Teaching Ethical Reflexivity in Information Systems: How to Equip Students to Deal With Moral and Ethical Issues of Emerging Information and Communication Technologies

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ABSTRACT

Teaching ethics to students of information systems (IS) raises a number of conceptual and content-related issues. The present paper starts out by developing a conceptual framework of moral and ethical issues that distinguishes between moral intuition, explicit morality, ethical theory and meta-ethical reflection. This conceptual framework demonstrates the complexity of the field and can be used to categorize different concerns and discourses. The paper then proceeds to discuss ethical issues that can be expected to arise from novel developments in information and communication technologies. These give rise to a set of recommendations, which are aimed at policy makers as well as ICT industry and professionals. The paper concludes by suggesting that the task of IS education is to develop ethical reflexivity in students. Such reflexivity will be required to provide the conceptual complexity and intellectual openness that will be needed to react appropriately to novel challenges.

Keywords: Ethics, critical thinking, life-long learning, privacy

1. INTRODUCTION

A problem that education in fast-moving technically oriented fields such as that of information systems (IS) faces is that the state of the art at the time of teaching tends to be obsolete by the time of graduation. The apparently ever-increasing speed of change and development renders this problem consistently acute. There are different possible answers that educators in IS can give to this problem. On the one hand they can attempt to keep their material up-to-date in the hope that the half-life of the technologies they teach is still relevant at the point of transition of students into their post-educational position. On the other hand, one can try to teach less variable principles that are likely to remain constant over time. A typical debate of this sort revolves around the question which programming language(s) to teach IS students. The one position would hold that students should learn programming languages they are likely to encounter in organizational practice. The other position is to teach the fundamentals of programming, possibly using legacy languages that are useful to understand principles, even if they are no longer used outside of educational environments. These two positions do not have to be contradictory, and a common aim is to combine them, to teach general principles using current tools.

While the two positions thus do not have to be mutually exclusive, it seems to be widely accepted that education in technical subjects, just as education in general, needs to equip students with the ability to continue educating themselves. There are broad expectations that long-term employment in the same role will become less and less common, while technical, organizational, and social change will continue to speed up. If it is thus the task of IS education to provide students with skills to react variably and appropriately to problems and challenges that may not be visible yet, then IS educators need to ask themselves how they can know what the skills are their students are likely to require.

The present paper takes this question as the point of departure to explore one specific area of IS education, namely that of ethics. Ethics is a conceptually difficult area, being related on the one hand to everybody's individual life-world, to socialize and internal experiences of what we believe to be right and wrong. At the same time ethics refers to several millennia of philosophical discourse. While it is easy to observe numerous ethically relevant phenomena arising from the use of information and communication technologies (ICTs) that are directly relevant to the field and practice of IS (e.g. privacy in social networks, ownership of content and software, changing relationships due to computer mediated communication,...) it is not always easy to determine why these are perceived to be of ethical relevance and how they are to be evaluated. This paper therefore starts by developing a framework for ethical issues in IS and shows that these have a significant tradition in the IS literature.

The subsequent section will describe a research project aimed at identifying ethical issues that are likely to emerge in the medium term future (10 to 15 years). This project explored likely emerging ICTs and it then investigated and evaluated the possible ethical issues that can reasonably be expected to arise from these technologies.

This description of ethical issues then leads the paper back to the question of education. The paper advocates the view that there are a number of interlinking policy and organizational activities that need to be in place if we are collectively going to be in a position to proactively engage with such emerging ethical issues. Education is one core aspect of this. The paper will argue that IS scholars and practitioners need to understand that ethics is a beneficial and pervasive aspect of any society and that it is in their interest to engage with it early. Once this is the case, they have to develop a form of ethical reflexivity that will allow them to transcend the situation in which they find themselves and critically question their position, their own framing and assumptions. The paper concludes by discussing how this could be achieved in current university IS courses.

