SL, there are still a number of technical constraints which affect how the islands can be used.

While Second Life could conceivably be used for large events such as lectures, the hard limit of 100 avatars per island (Linden Lab 2010) at any one time must be considered, and with large numbers of avatars below this limit, perceptible lag may occur, reducing the quality of the experience or making the simulation unusable. This limit necessitates new pedagogies, and a comment in the Eduserv report mirrored this sentiment:

‗There are the limitations on the number of avatars per island. However, I think that SL is not suited to big lecture scenarios, and I think that this limitation (like the one on text) actually helps steer you away from inappropriate pedagogies in SL.'

Sheila Webber, Department of Information Studies, University of Sheffield *(Kirriemuir 2008)*

It is also important to note that Linden Lab provide a ‗blank canvas', and it is up to individuals to expend considerable time and effort to build something on the land they have purchased. Many comments in the Eduserv questionnaire refer to the considerable, often unpaid, time spent in both crafting, administering and maintaining a SL presence (Kirriemuir 2008).

Another problem with SL is that users cannot use their real names when signing up for an account, instead entering any first name, and choosing from a list of surnames. While this does provide a measure of anonymity, there then exists the administrative nightmare of attempting to solidly link a student to their SL avatar. Mistakes could prevent students from accessing resources in SL, or allow unauthorised users into a supposedly protected area.

4.3.2 Client

While the minimum system requirements are quite low by modern standards (Second Life 2010), including supporting the Intel 945 chipset (also known as the GMA 950) present in the highly popular Intel Atom-based netbooks (Eee PC, MSI Wind etc.), very poor frame rates are a common report from users in the Second Life forums and realistically a more powerful, more expensive computer will be required to use SL effectively. The more complex the island and the greater the number of avatars, the greater the system requirements become, as evidenced by numerous benchmarks showing marked degradation of performance on low-end systems.

With relatively high-end requirements, this may prevent students using their own hardware from effectively engaging with an institution's SL presence, and upgrades may be required to a university's own computers in order to make best use of SL.

4.4 Pedagogy

SL in many ways seems to be (or have been) a focal point which allowed universities to experiment with the projected benefits of ICT, with many of the reported uses of SL for in HE (Kirriemuir 2008) being to investigate the possibilities of virtual environments for teaching and learning. This is an ongoing discourse whose theme was nicely summarised by a recent email of the UK's JISC (Joint Information Systems Council) which announced in a news release on 11 February 2010 "Universities to achieve business goals through technology". There is enormous hope that ICT will improve teaching and learning in HE, despite a lack of evidence of the success of such technology initiatives (Cukier et al., 2009).

That being said, a number of interesting pedagogical experiments have been undertaken in SL, from recreations of traditional learning environments such as classrooms, to interactive scenarios such as training for paramedics.

Figure 28 A classroom in Second Life

Figure 29 A screenshot of the St George‘s University paramedic training area

Despite the visual and technical attractiveness of SL‘s teaching and learning environments, data on the efficacy (or otherwise) of such environments is limited, and many areas are described by their creators as ‗experimental‘ (Kirriemuir 2008).

In the arena of computer science and computer aided design however, Second Life itself can provide an environment within which to work in much the same way working with any programmable, malleable system is, and it can be argued that in this regard Second Life provides a valuable learning opportunity, although issues of intellectual property and the safety of data held by Linden Lab are concerning regardless of the pedagogical approach.

4.5 Usability/Disability

As an inherently visual environment, the default SL viewer would not be utilisable by visually impaired users. This has a particular importance in education where there are ethical and indeed legal obligations for educational institutions. In the UK, the Special Education Needs and Disability Act (HM Government 2001) obliges educational institutions to not substantially disadvantage disabled students with regard to services provided. If an institution's Second Life presence is not a required portion of curriculum then this may not pose a problem, but if SL were to be used as a platform for delivering core course content, then appropriate provisions must be made for disabled students, particularly those with visual or motor impairments which prevented them from fully engaging with the environment.

Linden Lab do not have any employees dedicated to accessibility for less able users (Linden Lab, 2010b), and view the open-source nature of the viewer as offering the community at large a means with which to make SL available to such users.

A text-only version of the SL Viewer is in development, SLText (http://textsl.org), but has limited compatibility with screen reader software.

4.6 Intellectual Property

The open-sourcing of the SL Viewer has created an avenue for theft of custom objects in-world. CopyBot, a hacked Second Life client, allows users to steal any object which they can ‗see‘. Linden Lab advises users that they should file an abuse report if a CopyBot is used to steal content, but this requires a user to know when such theft has taken place. Equally, if intellectual property has been stolen, it is left to the user to pursue offenders, for instance by using a Digital Millenium Copyright Act (DMCA) notice. However, as accounts are free in Second Life it is likely that a thief could use a number of aliases with fake personal details, making it difficult if not impossible to track them down.

The SL Viewer uses the OpenGL library to render graphics onscreen. As OpenGL library calls are not encrypted, the GLIntercept (http://glintercept.nutty.org/) tool, available free as a debugging tool for OpenGL applications, can be used to extract world-drawing resources such as textures.

A number of entries referring to intellectual property also exist in the Second Life Terms of Service, analysed below.

4.7 Terms of Service

Anything added to SL, from the appearance of avatars to L$ account balance to buildings and objects becomes usable by Linden Lab for marketing, although without granting Linden Lab permission to distribute user-created submissions, it would be impossible to run Second Life. This also however allows Linden Lab to benefit from user‘s content.

In addition, however, Linden Lab also asserts that:

'5.3 All data on Linden Lab's servers are subject to deletion, alteration or transfer'

(Linden Lab, 2010c)

This means that by using Second Life, any creation added to SL can be destroyed at any time for any reason, with no provision for recourse save for restrictive private arbitration. If students‘ work was arbitrarily deleted or altered it may prove very difficult for a student to prove that the work was ever done unless adequate backups or evidence of completion exists. This would constitute a serious problem for students, academics and the reputation of a university which penalised a student for a fault with third-party infrastructure. Equally:

'2.6 Linden Lab may suspend or terminate your account at any time, without refund or obligation to you...In the event that Linden Lab suspends or terminates your Account or this Agreement, you understand and agree that you shall receive no refund or exchange for any unused time on a subscription, any license or subscription fees, any content or data associated with your Account' (Linden Lab, 2010c)

Although an individual or institution may have invested considerable time, energy and money in crafting an SL presence, this clause exists as a constant threat; at any time, for any reason, any and all content and avatars exist at the sole discretion of Linden Lab, and may be permanently destroyed at any time, arguably making all users of Second Life digital slaves, with „personal data items to be considered as proxies rather than organs of data subjects‘ (Rogerson et al., 2007).

Interestingly, in one case where a user‘s access to their account was suspended, when taken to court in the US a judge viewed Linden Labs as having unreasonable terms regarding arbitration in their Terms of Service and awarded damages (Bragg vs Linden Research Inc. 2007). However, virtual property rights are a new field in law, and very much depend on individual interpretation.

4.8 Second Life – Not the only virtual world

Usages figures from Linden Lab show that there are over 18 million registered users. However, of these, approximately 1 million had logged in during the last 60 days, and approximately 64,000 users were in-world (Linden Lab, 2010e). A paper presented to CoNEXT 2008 (Varvello et al. 2008) conducted analysis of usage of Second Life and found:

„The active population at any point of time was between 30000 and 50000 avatars, i.e., about 0.3% of the registered avatars. Quite surprisingly, about 30% of the Regions were continuously empty during six days’

These figures suggest that Second Life‘s user base has shrunk considerably since inception. Lively, a customisable (though to a much lesser extent than Second Life) virtual world, failed to live up to owner Google‘s expectations and was closed down in 2008 (Google, 2008), with the *loss of all user-created content*. If universities place critical course material into Second Life, there exists the possibility that it could one day be lost in much the same way should Second Life cease to be profitable and be shut down.

However, Figure 8 illustrates the Gartner Hype Cycle for Social Virtual Worlds, including Second Life, showing 2009 as the lowest ebb, with the social virtual world medium as a whole recovering in 2010 as open source, browser-based virtual worlds appear.

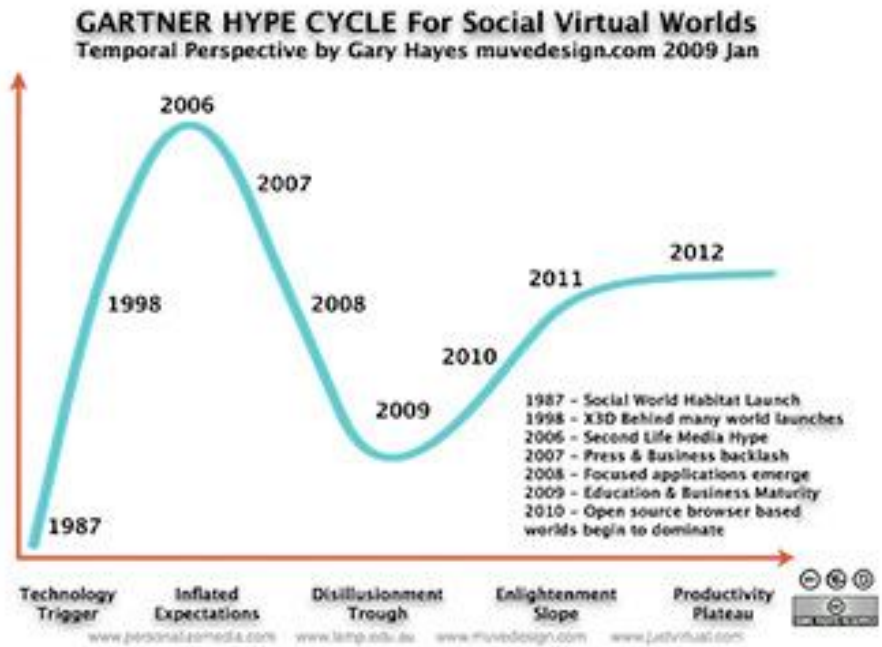

Figure 30 Gartner Hype Cycle for Social Virtual Worlds (Papp, 2009)

While this is of course highly speculative, it is not unreasonable to predict that virtual worlds based on free, open source technology, offering full control of both client and server, with portable browser-based resources not tied to a specific vendor, may prove more attractive than more established but proprietary systems with significant loss of control and the constant threat of deletion. The recent introduction of experimental WebGL support in Firefox, WebKit (the rendering engine used in the Safari browser) and Google Chrome (CNet News 2009), which uses the simple, ubiquitous browser-based JavaScript language to implement hardware-accelerated 3D graphics, offers a glimpse of this projected future.