2. ETHICS IN INFORMATION SYSTEMS

A core difficulty of any research related to ethics arises in arises from the definition of the term. Ethics reaches across several disciplines and discourses. All of these have different definitions of the term. The main body of literature that the present paper builds on is that of philosophy, more specifically moral philosophy, and even more specifically the part of moral philosophy that deals with technology and in particular with information and communication technology (ICT). Philosophy is a large and very old field and discourses on ethics within philosophy fill whole libraries. It is therefore beyond the scope of this paper to do justice to all positions and definitions. Very briefly this section suggests that it is useful to distinguish between four different levels of normativity: moral intuition, explicit morality, ethical justification, and higher level reflexivity. The following sub-sections introduce each of these terms and then explore their relevance to IS.

2.1 Moral Intuition
Morality intuition can be defined as the non-reflected reaction that individuals have when faced with questions or issues that they perceive to be good or bad (Kekes, 1986). It is the basis of utterances such as "this is good" or "that cannot be right!". Most human beings have this sort of reaction to a wide range of issues and actions. Moral intuition is a fact of life. One of the reasons why it remains implicit is that it tends to be shared by the local community. Groups, cultures, nations share moral intuitions; they arguably are to a large extent defined by them. In many cases these moral intuitions are inextricably interwoven with generally shared world views and usually underpinned by a shared religion.

Much IS research has been undertaken on issues of moral intuition. Such moral intuitions are important for IS because they can have significant impact on the use and success of information systems. They relate to the question whether technology is conducive to social and organizational goals. It is therefore not surprising that a seminal paper on ethics and IS (Mason, 1986) lists four moral issues that many individuals have strong intuitions about: Privacy, accuracy, property and access. The issues Mason discussed continue to dominate IS research on moral intuitions. Straub and Collins (1990) picked up a set of closely related issues, namely piracy, proprietary databases and privacy. Over time, most of these issues developed their own dynamics and turned into sub-disciplines or even whole disciplines themselves. Privacy is probably the most notable example. There are numerous scholarly journals which deal exclusively with privacy concerns. Some of this activity is then reflected back in mainstream IS work (Culnan & Williams, 2009; Milberg, Burke, & H. Smith, 1996).

A similar development can be observed in the area of intellectual property. Electronic data and information raise a number of interesting legal and ethical questions which are far from solved. Questions include the moral evaluation of user activities, such as content downloading, as well as ownership in data, information, content or software. Despite the ubiquity of moral intuitions, they continue to raises considerable questions.

2.2 Explicit Morality
The problem of moral intuition is that it relies on two, sometimes mutually exclusive conditions: internal consistency and external consensus. Moral intuition carries the connotation of consensus with the peer group. It breaks down when this consensus is no longer given (Cushman, Young, & Hauser, 2006). This requires a discourse on what is perceived to be shared morality by discussing what is perceived to be right or wrong. Examples might be: "companies can do what serves their bottom line". Or: "employees do not have to do what employers tell them, if it is against their conscience". This type of statement is required when there is disagreement on implicit morality.

Explicit morality is, as the term suggests, something that is open to discussion. It needs to be stated. Statements on explicit morality have found their way in one of the dominant streams of positivist and quantitative IS research, namely as "subjective norms" in the Theory of Planned Behaviour (Ajzen, 1991). These subjective norms have been shown to have significant influence on the use of technology and therefore now constitute a core element of such research in numerous different areas from the adoption of WAP-enabled mobile phones (Teo & Pok, 2003) to mobile payment services (Schierz, Schilke, & Wirtz, 2010). Other IS research on explicit morality explores the moral norms by particular stakeholder groups such as students or customers.

Interest in stakeholders' explicit views of morality tends to be directly motivated by functional interests. Infringing moral views can lead to customer rejection. Given the sometimes close relationship between moral and legal issues, there is also an interest in normative issues to limit liability. In the case of research on students, an explicit motivation is often the wish to affect their moral preferences and make the "better" professionals. Understanding employees, for example can also allow the enforcement of rules and ensuring compliance. This functional interest has pervaded IS research in the area for decades (Straub & Collins, 1990) and continues to be relevant (Cavusoglu, Benbasat, & Bulgurcu, 2010).