In the nearer term, the OpenSim project (http://opensimulator.org/wiki/Main_Page), an effort to create an open source virtual world compatible with the SL Viewer, and Project Wonderland (http://www.projectwonderland.com/), an open source virtual world built using the platform-independent Java language, along with an entirely open source world development process, both offer alternative routes into virtual worlds, though both are at an early stage of development.

4.9 Liability

In „Second Thoughts About Second Life“ (Bugeja, 2007), the author highlights a number of incidents involving SL, including presences maintained by universities, and the associated difficulties in policing the virtual world. If a university chooses to make students complete courses in Second Life, the university could be culpable for exposing students to any of a number of unpleasant situations.

One such incident, also discussed on the official SL Blog (Linden, 2007) refers to two users, a 54 year old male and 27 year old female, acting as an adult male avatar and a child avatar, engaged in „depicted sexual conduct“. Due to the „ages“ of the avatars, both users were banned from SL. However, the users involved were both over the age of majority and as such it could be argued that no „real“ crime had been committed, the comments on the blog post from the SL community reflecting both sides of the argument. In this case, Linden Lab chose to intervene, but in the Terms of Service (Linden Lab, 2010c), it is clearly stated that it has „right but not the obligation“ to take action, meaning that a university may instead be left to deal with highly divisive issues such as this, in uncharted legal waters, particularly if a student intended to lay blame with the university for failing to look after the welfare of students in an environment the university had obliged them to enter. It is important again to note that SL is a massive virtual world not limited to only those environments provided or endorsed by the university, but by requiring students to enter SL the university could be deemed culpable for an incident *anywhere* in SL.

Indeed, it may be that individual academics have entered into SL, and required their students to enter SL, without the permission, endorsement or knowledge of their employer, and may be personally liable, or have made their employer liable, for incidents within any SL.

4.10 Summary of Issues

The table 2 attempts to organise the issues outlined in this section using the theoretical framework developed in section 2. This table shows that the theoretical framework offered earlier has the potential to display and organise the problems that the delivery of HE in SL can raise. The next question then is whether there are solutions that could address possible problems.

5. Possible Solutions

Now that a range of issues with SL in higher education have been identified, the paper will proceed to outline measures to ameliorate the effects of these issues. If SL must be used as part of curriculum, the following recommendations should help to ensure the experience is rewarding. We want to underline that these are general ideas that may apply to individual issues. We do not claim to have a general solution. Some of the issues, notably questions of power and control over content, issues of ownership, and guarantee of quality of delivery of education are so significant that it may be impossible to address them in a satisfactory manner when using SL as the means of delivery.

	Theoretical problems	**Practical problems**	**Ethical problems**	**Moral problems**
Macro level	Why use SL in teaching? What benefits are expected, how can they be measured / assessed?	Access to SL, implies access to technology Additional learning required	How should resources be invested in HE?	Intellectual property Abuse / enforcement of policies
Meso level	Organisational benefits of SL Mimetic isomorphism	Which applications? Fit with organisational strategy? Technical / infrastructure requirements?	What are students' and teachers' rights? Who should control content and delivery of education?	Security, misuse Intellectual property Relationship with provider? Academic quality
Micro level	Opportunity costs	Who trains users? Accessibility, usability?	Who benefits, who is disadvantaged?	Students: • Quality of teaching • Participation Teachers: • Power • Privacy • Surveillance

Table 2: Framework of ethical issues in e-teaching applied to SL

5.1 Management/Governance / Awareness

The university, including legal representatives should be made aware of any and all use of SL involving students, and be made aware of potential hazards. Careful control of signup procedures should be made, and students should be encouraged to create new avatars specifically for learning exercises, to avoid crossover between academic and personal ties in SL.

5.2 Duty of Care

Although strictly speaking users of SL are only bound by the Linden Lab Terms of Service and Community Guidelines (Linden Lab, 2010d), a higher education institution can and should develop and enforce additional guidelines for users, in line with the university‘s own policies. This removes the potential mismatch between what Linden Lab can enforce, as opposed to what they will enforce.

Proper use of permissions and access control for university islands should be investigated and implemented, enabling the suspension of users who abuse the resource. Students should be encouraged to contact the university‘s administration regarding incidents, rather than Linden Lab, who may choose to suspend accounts and destroy another students‘ work.

5.3 Contracts

The default terms of service in SL are restrictive and pose the risk of the complete loss of all efforts placed in Linden Lab‘s hands. As such, universities should seek to negotiate more favourable terms with Linden Lab, such as investing in premium support, guaranteeing better service levels than individuals in the event of a problem.

5.4 Intellectual Property

Due to the nature of Linden Lab‘s view of user-created content as data which can be destroyed at any time, all staff and students should be encouraged to keep backups of anything which is to reside in SL. This should reduce the affect of a catastrophic loss of data and reduce the risk of either loss of students‘ or staffs‘ work, or falsely claimed loss of work.

6. Conclusion

Having discussed the use of SL in higher education we can conclude that it raises a number of substantial issues: theoretical, practical, ethical and moral. It would be subject of a different study to investigate which of these issues (or possibly others) universities did encounter when using SL. We can only speculate that some of these issues were substantial because the initial hype of SL use in higher education seems to have subsided.

The paper is therefore potentially of interest beyond the immediate issue of SL in higher education and points to more general problems of the use of technology. SL was greeted enthusiastically by educators around the globe who thought that this was a new platform that would allow them to deliver education in new ways. Why it was thus perceived and whether most individuals who jumped on the band wagon had good reason for doing so is a different matter. While SL shares some of the generic advantages of e-teaching, such as independence of space and ease of distribution of material, it is not immediately obvious that these advantages warrant its use in educational environments. The pedagogic disadvantage of all distance education, namely the lack of direct interaction and feedback does not seem to have disappeared. In addition, SL raises a host of new problems that this paper has discussed.

The general lesson to be learnt from this paper therefore seems to be that the match between early promise, useful application and possible disadvantages of a technology need to be considered. There is of course nothing wrong with experimenting with new technologies and media but the case of SL indicates that early attention to these issues may prevent hype and the corresponding waste of resources.

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SEEING THE MEANING: ONE ROLE FOR ICTS IN THE DEVELOPMENT OF PRACTICAL WISDOM

Timothy Walsh

Abstract

Certain features of the Internet, as it exists today and as it appears to be evolving, can support the refinement of ethical perception. This, in turn, can help us develop the capacity to exercise practical wisdom, which is vital to ethical practice. The exploration and exchange of self-narratives fostered by many Web 2.0 technologies can help us to understand the impact that particular choices have on the quality of our lives and on the coherence of our identities.

1. Introduction

Few would deny that the Internet is a cultural creation of great significance. As with any element of culture that has such potential to influence our interactions with each other and with the world, its existence, and the direction in which it evolves, impacts our ethical experience. Regardless of how one might evaluate the effects of modern information and communication technologies (ICTs) on our lives, it is clearly true that the development and use of these technologies has engendered new possible experiences, new concepts, and new expectations. Exploring the alternative perspectives brought to light by these changes has almost certainly enriched contemporary ethical theory. The emergence of "computer ethics" as an increasingly important discipline, the development of info-centric ethical theories such as Luciano Floridi's "Information Ethics," and the contemporary revival of interest in virtue ethics could all be viewed, to varying degrees, as responses to ethical questions and possibilities prompted by developments in ICT. Of course, the same conditions that lead to a richer or more sophisticated theoretical debate are not necessarily conducive to ethical excellence in practice. There are good reasons, however, to believe that the evolving networks, technologies, and practices comprising the Internet will yield important practical benefits. Over time, active engagement with the continuously evolving Internet can enhance our ability to perceive the unique qualitative impact certain choices or patterns of choice have on our personal identities or life stories, and on the evolving conceptions of "the good" that give our identities and self-narratives their meaning and direction. Refining this type of perception fosters practical wisdom, which allows one to discover what kind of person one ought to be, to continually develop one's understanding of what it means to be such a person, and to find or create those practices that allow one to become such a person.

The first part of this paper will explore the complexities of ethical choice and offer a more detailed picture of "practical wisdom," defending the claim that it is vital to ethical practice. The second section will examine the growing use of the Internet for creating, sharing, and exploring self-narratives and other stories, arguing that this trend, and its effects on how we think about our lives, can support the development of ethical perception.

1.1 A Few Words of Caution

Lest this argument appear to be far more ambitious than it is, a few caveats are in order. I do not believe that surfing the Web is sufficient for attaining excellence in wisdom or ethical life. Leading a good life—or "making something" of oneself—is an accomplishment, and we should embrace as many cultural and personal resources as we can in shaping our lives into something meaningful. I do not believe, for example, that insights and experiences gained from online culture substitute for those gained from everyday "offline" life and interaction, or from literature; but I also do not believe that everything we might learn from interacting with the online world could potentially be discovered outside of this new culture. Contemplating great literary works and participating in the culture of the Internet both provide specific goods with the potential to be constitutive elements of practical wisdom; and the narrow-minded pursuit of any one good to the exclusion of all others is a dubious recipe for ethical excellence. This is particularly true given that our lives are multifaceted, and that we see both

meaning and personal growth in the adaptations we make when faced with new experiences, new information, and new dilemmas.

My intent, furthermore, is not to argue that contemporary and emerging technologies will necessarily make everyone adept at exercising practical wisdom, or that perceptual excellence alone is sufficient for the creation of an ethical, meaningful life. I hope only to show how the emergence and evolution of the Internet might enrich our lives rather than make them shallower, since the potential erosion of our deep commitments and identities seems to be a concern shared by many over the influence of modern technology.