One further reason why interest in explicit morality is likely to remain high in IS is that such explicit moral rules often mirror a typical approach to professional ethics, namely that of codes of conduct or codes of ethics. Professional ethics often tries to codify what is expected of professionals. This includes professional bodies such as the Association for Computing Machinery, the British Computer Society and also the Association for Information Systems. Given the prominence of such codes as means to express moral standards, it is not surprising that they have been the subject of IS research (Walsham, 1996) and figure prominently in much IS research on ethics.

The fact that explicit morality needs to be made explicit indicates, however, that it is not universally shared. While explicit morality may denote the moral consensus of a group, there is no guarantee that it does so. Moreover, it is not clear why an explicit moral statement is meant to be acceptable. If one wants to come to an understanding of moral issues, however, there needs to be agreement not only on what is good or bad, but also on why it is good or bad.

2.3 Ethical Theory
Ethical theory asks for the grounds on which moral statements are made. Ethical theory is one of the main branches of philosophy. The distinction between morality as social fact and ethical theory as reflection, while not universally accepted, is widely recognized (Adam, 2005; Ricoeur, 1990; M. T. Siponen & T. Vartiainen, 2002), even though sometimes slightly different terminology is used (Moores & Chang, 2006).

Prominent ethical theories include utilitarianism, (Kantian) deontology and virtue ethics. Utilitarianism is an ethical theory going back to Jeremy Bentham (2009), James Mill (1829), John Stuart Mill (2002) and others. The main idea of utilitarian ethics is to compare the aggregated utility and disutility of each option in a decision situation. The ethical decision would be the one that maximizes overall utility. In essence this approach concentrates exclusively on the outcomes or consequences of decisions, which is the reason why it is usually called 'consequentialist'.

Kantian deontology (1986, 1998), on the other hand, takes a fundamentally different approach and evaluates the ethical quality of a decision according to the intention of the agent. Famously linked to the so-called Categorical Imperative, the ethical evaluation of a maxim depends on whether it can be universalized or imagined as a universal law. An alternative formulation stipulates that a maxim is ethically acceptable if it treats humans as ends in themselves, not merely as means. The approach is called deontological (from Greek deon, duty) because it concentrates on the duty-bound intention of the agent with little regard to consequences.

A final group of ethical theories often discussed in information systems discounts both the relevance of consequences and of duty, but instead concentrates on the individual. This is the family of virtue ethics, where the theoretical distinction between good and bad is not made on the grounds of external aspects of an action but based on the way in which an action reflects on the character of the individual. This family of ethical theory goes back to classical Antiquity, to Plato (1945) and Aristotle (2007) and finds its current instantiations in contemporary virtue ethics (MacIntyre, 2007).

These three approaches are important because they are the dominant theories currently discussed and they capture much of our moral intuition. At the same time, one needs to see that there is a wealth of other ethical theories around that could be considered. Influential with regards to computing and information systems are Aristotelian and neo-Aristotelian theories of virtue ethics (T. W. Bynum, 2006) feminist ethics of care (Adam, 2005) or ethical approaches more specifically aimed at technology, such as disclosive ethics (Brey, 2000; Introna, 2005). There has also been some debate of the limitations and applicability of traditional ethical theories in the information society (L. Floridi, 1999; L. Floridi & Sanders, 2002).

There are many more ethical theories beyond those listed above. Many attempts have been made to apply these or make them usable to the area of IS. However, most such work is done outside the field of IS, notably in the area of computer and information ethics (Brey & Soraker, 2009; Luciano Floridi, 2010; Himma & Tavani, 2008; van den Hoven & Weckert, 2008; Johnson, 2001).

2.4 Reflection and Meta-Ethics
The different ethical theories offer different reasons why something would be considered good or right and may lead to conflicting recommendations. In order to understand and evaluated such differences a more abstract viewpoint is required. This next higher level for ethics is often called meta-ethics in philosophy (Marturano, 2002; Sayre-McCord, 2007). In this paper it will also be called reflection, because it is the next higher level of reflexivity relating to normative issues.

Meta-ethics can relate different ethical theories and find a way of mediating between them or allowing communication about their differences. A problem of different ethical theories is that they may come to different evaluation of moral norms and support different evaluations or actions. It leads to the important question, which is currently not well explored, what are the conditions for the successful applications of ethical theories and moral practice.

In the field of IS, one way of engaging in such meta-ethical work is to describe and compare different ethical theories. Some work on ethical theory includes such meta-ethical analyses (H. J. Smith & Hasnas, 1999), while other work concentrates exclusively on it (Bull, 2009). For IS educators this is a central question because it relates to the question why ethics is taught in the first place. In order for students as future researchers and practitioners to design and use technologies and organizational practices that are morally accepted and ethically sound, they need to understand the different levels of argument, which is why a thorough education in ethics is important, as will be argued below.

The four different levels of normativity overlap and inform one another. While they were described in a hierarchical way in this section, they do not have to be so. They interplay and are present in most interactions, but many actors don't think about them consciously most of the time. For our purposes this model should be seen as a way of understanding different aspects of ethics, all of which are important for students to understand the breadth of the field.

In order to see how they relate to IS practice, the next section will describe research on the ethics of emerging ICTs to give an illustration of ethical issues that are likely to be relevant in the medium term future and therefore be in the domain of what current IS students should be able to understand and deal with.

3. ETHICAL ISSUES OF EMERGING ICTS

Emerging ICTs are the material basis of future information systems and thus a legitimate subject of IS education. In recent decades the development of ICTs has led to the current ubiquity of technology in personal and organizational life. There is an ongoing and highly visible debate about the ethical consequences of current ICTs. It stands to reason that new developments can lead to new ethical issues or to the exacerbation of existing ones. It would therefore be helpful to have an early understanding of emerging ICTs and the ethical issues they can be expected to raise. This is the basic idea of the ETICA project, which is the basis of the current section.

ETICA was a 26 months European collaborative research project including 12 partners that engaged in a foresight activity to explore developments in ICT and come to an understanding of how these might be addressed. The present paper does not provide the space to review the project in much depth. It therefore concentrates on some of the high level findings and recommendations arising from the project (for more detailed accounts of ETICA, see (Stahl, 2011; Stahl et al., 2010)) or the project website at www.etica-project.eu). These are relevant for the paper because they highlight some of the problems with ethics education in IS.

3.1 Identification of Emerging ICTs
The ETICA project may best be interpreted as a foresight project (Cuhls, 2003; Martin, 2010) in that it did not claim to know the future but to explore possible futures with a view to providing a basis for current policy development. The methodology chosen for the first step, namely the identification of emerging ICTs was a discourse analysis. The consortium collected two types of publications on emerging ICTs: high level governmental and funding publications and publications from research centres and institutes. The justification for this approach was that between these two, the analysis would be able to show which ICTs are currently being developed. Such technologies are likely to be socially and economically relevant in the next 10 to 15 years, the time frame chosen for this project. The findings of this first step led to a consolidated list of 11 ICTs that can be seen as likely emerging ICTs:

- Affective Computing
- Ambient Intelligence
- Artificial Intelligence
- Bioelectronics
- Cloud Computing
- Future Internet
- Human-machine symbiosis
- Neuroelectronics
- Quantum Computing
- Robotics
- Virtual / Augmented Reality

It is important to state what this list of emerging ICTs represents. It is the result of an analysis of two interlinked discourses on emerging technologies. The paper's claim is that these are reasonable and robustly determined candidates of ICTs that are likely to have significantly increasing social impact in the next 10 to 15 years. They are thus a good guess of what the future holds in stock and they serve the purpose of reflecting on which futures they will facilitate and which consequences this might require at present.

3.2 Ethics of Emerging ICTs
Ethical issues of these emerging ICTs were identified by undertaking another round of discourse analysis. This time, the literature on computer and information ethics was reviewed. For each of the emerging ICTs identified above, a review of ethical issues was undertaken. This started out with a bibliometric analysis of the computer and information ethics literature. A more detailed review then collected ethical issues either related to the technologies themselves or, if no literature could be found that discussed the ethics of a particular ICT, then the defining features of the ICT were discussed (Heersmink, van den Hoven, van Eck, & van den Berg, 2011).