It is probably obvious from the language I have been using that I am strongly sympathetic to virtue ethics and to a form of eudaemonist value theory. I will leave it to my readers to exercise their own practical wisdom in determining whether or not the ideas expressed here constitute a vision compelling enough to merit incorporation into their own visions of "the good."

Finally, it is and always has been true that technological developments prompt "forward, backwards, and sideways" changes in our lives, even if the overall trajectory of our development may be forward. There are dangers and potential setbacks on any path. It is foolish at best, and inhumane at worst, to ignore or discount these problems even when one accepts a particular course as the best of those available, or when one sees some vital, unique, and compelling value in a chosen path. The outlook presented here is optimistic, but its optimism it tempered by an awareness of the many challenges posed by any major technological revolution. It is not intended to be dismissive of the important work being done to identify some of these challenges, and to craft policies that respond to them.

2. The Complexity of Human Choice and the Need for Wisdom

The choices examined in ethics, understood broadly as the study of "what kind of person one ought to be" and "howone ought to live," take place within a dynamic, evolving world that eludes description in fixed, inflexible terms. Contemporary ICTs have made the dynamism of the world even more apparent by bringing much of the local, distributed information throughout the world into our field of vision, while also allowing us to see the "higher-level," complex interrelationships that exist between seemingly disparate events and situations. For example, many of the concerns on peoples' minds of late—climate change, global financial health, immigration, international terrorism, to name a few—cannot be fully appreciated or understood without examining a wealth of detailed local information, while also being able to shift to a higher level of analysis so that whole systems come more clearly into focus.

ICTs have not only made us more aware of the dynamism of the world; they have also contributed to it by increasing the volume and speed of information exchange, and by harnessing the distributed information processing power of millions of meaning-generating problem solvers—that is, people—throughout the world. While it is probably true that some degree of practical wisdom has always been necessary for manifesting ethical excellence in a world of evolving ideas and changing circumstances, the need for practical wisdom becomes even more apparent when conventional authorities have been called into question, when choices are abundant, when the pace of change has accelerated, and when multiple competing views of basic concepts such as "the good" or "the right" each seem to enjoy significant support. This seems to be the situation we find ourselves in today, largely due to the influence of ICTs on life.

2.1 Some Common Ground

The term "practical wisdom," or *phronesis*, is associated with Aristotle and with virtue ethics in general, but the use of some form of reasoning that focuses on the particular and the concrete seems necessary for ethical practice, regardless of one's theoretical commitments. Consequentialists need to properly gather information about potential consequences in specific situations, and to weigh these possible outcomes correctly. Kantians need to develop the ability to determine whether their maxims for action in particular cases could be willed universally by rational beings. Furthermore, deontologists need to know how to apply certain previously derived principles in specific contexts; and they must be ethically aware enough to recognise particular situations as instances in which they can formulate or apply specific maxims. Kant notes that the action of helping others is an "objective end," or an end that is also a duty, but fulfilling this duty clearly requires an understanding of what "helping others"

demands, as well as an ability to recognise situations in which one has a good opportunity to help others. At the very least, ethical theorists in either camp should accept an instrumental form of practical reasoning as a necessary component of ethics.

2.2 Some Uncommon Ground: Qualitative Distinctions in Ethical Choice

In the Aristotelian conception, practical wisdom is not conceived merely as instrumental reasoning. It involves deliberation about the worthiness of ends as well as the appropriateness of means, exploring both through an examination of the concrete and the particular. The Aristotelian approach respects and embraces the dynamism and complexity of making decisions as a particular person in specific circumstances, in an ever-changing world. Failing to attend to the richness of concrete experience in deliberating about ends threatens to impoverish our ethical vision, and to limit our potential for gaining true wisdom.

As Martha Nussbaum cogently argues in *Loves Knowledge*, there is a "qualitative heterogeneity" between various human goods, each of which has a unique role to play in ethical excellence, or human flourishing (Nussbaum 1990). Excellence in justice does not provide some quantity of the same good that excellence in courage provides. The experience of practicing the virtue of justice is qualitatively distinct from that of practicing courage, or any other virtue. Reducing them to something amenable to measurement in common units would obscure their unique qualities; yet these qualities are the very things that give each of these goods their meaning and value. We experience these goods as distinct from each other, as our everyday language reflects; and since it is in our everyday lives that we feel the impact of ethical decisions, it may be misguided to conceive of these distinctly experienced goods as instances of one overall good.

The distinctions between any two virtues may be analogous to the qualitative distinctions between the works of two great artists, such as Michelangelo and Leonardo da Vinci: both produced exceptional works, and most would agree that the world would be a duller place if only one artist's works could be preserved, or if only one had chosen to be an artist. Given many lifetimes to work, Michelangelo could not have created what da Vinci did, and vice versa. Something unique and irreplaceable would be lost if either artist's works were destroyed; and if one had to choose between preserving the works of one or the other, there is arguably no way of converting either artists' works into units of "aesthetic goodness" that could then be directly compared.

This does not mean that one could not make a reasonable decision regarding whose works to preserve, or that any choice between the two must be arbitrary; but making such a decision would require a kind of reasoning that does not obscure the rich, complex, unique, and irreplaceable attributes of each body of work in the process. In fact, people do claim that one oeuvre is superior to the other. Those who make convincing cases present a compelling vision of the impact their chosen artist's work has on the richness of our lives, or on the practice of making art, or on our aesthetic sensibilities themselves. In everyday life, too, we make cases such as these to ourselves and to others all the time, although probably not very cogently, and often about less "lofty" subjects. Which is better: Citizen Kane or Casablanca? Star Wars or Star Trek? Macs or PCs? Certainly we do not compare these by citing the "quantity" of happiness each one makes us feel, or by appealing exclusively to any other measurable attribute. Measurements of a sort may be involved in some of these comparisons; but when we debate about such things, we describe their unique qualities, telling a story about the particularly compelling contributions one or the other makes—however small—to our lives.

If it is true that there is an experience of qualitative difference between various human ethical goods, it seems that abstracting away from the particulars of these ends in order to compare them along a single dimension of value is not the right approach. It may be the case that many of the ethical choices we face are of a similar character: that of choosing between qualitatively distinct but worthy ends, rather than of choosing between strictly right or wrong actions, or between better or worse consequences. To ignore these qualitative distinctions, or to "reason" them out of one's consciousness, is to retreat from a full engagement with ethical life and from the questions and possibilities it raises. Perhaps even more significantly, it is to potentially miss the opportunity to discover a more complete, more satisfying, and more concrete conception of what constitutes a "good end."

The difference between the Aristotelian conception of what it means to deliberate well in practice and the description of deliberation found in many other theories parallels the distinction between common law and code law, as Martha Nussbaum has pointed out (Nussbaum 1990). Principles that are

used to judge decisions can be derived from the common law; but the law is constituted by particular judgments in specific circumstances, and it is subject to reinterpretation and re-evaluation as judges face new, unexplored circumstances or possibilities. The law is not fixed, but it is not arbitrary either; it has a definite character or nature, but it responds to the unique elements of the situations in which it is applied, generating new laws or new interpretations in the process. In the Aristotelian view, good ethical deliberation has a similar quality: it focuses on the unique qualities of the contexts in which it is being used, generating more complex or more developed conceptions of good ends in the process. Mastering such a form of deliberation is particularly important in a rapidly changing and increasingly information-saturated world.

2.3 Living, Breathing Decision-Makers and Living, Breathing Decisions

An awareness of the qualitative heterogeneity of human goods and of our potential for uncovering more complete or richer conceptions of these goods should prompt us to prioritise the rich and multifaceted particulars of experience when contemplating worthy ends and worthy choices; but this is not the only insight that a more Aristotelian perspective on practical reasoning can provide. The Aristotelian perspective suggests that when one deliberates practically about ethical choices, one is deliberating about entire ways of being, or deciding on whether a particular choice further articulates or develops the evolving sense of ―the good" that gives shape and meaning to one's life story and to one's identity. This is not ―just" a claim about the accuracy of our descriptions of ethical deliberation; it is a normative claim about how we should envision the reasoning we use in making choices, if we are serious about seeking wise answers to the fundamental questions of ethics.

The picture of ethical choice often presented by theories of right action is problematic, since it is rare that our ethical decisions can be adequately described as discrete choices made at a particular point in time. Where does one choice stop and another begin? Can the choice be conceived apart from its context? Is the decision to help someone a single choice, or is it a conglomerate of many choices: the decision to help; the choice of whom to help; the choice of how to help; the choice of how to interpret the events that led to the recognition of an opportunity to help? What level of detail is correct in describing the choices we might make when we try to determine whether they will produce good consequences, or whether the maxim for action underlying each potential choice could be universally willed?

When viewed at the level of description that is most relevant for ethics—that of our everyday, concrete experience—ethical decision-making is a continuous, interactive process and that permits new information and new interpretations to enter into the deliberation at any moment. It is like an unfolding conversation between oneself and the world: the meaning and value of what is being said cannot be determined by looking at isolated sentences, and what was said in the past can be reinterpreted in light of what is being said in the present. At the same time, past statements continue to exert an influence on the present course of the conversation without fully determining its direction, just as past actions exert an influence on our present choices without fully determining them. In addition, conversations can take surprising turns and generate new ideas, since neither participant is in complete control of the dialogue. Similarly, we should not be surprised if we encounter new situations and new information that prompts us to reflect on our conceptions of ethical ends and ethical means. We continually modify the world, and the world, in turn, continually modifies us. Such feedback and mutual influence can lead to surprising—perhaps unforeseeable—developments.

As is the case with conversations, some ways of being are clearly more meaningful, or of a better quality, than others; but one cannot make this determination if one examines them at the wrong level of description. Individual actions might, indeed, be the more basic ―building blocks" of our ethical experience. It certainly must be the case that countless individual events and actions give rise to our lives. However, this does not mean that ethics should be pursued only through an examination of actions. Doing so might be a bit like seeking to understand the aesthetic value of a painting by studying the quality of the individual brushstrokes, or seeking to understand consciousness by examining the workings of individual neurons. Paintings are created out of brushstrokes, and consciousness out of the firing of neurons, but consciousness and art reside in complex patterns and relationships rather than in the qualities of the elements from which they emerge. This does not mean that brushstrokes and neurons are insignificant, but they should not be our primary focus.

2.4 Practical Wisdom and Perception

Ethics deals with complex patterns and relationships. In everyday ethical experience, we must choose how to interpret actions, situations, feelings, and events in complex contexts; we attend to commitments that seem to pull us in various directions simultaneously; and we feel compelled to integrate our past and present, as well as our interpretations, principles, desires, beliefs, and visions for the future, into an evolving but coherent sense of self that gives us a feeling of "authorship" of our own lives. None of the choices we make when faced with these experiences can be grossly mismanaged without affecting the quality of our lives. Nor can we make any of these choices in isolation from each other, since they are mutually reinforcing.

The question of how one ought to live is best approached by cultivating wisdom, since it is through the cultivation of this character trait that we can attend to the many facets of the complex choices we face, yet still find a compelling way forward. In exercising practical wisdom, we deliberate about ethical choices by envisioning their qualitative impact on our personal narratives, and on the characters—or selves—and conceptions of "the good" at their heart. It is in these "higher level" constructions that the full value and meaning of our choices emerges, for we care about these constructions immensely. Deliberating about the complex goods that are revealed in the multidimensional nature of particular characters and in the richness of particular narratives allows us to reason about ethics in a way that respects the complexity of the choices we face. More significantly, such reasoning offers us the chance to enrich our conceptions of what it means to flourish, by helping us to envision flourishing in increasingly concrete, personally meaningful, and multidimensional detail as we gain more experience and as our understanding grows.

Whatever else the cultivation of practical wisdom may require, it cannot be attained without experience, or without developing both the acuity and breadth of one's ethical perception. Ethical perception, as understood here, is an ability to "see" certain information in one's particular experiences and circumstances as ethically relevant. Given the view of ethics and wisdom expressed above, "ethically relevant" information is information that can have an impact on the richness and coherence of our conceptions of "the good," and therefore on how compelling and fulfilling our self-narratives are. More concretely, it is ethical perception that allows one to see, for example, that it is good to help a friend in need, and that being a good friend has a positive qualitative impact on one's identity.

As is the case with visual perceptions, ethical perception can be more or less acute, and the scope of one's ethical "field of view" can be more or less broad or expansive. Very roughly, the breadth of one's ethical perception can be understood as the number and variety of interests outside of one's most immediate and narrow self-interest that one recognises as valuable or meaningful. Truly selfish people, it is safe to say, would have a very limited ethical "field of view." The acuity of perception refers to the fineness of one's discernment in determining the unique qualities of a given action, practice, or other choice, which might either harmonise with one's conception of "the good," or perhaps enrich it. Developing perceptual acuity is akin to developing connoisseurship, at least in some respects. To the inexperienced, all red Burgundy wines might taste roughly the same; all Japanese sumi paintings might look fairly similar; and all classical music might simply sound "classical." As one becomes more familiar with wine, Japanese art, or classical music, the distinctions become more apparent; but connoisseurship is not merely an ability to note distinctions. Connoisseurs revel in these distinctions. They develop an ability to recognise the superior quality of certain examples within their chosen field, and a mind-expanding and life-enriching appreciation for those qualities that make one example superior to another. Someone intimately familiar with Western classical music will have a much richer experience listening to a Beethoven symphony than someone who lacks this familiarity, and a classical music lover will be aware of the qualitative differences between two performances of the same piece. Similarly, someone with acute ethical perception might recognise the better choice between two seemingly identical possibilities.

3. The Internet, Perception, and Narrative

A number of contemporary philosophers, including Martha Nussbaum, Daniel Jacobson, and Anthony Cunningham, have argued that certain works of narrative art have a role to play in helping to "refine our moral vision by giving us a studied opportunity to practice seeing and appreciating diverse

ethical loves" (Cunningham 2001). While it might not be uncommon to associate terms such as "wisdom" and "perception" with great works of literature, these terms are probably not often mentioned in the same breath as "the Internet." However, examining certain features of the structure and contemporary use of the Internet offers a glimpse of how this new cultural creation, too, might aid us in our quest to refine our understanding of who we ought to be and how we ought to live.

Whatever one may think of the content found online, it is undoubtedly true that the Internet encourages people to freely share what is meaningful to them and to find others who share these passions, making it an ideal place for further exploring the unique qualities of their practices or interests. The interconnected nature of the Internet combined with its quasi-global scope makes it more likely that users sharing a particular passion or practice will find others who share an interest in this same pursuit, but who may come from distinct backgrounds. This might prompt each user to examine the meaning and value of the pursuit from a new angle. A musician might hear the complex rhythmic pattern of an Indian *tala* and wish to investigate it more, to add another dimension to her playing. It is then likely that she will not only learn that there are significant differences between Indian and typical Western conceptions of rhythm, but also that the Indian conception is linked to Hindu philosophy concerning life, death, and rebirth. Someone steeped in the tradition of Hindustani or Carnatic music may have a rather different idea of what music is and what it means to play music than someone unfamiliar with these traditions. What starts as a quest for better musicianship, or simply a desire to understand an unfamiliar rhythm, might lead one to perceive previously invisible connections between music and life. Of course, such discoveries can be made without the Internet. However, the ease of information exchange through the Internet, the sheer number of people online globally, and the culture of sharing supported by the technology and ethos of the Internet makes such discoveries more likely.

The Internet was originally conceived primarily as a tool for exchanging data and for fostering collaboration through sharing knowledge. This is still part of its character, but it also has developed into a space in which to create, share, and explore narrative content. This aspect of the Internet has been facilitated primarily by Web 2.0 technologies such as social networking sites like Facebook, Myspace, and others, as well as blogs, fanfiction sites, photo sharing sites like Flickr, and simulation games such as Second Life. These sites demand active participation from their users, and tend to encourage the creative use of those tools they make available. The same trend toward greater user participation and content creation can be seen elsewhere on the Web as well, such as in the "mashups" posted on Youtube, or in the entries created for Wikipedia. The creativity and active participation each of these sites can prompt is noteworthy, but it is the focus on narrative encouraged by some of these sites, and perhaps by the nature of the Internet itself, that is likely to have a more profound impact on our ethical perception.

Given the picture of ethical deliberation and practical wisdom sketched earlier, any shift in orientation that prompts us to think about our experiences and actions on a narrative level should be a welcome development. One aspect of this phenomenon, however, may be particularly important. In a speech on happiness, human variation, and tomato sauce, Malcolm Gladwell quipped that the "mind knows not what the tongue wants" (Gladwell, 2004). We may believe that we know everything there is to know about our identities and our conceptions of "the good," but our narratives are not always as complete, as rich, or as compelling as they could be—or as we seem to think they are. Sometimes, the unexpressed ideas in our heads, which may seem quite profound and compelling, are more inchoate than we know. I know this only too well, having just watched many of the ideas I intended to incorporate into this paper evaporate upon further reflection. This experience is probably not uncommon. When speaking, we do not necessarily know what we are going to say until we say it; when writing—and particularly when telling stories—we are often surprised by what we discover in our own minds.

New experiences often teach us new things about ourselves, and give us opportunities to develop or grow. The experience of participating in the creation and exchange of narrative content on the web is distinct from simply thinking to ourselves about our life stories or about the nature of our personal identities. We can gain new and helpful perspectives on our personal narratives, and on the conceptions of "the good" that give them meaning and value, as we consciously make these stories part of the evolving and growing online world. Interacting with this world gives us a new vantage point: we can see more clearly how our stories intersect and overlap with the narratives created by

friends and others online; and we can see how our identities continue to evolve, perhaps even coming to recognise and accept that this is a necessary condition for true integrity. By envisioning and contemplating our self-narratives in the context of the interconnected Web, and by preserving some of this mindset as we go about our daily lives, we might become better able to perceive which acts or practices are central to the integrity of our personal identities, or capable of enriching our conceptions of "the good."

This may not seem like a terribly profound idea; in fact, I grant that it is not. This reminds me of a classic Zen parable:

> One day a man approached Ikkyu and asked: "Master, will you please write for me some maxims of the highest wisdom?"
> Ikkyu took his brush and wrote: "Attention."
> "Is that all?" asked the man.
> Ikkyu then wrote: "Attention. Attention."
> "Well," said the man, "I really don't see much depth in what you have written."
> Then Ikkyu wrote the same word three times: "Attention. Attention. Attention."
> Half-angered, the man demanded: "What does that word 'Attention' mean, anyway?"
> Ikkyu gently responded, "Attention means attention." (Schiller 1994)

The importance of "attention" is not in the meaning of the word, but in the practice of actually paying attention. Similarly, it is the practice and experience of actively engaging with the Internet that fosters the refinement of ethical perception. The "lessons" the Internet might teach us cannot be represented as a set of communicable maxims.

4. Conclusion

The Internet is very much in its infancy, and it is still quickly evolving. I have attempted to provide a small glimpse of one way in which its existence might sharpen our ethical perception and help us attain wisdom. Perhaps this is a vision of what the Internet can be rather than of what it is; but if the Internet continues to exist as a space for the free exchange of ideas, some reasonable optimism is warranted. We should expect that our shaping of the Internet, and the Internet's influence on us, may lead to some surprises, but that we will find our relationship meaningful and fulfilling overall.

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PRIVACY AND THE PUBLIC – PERCEPTION AND ACCEPTANCE OF VARIOUS APPLICATIONS OF ICT

Misse Wester and Per Sandin

Abstract

An increase of e-services and novel technologies that keep track of individuals and information about them is often seen as beneficial for the individual, with little discussion about possible risks this might have for the individuals‘ privacy. This article presents results from a Swedish survey study, where privacy is discussed in relation to use of technologies collecting personal information, confidence in actors trusted with this information and reasonable alternatives. The results show that even if usage of these technologies is wide-spread, the knowledge of risks is low, as is the confidence in government and private actors that handle personal information.