For the purpose of the present paper these ethical issues were collected into a mind map that contained a node for each emerging ICT and the ethical issues as sub-nodes. This allowed the development of categories of ethical issues that had an overarching quality. Figure 1 shows a high level overview of these shared issues.

Each of these nodes allows for a drill-down analysis of the ethical issues, the particular ICTs they arise from and the details of their description. Again, there is no space in this paper to discuss these ethical issues in much detail. Suffice it to say that there are some rather unsurprising ones among these. These include high profile ethical issues that are discussed with regards to current ICTs, such as privacy or intellectual property. Some of the general trends that one can discern when looking at the trajectory of ICT development include the generation and collection of more data, new types of data and new ways of interpreting and processing it. It is thus more than likely that current privacy issues will be exacerbated by future ICTs. Technologies are likely to increase in complexity and questions of liability and responsibility for malfunction and unintended consequences will continue to gain in importance. The growing importance of ICT will furthermore mean that questions of access and resulting digital divides will remain important issues.

In addition to such easily predictable issues, one can speculate that there will be novel issues or issues that are currently not discussed as widely but that will raise novel challenges for societies and individuals. Many of these are related to the relationship between humans and ICT. ICTs are set to become more and more ubiquitous. They are likely to fade into the background and require new ways of interacting. The ubiquity of ICTs will lead to novel opportunities with regards to surveillance. More importantly, the boundaries between ICTs and humans will continue to blur. Humans will increasingly rely on a range of ICT artifacts for a range of functions that were traditionally considered to be specific to humans, from memory and cognition to interacting with their environment. This can lead to difficult questions about what counts as human activities

and how we evaluate humans and their actions. This raises difficult fundamental anthropological questions that

Weizenbaum (1977) pointed to more than 30 years ago but to which we have no generally accepted answer yet.
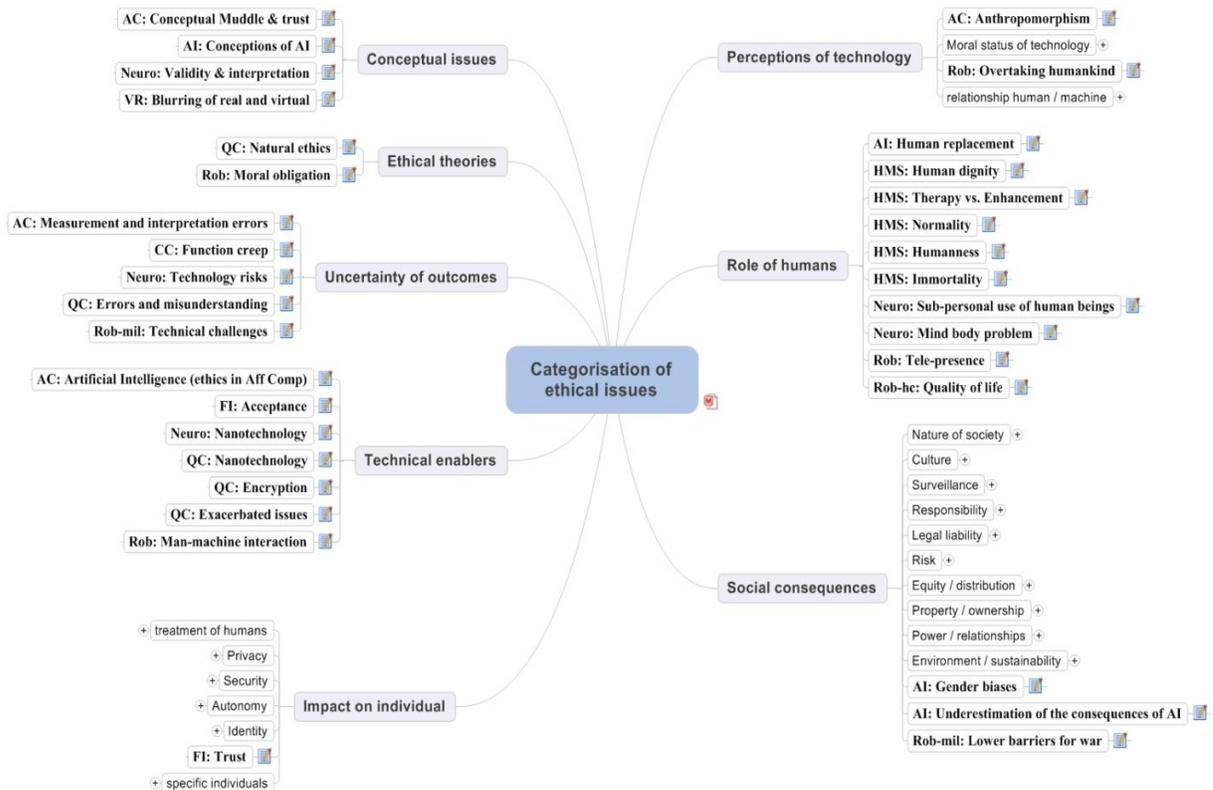
Figure 1: Categories of ethical issues of emerging ICTs