1. Introduction

There is a growing concern that too much data concerning personal information is stored by different actors in society and that this information could potentially be harmful for the individual it concerns. Issues of safety can range from the release of consumer patterns to a third party for marketing purposes to an invasion of privacy where sensitive or damaging information about a person is let into the public domain. As the range of information stored about individuals is so highly diverse there will be a need to identify how different kinds of information stored about individuals relates to issues of privacy. This paper presents the results from a Sweden survey study aimed at investigating how the Swedish population perceive and use some of the modern technologies that can be used in an invasive manner.

The structure of this paper is as follows: first an introduction will present the relevant definitions of key terms used in the paper. Second, the empirical material is presented. Following this brief presentation is a section covering the main results. The fourth and final section discusses what the implications of the results are for further developments of key terms, such as privacy, informed consent and security.

1.1 The importance of privacy in public

In order to be able to state what the reasonable man should have reason to accept in terms of stating personal data, a better understanding of privacy is necessary. Due to an ancient dichotomy between a private and a public sphere, privacy expectations in public are typically considered less reasonable than in private, i.e. in the obviously private domain of one‘s home. For several reasons however, this divide is untenable. The proliferation of ICT obscures and necessitates a questioning of the private - public split. ICT may be used to collect personal information, trace and track individuals irrespective of their geographical location – even in the obviously private realms of their homes. And, given the extent to which most individuals participate in the traditionally publicly realm, withdrawal or seclusion in order to protect personal aspects becomes untenable (Regan, 2003). Moreover, it has been suggested that individuals‘ need for privacy changes with situations and relations and that we therefore should consider ―contextualised privacy" (Nissenbaum, 2004). That is, individuals‘ privacy claims are likely to differ depending on the context they are in and on surrounding relations. Convincing reasons why privacy is important and why it should be protected are provided by Beate Rössler (2005). Following Rössler, privacy consists of at least three different dimensions; (1) decisional privacy, (2) informational privacy and (3) local privacy. All three aspects are necessary for individuals to control aspects of themselves, to be able to express themselves and to act according to their own values and plans. By protecting these aspects personal autonomy is secured. That is, privacy is important for the reason that it enables individuals to act autonomously. The triptyche model implies that individuals should be able to influence and control others access to information about themselves (both direct sensory access and registered data), to decide on matters that concern them and to have access to an

area in which they can act as if it was their private domain (Rössler, 2005). In order to cope with the public role individuals' need seclusion to be able to rehearse and prepare their public acts (Goffman, 1971, Simmel, 1995) - the back stage is a prerequisite for individuals' on stage performance (Goffman, 1971). Moreover, individuals define and conceive of themselves differently when surrounded by others than in private. Without the ability to control information about themselves individuals would not be able to direct their personas and hence, to influence how others perceive of them.

Monitoring and storing information about individuals is not a new phenomenon nor is it considered to be a peril by those who are critical to the developments in information technology. Surveillance and control is performed by parents, employers, spouses as well as law enforcement, militaries and governments. What has changed drastically the past decade or so however, is that this information is not just stored but is subjected to some sort of analysis (Lyon, 2006). From the perspective of the public, information technologies and information storage has been an open process where e.g. consumers release information concerning their consumption preferences in order to receive special offers suited to their needs. Another area where this technology is utilised is when travelling, at airports or border crossings within the European Union. At these check-points, information regarding an individual is shared between individuals and authorities, and even between nations. The use of e-services is also increasing, where transactions and administration is done over the Internet. Examples of this can be personal banking, on-line shopping but also includes digital interaction with governmental agencies. This is usually referred to as e-government and can include various services, such as registering for unemployment benefits, sick-leave, declaring ones tax return or on-line voting. That certain processes are speeded up by the new technology, such as reducing the time waiting in the check-out line in the supermarket or facilitating certain administrative processes, may seem like a balanced trade-off for whatever problems might arise if this information is misused. However, this is a choice that can only be taken if individuals fully aware and have access to complete information and are knowledgeable about *which* processes they engage in that result in having data collected and stored about them. Only after this initial knowledge is determined can ~~"in~~formed consent" truly be discussed. Research has shown that groups that are highly knowledgeable about these matters tend to be just as sceptical and concerned as those who have little or no knowledge about what information safety and breaches of privacy really entail (EKOS, 1993 in Zureik, 2004). These findings suggest that knowledge does not lead to lesser concerns, but perhaps different ones.

The need for research in the area of information safety, surveillance and privacy is warranted as technical developments and use of these techniques continue to increase. Former military and safety techniques are now available to the general public, making information more easily collected; implying that safety thereof should be highly prioritised. The current understanding of how individuals perceive information safety primarily in connection with consumption and marketing show that people can be divided into three categories: *privacy fundamentalists, privacy unconcerned* and *privacy pragmatists* (Westin, 2003). Fundamentalists have been shown to reject all kinds of benefits that might come from storing information: the unconcerned group that would consent to releasing personal information. The third group, pragmatists, would consider releasing private information based on what benefits and risks this would entail. This latter group has up until the turn of the millennium made up about 55 % of the population, and the former two 25 and 20 % respectively. By 2000 there was a dramatic shift in these attitudes where unconcerned dropped to about 8 %, while pragmatists remained at about 58 %. The privacy fundamentalists increased to 34 %, illustrating that the attitudes towards privacy and information safety is undergoing changes (ibid.). There is a growing feeling that individuals have lost control over the spread and usage of their personal information.

Of course, there is information and then there is information. There is a span of information that individuals rank differently when comparing risks and benefits when consenting to having information stored regarding themselves. Some areas that were identified as being worth protecting were territorial privacy (not being disturbed at home), bodily privacy (not being monitored at work), informational privacy (being in control of who gets access to what information regarding oneself) and privacy of communication (not having conversations monitored) (Zureik, 2004). As can be seen, there are a variety of situations, groups characteristics and nature of the information itself as well as the purpose to consider when dealing with information safety.

1.2 Privacy, security and technology

Individuals‘ interests in keeping information to themselves may come in conflict with the service providers‘ need for personal data about their clients. How these interests should be balanced is far from obvious. Where access to personal data (sensory and stored) is requested for reasons of public safety e.g. aviation safety, individual and collective interests may conflict. To start out with, a nuanced discussion on the values to be balanced is needed. A common view is that safety is a collective good that comes in conflict with the individual value privacy should be questioned. For example, communitarian Amitai Etzioni opposes strong individual rights like privacy and advocates collective rights. He argued that individuals must abstain parts of their individual rights for a greater value - *summum bonum* - the collective good. The argument is problematic for the reason that we are supposed to accept the concrete and foreseeable loss/increment of specific individuals‘ privacy for the possibility of increased safety. Hence, safety must be operationalised, when and how do we obtain safety, and arguments to the effect that privacy is a collective good necessary for a democratic society (Regan, 2003) should be considered.

Trust and safety are seen as cornerstones for the further development and full exploitation of the technical infrastructure in modern society. This assumption however needs to be critically examined. Social trust has in many areas of risk research been found to be of vital importance for how risks are perceived and managed (Hornig Priest et al., 2003). This view is somewhat contradicted by other findings that point towards interpreting trust as an expression of epistemic concerns, i.e. questions about the validity of the scientific basis for risk regulation (Sjöberg & Wester-Herber, 2008). These values are important when discussing possible threats to privacy or breaches of information safety because it has to do with the overall societal and democratic processes that are relevant here. The development of more secure information technologies will most certainly lead to a more extensive use of this technology for various purposes, then a public debate and discussions concerning the confidence and desirability of this technology is highly merited.

2. Materials and methods

For this study, a survey was constructed that built in part on a previously developed survey within the PRISE project (see http://www.prise.oeaw.ac.at/ for more information). The survey covered a broad range of themes and in this paper the following categories will be focused on:

- Knowledge of technologies and perceived control over information
- Behaviour: the use of specific technologies and actions taken to protect privacy
- Confidence in government and private actors

In this paper, the choice of technologies will be on the web-based technologies as opposed to other technologies that can be used for tracking individuals as GPS or CCTV. Technologies such as e-mail, using on-line services and internet-based e-government services will be examined here. These technologies are chosen since they can be used for sending personal information that can be stored, accessed and combined by other actors than the information was intended for. The results are presented under two sub-headings: perception of the technologies and behaviour relating to technologies.

The survey was distributed to a web based panel of respondents. This panel is made up by a representative sample of the Swedish population and is managed by Sifo International. The results are analyzed in relation to gender, age and sise of town the respondents lived in. The respondents were also asked if they had children or not, something that co-varies with age.

3. Results

A total of 2010 completed surveys were returned. The demographical distribution of the sample is as follows:

The sample had a good distribution between genders, as 48% were male and 52% of the respondents were female. The sample was evenly spread in terms of age with the youngest respondent at age 13 and the oldest at 73 years of age. Almost three quarters of the sample had children (74%).

3.1 Behaviour - Use of technologies

Most respondents used mobile phones (80%) and e-mail (76%) every day, and another majority (84%) use the Internet for other purposes than e-mail on a daily basis. A little over one third of the respondents use public transportation at least once a month (37%). As certain cards can be used for tracking or mapping an individual‘s movements or consumer habits, we also asked how many cards (e.g. credit cards, cards for public transportation, bonus programmes) the respondents used in their everyday lives. Approximately 13% of the respondents stated they had no cards, and 62% had up to four cards and 23 % had between five and ten cards.

The use of governmental e-services among the respondents had the following pattern:

Use of e-services	**Percent**
Not at all or small extent	32
Neither small nor large extent	17
Fairly large or very large extent	51

How the respondents acted when asked to release information about themselves we asked questions relating to what actions that had taken (percentage of those that had taken an action is in brackets). These results give an indication on how active or aware the respondents are regarding the release and protection of personal information.

- Refused to give personal information to private company (42.5%)
- Refused to give personal information to governmental authority (5%)
- Asked private company to remove you from mailing list used for marketing (50%)
- Asked private company not to release your information to third party (22%)
- Asked company of their policy for handling personal information (8%)
- Asked company for what additional information they have about you other than what is needed for billing purposes (5%)
- Deliberately given false personal information to sales person (15%)
- Deliberately given false personal information to governmental agency (1%)
- Read policy for handling personal information on website for private company (39%)
- Read policy for handling personal information on website for governmental site (22%)
- Never done anything to protect my personal information (25%)

As can be seen, the most usual actions are to refuse to give information, read the policy or asked to be removed from lists. However, one quarter of the sample have never done anything to protect their personal information. Closer inspection reveals that within this group there were of more women and younger individuals. Also, the group consisted of both individuals that use e-services frequently (43%) and of those that did not use e-services at all or to a limited extent (39%).

3.2 Perception - knowledge, worry and trust

When asked about what knowledge the respondents had on issues relating to using the internet, it can be seen that the overall knowledge of the Internet in a broad sense is higher than the knowledge surrounding the risks with Internet use.

	Internet	**Phishing**	**Rfid tags**
No or limited knowledge	15 %	30 %	78 %
Sufficient knowledge	31 %	33 %	14 %
Good or great knowledge	54 %	37 %	8 %

The respondents were asked the following question: ‗Regarding your integrity, how concerned are you about disclosing personal information on a website? It can be information such as your name, address, date of birth or sex.' The results are presented below:

Level of concern	Percent
Very concerned	8
Somewhat concerned	30.5
Neither concerned nor unconcerned	24
A little concerned	22
Not concerned at all	8
Do not release personal information	7

Questions were also asked how effective they believed the existing regulation is in protecting the uses of privacy sensitive information. A distinction between private and governmental actors was made.

	Efficient regulation governmental agencies	Efficient regulation private companies
Very or somewhat effective	27.5 %	37 %
Neither effective nor ineffective	41 %	43 %
Little or not effective at all	33.5 %	20 %

As can be seen, confidence in regulation surrounding private actors is higher than for governmental agencies. Looking specifically at gender, it can be seem that women are less confident than men in the current regulation, for both private and governmental agencies. We also included two questions aimed at measuring how great the risk was that personal information would be misused, either by the governmental officials or by individuals with a criminal intent. The scale used for these questions went from 1to 5, where 1 represented ‗no risk' and 5 represented ‗high risk'. Here, in contrast to the questions of confidence, men felt that personal information ran the risk of being misused by governmental to a greater extent than women.

	Men (Mean score)	Women (Mean score)
Governmental misuse	3.28	3.03
Criminal misuse	3.94	3.88

As can be seen in the table above, the risk of criminals misusing personal information is judged to be high by both men and women. A different pattern emerged when looking at age.

	13 to 41	42 to 55	56 to 73
Governmental misuse	3.31	3.14	2.99
Criminal misuse	3.81	3.97	3.95

Here is can be seen that the older generation has more faith in the integrity of governmental agencies than younger generations. Still, all groups perceive that the risk of criminal misuse of personal information is great.

Trust in decision makers to make the right balance between security and privacy as well as trust in the various actors to protect the information that they store relating to individuals was perceived in the following manner:

	Decision-makers	Governmental agencies	Private actors
Little or no trust	40	30	54
Neither high nor low	35	28	34
High or very high	25	42	12

Here there were also differences between genders, where women had a higher degree of trust in decision-makers than did men.

4. Discussion

The results presented in this paper seem to confirm that privacy is perceived different by various actors. Differences in attitudes towards possible privacy invasive technologies vary with age and gender. This means that there is a need to discuss and develop the concepts of privacy and privacy invasive technologies.

The level of concern for possible misuses of personal information seems to be evenly spread among the sample, with those that are very concerned and those who are not at all concerned that their personal information can be used for other purposed than originally intended. In addition, the results presented here also show that a majority of respondents use certain technologies that can track, send and store personal information about them. A large majority of respondents use the Internet, still the knowledge of the risks with this, such as Phishing, is relatively low. This means that respondents use services and technologies that might put them at risk of having their personal information misused, as they are not aware of how these attacks happen or how to protect themselves. The same pattern can be seen for Rfid tags, a technology used in many public transportations systems in Sweden, that knowledge of risks is low. At the same time the applications for this technology is spreading rapidly in society. The consequences for this can be that we end up with a widespread use of a specific technology that can be used for collecting information about an individual in ways she is unaware and not knowledgeable of. In light of this, the public debate about applications of novel technologies and true informed consent needs to be developed. Can one really consent to something one has limited knowledge about?

The use of e-services is fairly common among this sample, even though the confidence in the actors that have access to this information - whether it is a private or governmental actor – is low. Also, the respondents perceive that the risks of their personal information being misused are large. The discrepancy between usage of a certain technology and trust in those that govern it suggests that there are benefits to be made by using e.g. the Internet that outweigh the risks. However, this can also reflect a lack of reasonable choices for the individuals.

Compared to the results found in Westin (2003), our sample does not correspond to any particular group. Instead there seems to be a mix of those that make good use of the modern technologies, but at the same time perceive that the risks are great. The respondents in this study have done few things to guard their personal information. The most common actions taken were to ask to be removed from a mailing list, to refuse to give information to a company and to read the policy for how private companies handle personal information. These actions take place on-line whereas actions that require other forms of communication, such as asking a company of what personal information store or deliberately providing false information about oneself (something assumed here to be carried out by verbal communication), are not done to the same extent. Perhaps one way of increasing the individuals‘ opportunities to gain more control over his or her personal information is to provide clearer options and policies for Internet-based services.

The conclusions that can be drawn from the results presented here can be that even though there is a risk of privacy being violated, the risks are outweighed by the benefits as the use of these technologies is rather general. Even if the risk of having ones information misused is perceived as large, it is

sometimes argued that if one has nothing to hide, protecting ones information is not necessarily as important, especially if integrity is balanced with societal security. In other words, if I have nothing to hide, my privacy can be violated without it having detrimental consequences for me if it is done for the greater good. However, two arguments can be used against this view. First, there are laws regulating the collection, storage and use of personal information in place today. If these are compromised, even for the greater good, the trust and confidence in the regulators and governing authorities will be diminished. Second, this view perpetuates the view that integrity is an individual value, whereas security is a collective value. It is unfortunate if these values are put in direct conflict with each other, since both are vital for democratic societies. An individual must have the basic right to exert control over his or her own information and citizens should feel safe and secure in the belief that those with access to sensitive information treat this information in the proper manner.

In conclusion, there seems to be different groups in society that perceive privacy and use novel technologies that collect, store and use personal information in different ways. This means that concepts like privacy and integrity, as well as security, needs to be further discussed and defined. Privacy can be viewed to entail different things for different groups and much of the differences in perception can be ascribed to gender and age, making privacy a term that is difficult to capture. The perceived risks of having ones personal information misused can in some cases affect ones behaviour. The differences in behaviour can be that certain groups chose not to make use of novel technologies. Others might use e-services or similar technologies to a greater extent but still view privacy and personal integrity as important. This raises the question of availability of reasonable options. A public debate on the concept of privacy and list of reasonable options will aid in differentiating privacy into a more nuanced term and will aid in the development and implementation of novel technologies.

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THE SOCIAL AND ETHICAL IMPLICATIONS CONNECTED WITH THE DEVELOPMENT OF SOCIAL NETWORKING WEBSITES

Janusz Wielki

Abstract

This paper looks at the problem of the impact of rapidly growing social networking websites on the functioning of contemporary organizations. In the first part, an overview of the phenomenon called Web 2.0 is briefly provided. Next, social networking websites, as an important element of Web 2.0, are characterised and their typology is proposed. The following part is focused on an analysis of the opportunities and challenges emerging for contemporary organizations as these social networking websites grow in popularity. Finally the most significant conclusions and suggestions are provided.

1. Introduction

The first phase of the Internet's development, i.e. the second half of the 1990s, commonly called Web 1.0, marked its introduction into organizations and the development of its use as a business tool. The most characteristic features of the multimedial part of the Internet at that time included: commercialization; control held by experts; passive users; domination by directories (such as Yahoo! or Open Directory Project) and traditional search engines (such as Excite, Infoseek, Lycos, AltaVista, WebCrawler or HotBot) and enforced ways of indexing and positioning documents displayed on pages. Thus, it was obviously hierarchical and institutionalised (Keen, 2007), and in fact it ―was about publishing" (see (O'Reilly, 2005)).

The years following have been a time of even more dynamic development and further utilization of the Internet by all types of organizations. The year 2001 (the collapse of the dot-com bubble) became a key date in the separating of the phases of the internet's evolution, because it marks the development of Web 1.0 into Web 2.0. Among other issues, the key element of the new on-line reality was the development of a set of tools, called by McAfee ―emergent social software platforms (ESSPs)", which shared a few technical features. They included: search facilities, links, authoring, tagging, extensions and signals (see (McAfee, 2009)). These tools quickly became quite popular among various types of organizations. According to the results of a survey conducted by Forrester Software Research in May 2009, 50% of American companies use these social tools in some way (see (McAfee, 2009a)).

Undoubtedly social networking websites are one of the most dynamically growing and key components of ESSPs and this paper is focused on the implications connected with their development. The paper is composed of four parts. The first part is focused on Web 2.0 as the second phase of the Internet's development. It has been briefly characterised and its basic components have been presented. The following two parts form the core of this paper. Firstly, social networking websites have been characterised and their typology presented. Next, opportunities connected with their utilization are provided. They include three areas of an organization's activities: marketing, human resources management and knowledge management.

Next, the challenges connected with social networking websites development are presented and discussed. In all cases special attention is concentrated on the social and ethical challenges and implications connected with social networking Websites development and their impact on the functioning of contemporary organizations. All these issues are supported by numerous examples from various sectors

In the case of both the opportunities and challenges, the impact of social networking Websites on organizational dynamics and culture is analyzed as well. This has been done by taking into consideration the main characteristics of the Web 2.0 i.e. participation, collectivism, virtual communities and amateurism. In the final part of the paper, the most significant conclusions and suggestions are offered.

2. Web 2.0 as the second phase of the Internet‘s development

As was mentioned earlier, the second phase of the Internet‘s development started after the collapse of the dot-com bubble and coincided with the first decade of the new millennium. At that time the Internet, and particularly its multimedial part, gradually started to differ significantly from the first phase. It is connected with the development of technologies often called Web 2.0 technologies (see (Bughin, Manyika, Miller, 2008)), with emergent social software platforms as key elements, and the rapidly growing involvement and creativity of the users utilizing them (Chui, Miller, Roberts, 2009). Hence participation has become its most important feature, and O‘Reilly, who in 2005 introduced the term ―Web 2.0”, has called it the ―architecture of participation” (see (O‘Reilly, 2005)). Beside participation, its three other main elements are collectivism, virtual communities and amateurism (Carr, 2005). Because of the above mentioned features, an important characteristic of Web 2.0 is its lack of imposed structures, which were typical for the Web 1.0 phase (see (McAfee, 2009)).

Web 2.0 is also closely connected with the notion of ―folksonomy” i.e. the collaborative style of categorization of the content of Web sites, based on freely chosen keywords, commonly called ―tags” (O‘Reilly, 2005). Such an approach is opposed to the taxonomy which dominating the first phase of the Internet development, and means the indexing of the content according to the imposed categories as chosen by ‗experts‘ (Keen, 2007).

The basic elements and components of Web 2.0 include:

- new generation search engines (e.g. Google),
- Wikis (e.g. Wikipedia),
- peer-to-peer,
- mash-ups,
- Web services,
- blogs,
- podcasts and videocasts,
- RSS,
- virtual worlds (e.g. SecondLife),
- social networking Websites.

3. Social networking websites as an important element of Web 2.0

The above mentioned social networking websites (SNW) are on-line communities which gather people who want to stay connected with their friends, family, co-workers and even strangers, who share interests and/or activities with them. According to the results of a survey conducted by the Aberdeen Group, they are the tools which are most often associated with the phrase ―Web 2.0” (see (Aberdeen Group, 2008)). Their emergence provided people with new opportunities of communicating and sharing information and other types of content (e.g. pictures). Although the first social networking websites emerged in 1997 (SixDegrees.com), the most popular and well-known of them were established around 2005 (see (Boyd, Ellison, 2007)), and the year 2009 was the peak time of their development (see (Gaudin, 2009)).

There are many types of social networking websites, all differing significantly from one other, but there are four components characteristic for each of them. They are: profiles, connections, content and activities (see (Carfi, 2010)). The most important elements distinguishing them include:

- type of content,
- thematic area,
- type of target users.

As a result, it is possible to distinguish social networking websites aimed at specific content (e.g. pictures, movies) or varying content. In the case of thematic criteria, one can distinguish social networks by mass appeal or by specialist area. In addition, an important distinction between social networking websites is their target users. The criteria determining their segmentation mostly include such issues as belonging to social, professional, language or national groups (or a combination of these elements). A proposed typology of social networking Websites has been presented in figure 1.

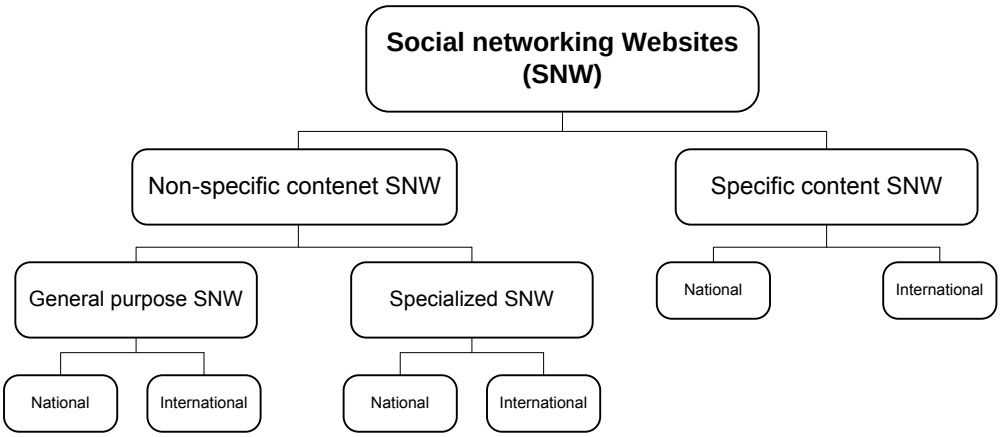

Figure 1: Typology of social networking Websites Source: Author's own

General purpose social networking websites, i.e. those without specific content, have the largest number of users. The most popular ones among them are Facebook and MySpace (see (Lenhart, 2009)). Both of them are available in a wide variety of languages, which has given them most definitely an international profile. In addition, there are country-specific versions which are aimed at local users (e.g. www.vkontakte.ru).

Increasingly dynamic are the rapidly developing specialised social networking websites, and the area of the specific interests they cover is very diverse. Among them are social networking websites aimed at finding old school friends (Classmates, Nasza-klasa); communities of professionals, both general (LinkedIn), and specific (e.g. physicians – Sermo); animal fans (Dogster, Catster), and those dedicated to a specific sex (Muli-Tasking Women). Among them, there are also highly specialised social networking websites such as Children with Diabetes. These specialised SNW tend to address a particular national or language group of users.

Social networking websites focused on specific content are developing extremely dynamically. The most well-known of these are YouTube (movies) and Flickr (pictures). This group of social networks features both international (YouTube) and national (Fotka.pl) sites.

An additional criteria of division of social networking websites emerged with the development of microblogs i.e. where the length of a single entry cannot exceed a particular number of characters (typically 140). They function as „stand-alone" services (as in the case of „classical" services i.e. Twitter), but they can also be an additional functionality within other social networking websites (as is the case of the biggest Polish SNW i.e. Nasza-Klasa, which at the end of 2009 added an internal microblog service called Śledzik.pl). These types of services are also very internally diverse, through the content which can be provided by its users (text alone, pictures, short audio or video files) and also because of the type of thematic area or target users (Hill, 2008). In fact they are the next phase of development of a set of technologies called real-time Web (see (Krzysztofek, 2010).

Generally, social networking websites are an element of the Internet which have been developing in an extremely dynamic way, and which have manifested themselves in the rapidly growing number of people using them. Undoubtedly, they are most popular among younger users, but the proportion of adult SNW users is rising rapidly. According to the results of a survey conducted by the Pew Internet & American Life Project, at the end of December 2008, 35% of American adult Internet users have a profile on a social networking website, which means that the number has quadrupled since 2005 (8%). The survey also shows that the largest number of users belong to the age range 18-24. In the case of teens, 65% of them are social network users. The most popular SNWs are general purpose ones and among these the leaders are MySpace, Facebook and LinkedIn (Lenhart, 2009).

4. Opportunities and challenges connected with the development of social networking websites

The development of social networking websites is important not only from the point of view of the single Internet user, but also to organizations, owing to the scale and dynamism of this phenomenon.

Because of this, their adoption by organizations continues to grow rapidly. According to the results of a study conducted by The Center for Marketing Research at the University of Massachusetts, in 2009, 80% of surveyed US companies declared using social networking websites (in 2007 it was 27% and in 2008 49% - see (eMarketer, 2009c)).

With their growth, they provide many new opportunities which are important for the realization of various organizational tasks. The most significant ones relate to three processes:

- marketing,
- human resources management,
- knowledge management.

If marketing processes are considered, according to the results of a survey conducted by Mzinga and Babson in August 2009, social media, including SNW at the top of them, are mainly utilised by organizations in this area of their business activity (see (Mzinga and Babson, 2009)). Generally, there are three basic areas where new opportunities connected with social networking websites have emerged. They include:

- promotional activities,
- customer relationship management,
- marketing information systems.

In the case of the first issue, the biggest opportunities appear in relation to connecting with consumers. According to executives surveyed by the Marketing Executive Networking Group, the main benefits of the utilization of social networking websites by organizations include customer engagement and direct customer communication (see (eMarketer, 2008)). Also the results of other research provide similar results (see e.g. (Aberdeen Group, 2008)).

In practice, organizations use numerous tools on social networking websites in order to communicate with their customers and to involve them in various initiatives relating to their products or services. The most popular one is when an organization creates its own profile (it can be also a brand profile - see (Holahan, 2007)) and attracts consumers to it. For example, at the end of 2008, 32% of US on-line retailers had a page on Facebook, 27% on MySpace and 26% on YouTube (eMarketer, 2008a). This is becoming increasingly popular in other sectors as well. MySpace profiles have become standard in the music industry. They are set up not only by known musicians and bands but also by amateurs who want to get noticed. A similar situation also occurs on YouTube (see (Makarenko, 2008)). Generally, according to the results of the research from the "2009 B2B Social Media Benchmarking Study", maintaining company-related profiles on social networking Websites was the leading initiative both among B2B and B2C organizations although the former turned out to be significantly more active in such initiatives (81% of them had own profile, comparing to 67% of the B2C companies – see (eMarketer, 2009b)).

Because of the extremely dynamic development of microblogging services (the number of visits to Twitter increased by 1170% in September 2009 compared to the same period of 2008 (see (Gaudin, 2009a)), participating in them is the second type of initiative, with regards to social networking websites (see (eMarketer, 2009b)).

Simultaneously, customers increasingly expect organizations to use social networks in their activities. According to the results of the survey "The Cone Business in Social Media Study", 93% of social networking website users in America believe that companies should have a presence there, and 85% believe that they should not only be present there, but also use them to interact with consumers (Cone, 2008).

Once an organization has its own profile on a social networking website, it then tries to attract as many consumers as possible to its profile by sending them relevant information, trying to activate "owned" consumers and attract new ones through various initiatives, competitions, coupons etc. The profiles of organizations can have a standard from, but more and more often companies are trying to have a more imaginative presence on social networking sites. A good example of such an attempt is the initiative of Teatr Dramatyczny from Warsaw, which has created its profile as if it were an individual i.e. a male over fifty with specific preferences (Chip Online, 2009). Another example of a non-standard approach is Zappos.com, which is an on-line shoe and clothing store. It intensively uses SNWS, mainly Twitter, through its employees who actively utilise their own profiles to promote the company. The scale of such activities is quite significant, because out of 1400 employees, 450 actively

use Twitter in promotional activities (Gaudin, 2009c). Apart from innovative ways of communicating with consumers, social networks are places where traditional internet promotional tools such as banners and video spots are used as well. It is worth mentioning that it is not only organizations which have their own profiles or channels (as in the case of YouTube) but also countries (e.g. the Vatican City) and government institutions (e.g. the Israeli army (see (Gazeta.pl, 2009), (Kruczkowski, 2009)).

Simultaneously, social networks are more and more commonly being used by consumers themselves. They present their own original creations and in some cases such initiatives turn into projects attracting millions of internet users, thus developing into not only a free but also extremely effective form of brand or product promotion. Undoubtedly the most spectacular example of this was the movie entitled „Experiment #214 – The Domino Effect" which was watched by over 7 million people around the world (Makarenko, 2008). So, consumers encouraged to take part in such activities (e.g. by means of competitions organised by companies) can be an extremely effectual form of rank-and-file promotion, which is especially important in this age of growing disenchantment with the traditional promotional forms created by professionals.

Along with the development of social networking websites, new opportunities are also emerging in the area of customer relationship management. Owing to the fact that users of SNWs eagerly make a lot of detailed information about themselves publicly available (see (Sofos, 2007a), (Debatin, Lovejoy, 2009)), there is the huge potential for this information to be used in the context of CRM activities (see (eMarketer, 2010)). In many cases, data and information retrieved from social networks can be more useful than the information previously gathered in CRM systems (see (Maciejewski, 2009)) and as a bare minimum the new information serves to enrich the previous information, providing organizations with greater possibilities for implementing the key idea underlying the CRM concept: i.e. to treat different people differently (see (Dobrow, 2009)). New versions of CRM applications, such as CRM Oracle or salesforce.com, now enable users to utilise information included in Facebook and LinkedIn (see (Maciejewski, 2009)).

In addition, this recourse to greater consumer information through social networking sites has greatly benefited the marketing information systems of organizations. The usage of SNWs in marketing research is indicated as one of the main benefits of using social networking websites for marketing (see (eMarketer, 2008)). It can take various forms, such as surveys and research, gathering behavioral data or conducting experimental research (e.g. probing consumers' opinions on new products or concepts, through the means of short film clips on YouTube).

The utilization of social networking websites is also becoming increasingly important in other elements of marketing information systems i.e. marketing intelligence systems (see (Kotler, 2003)). As social network users eagerly reveal a lot of detailed information about themselves (e-mail addresses, dates of birth, details about their education or workplace, current addresses, phone numbers, IM screennames, pictures – see (Havenstein, 2007), (Sofos, 2007a))) or about the activities of the companies they work for, social networking sites offer a lot of opportunities connected with marketing intelligence activities. The effectiveness of these opportunities are growing with the increased availability of tools enabling specific parts of the Internet (e.g. social networks) to be scanned in order to find out as much as possible about a given company or topic. Such tools are currently being provided, for example, by London-based StrategyEye (see (Havenstein, 2008), (Scott, 2008)).

Human resources management processes are a further area where social networking websites are utilised, in this case mainly for recruitment related issues. Comments, data and pictures freely made available on social networking websites are increasingly being used in the process of job application verification (see (Coutu, 2007)) or searching for potential candidates for particular positions (e.g. in specialised SNW such as LinkedIn or GoldenLine). According to the results of research conducted by CareerBuilder, information found on social networking sites mostly contributes to the rejection of a particular candidate but in rarer cases (one in four) to the selection of a candidate (Waszczuk, 2008). Organizations are also increasingly using specialised applications to advertise job vacancies through their employees' profiles on social networking websites. „Work for me" is an example of such an application available on Facebook (eGospodarka, 2009).

Because of the fact that in the „resource dimension", the contemporary economy increasingly evolves towards a knowledge-based economy, the number of knowledge workers has been increasing, hence knowledge management processes i.e. knowledge generation, codification and storage, retrieval and transfer (see (Wielki, Ziemba, 2008)), become the key challenges faced by contemporary

organizations. The development of the Web 2.0 phenomenon is providing organizations with numerous new opportunities relating to this area of business activity and according to the results of a survey conducted by McKinsey in June 2008, in the case of "internal" usage, tools based on Web 2.0 technologies are the ones most often utilised in the processes of knowledge management (Bughin, Manyika, Miller, 2008).

Social networking websites are the second, just after blogs, Web 2.0 tool associated by end-users with collaboration and knowledge sharing (see (Aberdeen Group, 2008a)). It results from the fact that they allow knowledge workers to contact each other, and to create groups interested in specialist knowledge, which can exchange and share information about that knowledge. A particularly important role in these processes has begun to be played by the earlier mentioned microblogs, which allow for the quick and easy dissemination of links to certain articles or websites containing specialist content as well as enabling users to quickly receive information relating to certain topics (Quitter, 2009). KnowledgeBoard is a good example of a group whose activity is based on the usage of Twitter and the sharing internally of information on knowledge transfer and business intelligence systems (Hill, 2008).

Simultaneously it is worth mentioning that social networking websites are also more and more commonly utilised by small business, although the most important, from their point of view, benefits are different compared to big organizations. According to the results of the research "Small Business Marketing Forecast 2010" the key, from their point of view, are such aspects as generating leads, keeping up with the industry and monitoring on-line chatter about the business. Facebook was the most important SNW for this group of organizations, although its usage was not very common (10% of surveyed companies) (see - (eMarketer, 2009)).

Apart from the undisputable benefits to organizations of utilizing social networking websites, they are also a source of completely new challenges and dangers. Their scope is similar to other web sites (see (Wielki, 2008)), but it has been significantly increased by some new elements. Typical aspects of the challenges and dangers associated with the use of social networking Websites by an organization's employees are:

- the risk of decreasing employee productivity,
- dangers relating to company security,
- the challenges connected with the proper and efficient functioning of an organization's IT infrastructure.

In the case of the first point, it poses a serious challenge which results from an employee devoting work time to personal business and taking part in social networking communications (see (Gaudin, 2009c)). The scale of this phenomenon has quickly become significant and has been deepening as a result of the explosion of microblogging services in early 2009 (see (eMarketer, 2009a)). Because of this, for many organizations there is an important question as to the kind of policy concerning SNWs which should be implemented (see (Palo Alto, 2009a)) and many of them now ban the visiting of social networking websites at work and a growing number of them have started to block access to these sites. (see (Sofos, 2007a), (West, 2007)).

The growth in popularity of SNWs has serious security concerns for organizations, particularly due to the potential for infection by malware software (see (Palo Alto, 2009)). This type of software is distributed particularly intensively through the most popular social networks such as MySpace, Facebook and YouTube. It is disseminated in numerous ways, with various aims and intentions (see (Cisco, 2009)). One of the means of malware distribution is through the creation of fake profiles. The scale of this phenomenon is significant, as it is estimated that 20% to 40% of new profiles on the most popular social networks are fake (see (Muncaster, 2008)). The goals of malicious software utilization are diverse. Some attempts to transmit a special type of worm which compromises computers in order to use them as a so-called "zombie" in botnets, while others try to install various types of spyware in order to gain access to the data collected in a company's computers (see (Wielki, 2008)). The rich amount of data gathered in the profiles of users of social networks is also a common goal.

Additionally, with the wide scope of SNWS usage by some companies (e.g. Zappos.com as mentioned earlier) there is the significant danger of accidental leakage of data or information.

More and more often these types of situations are connected with the private accounts of particular people (such situations took place in the case of Polish police officers revealing on the biggest Polish SNW information which could be useful for criminals – see (Sałwacka, 2007)) and with the families of influential people (such a situation took place in the case of wife the head of British secret

intelligence service MI6, disclosing private information and pictures on its Facebook account – see (Lewis, 2009), (Sturcke, 2009)).

Social networking websites also create completely new types of challenges that are connected not only with employees but also with organizational stakeholders (see (Wielki, 2007)). These are mainly related to the possibilities for the conscious or unconscious negative impact on the image of a specific organization, not only through the voicing of negative opinions, but also by placing pictures or short films on social networking sites, which can discredit an organization (see (Baron, 2008)). The possibilities for such negative action are quickly expanding with the growing integration of Internet and mobile technologies (see (Wielki, 2007a). However, customers, to an increasing degree, are taking control of the images of products or brands (see (Makarenko, 2007)). The results of this can be very positive for a particular company and be a form of free promotion (as in the case mentioned above —Experiment #214 – The Domino Effect" and with Coca-Cola and Mentos), but such activities can very easily be steered into a negative direction.

5. Conclusions

The growing popularity of social networking websites, as one of the most significant elements of the Web 2.0 phenomenon, has quickly changed the character of the Internet. Their development, although originally solely aimed at private users, has started to leave its stamp on the way organizations function, and on organizations' relationships with their stakeholders, both their internal and external ones (see (Freeman, 1984)).

As with any other technology, social networking websites generate both new opportunities and challenges and threats. External stakeholders have especially been provided with numerous new possibilities for influencing organizations, their products or images, which are often difficult or even, in some cases, impossible to control.

Equally, many new opportunities have emerged. They include the better and quicker means of communication between an organization and its customers, opportunities for deepening relations between them and possibilities to react faster to customers' needs.

In this new and dynamically changing situation every organization has to face the important issue of how to minimise the emerging threats and challenges while simultaneously maximizing the benefits connected with social networks. Organizations also have to determine how best to harness the enthusiasm and creativity of their users.

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As Alvin Toffler wrote "change is non-linear and can go backwards, forwards and sideways. ETHICOMP 2010 has the overall theme of "The backwards, forwards and sideways changes of ICT". Society has changed dramatically over the last sixty years with the advent of ICT. Some ICT-related changes have been good and have moved society forward, others were bad and caused harm, while some appear to have had no ethically relevant effect at all, simply moving us sideways. In developing and adding ICT, the ethical dimension must be considered so the potential positive, negative and neutral impacts on society, organisations and individuals can be understood and appropriate action taken.

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