The new ways of communicating and interacting have moreover the potential to change substantially the way societies are organized and run. This can have ethical implications, for example when ICTs have an impact on the way political decisions are made. Another set of issues can come from novel ways of collectively organizing, for example by developing social groups based on particular aspects of personal information.

The purpose of this very broad outlook is not to paint an entirely dystopian picture of emerging ICTs or the information systems that will be built on them. It is easy to see many positive developments as well. By exploring potential ethical issues, the paper points to the importance of an early ethical assessment of these issues in order to put policies in place that will allow addressing them.

It is also possible to relate these different issues to the classification of ethics elaborated earlier. They will give rise to moral intuitions, e.g. with regards to the desirability of cognition enhancing implants. This will predictably lead to diverging positions, requiring explicit formulation of moral positions. These will be subjected to ethical analysis from different perspectives and theoretical positions. The ethical arguments, in turn, can give rise to meta-ethical analyses.

To complicate matters even further, it needs to be considered that none of these abstract technologies and related issues outlined here are truly abstract. They will lead

to social realities, be used and implemented in practical situations and depend strongly on context. This means that the applications of the technologies will raise moral and ethical issues going far beyond what can currently be predicted. It is thus impossible to give current recommendations on what to do in order to pre-empt these issues. At the same time, different stakeholders need to become active and proactively engage with the ethics of emerging ICTs. The recommendations developed by ETICA and outlined below try to bridge this gap by giving advice that can now be implemented that will prepare appropriately for future challenges.

3.3 Recommendations
Based on the identification of emerging ICTs, their ethical consequences and evaluation of these as well as an analysis of current governance structures, the following recommendations were developed. The first set of three recommendations was made to policy makers. Policy makers have an important role to create the regulatory framework and the infrastructure to allow ethics to be considered in ICT. If emerging ICTs are to be developed in a responsible manner that allows identifying and addressing the social and ethical problems outlined above, then a framework and infrastructure for the development of responsibility needs to be provided. Such a framework should cover at least the

following three main areas of policy activity where policy makers should:

- Provide regulatory framework which will support Ethical Impact Assessment for ICTs;
- Establish an ICT Ethics Observatory;
- Establish a forum for stakeholder involvement.

Such a framework, which currently does not exist in most jurisdictions, would facilitate ethical reflexivity and provide incentives to technologists and developers to take ethics seriously. While such a framework is a necessary condition of raising the attention to ethics and allowing ethical concerns to be considered, it will need to be filled with life by the people. The ETICA project therefore also provided a set of recommendations for industry and researchers and civil society organizations (CSOs). The following recommendations should allow them to be proactive and foster socially responsible innovation. If the institutional framework, background, repository and societal discourses are there, then the conditions will be favorable for the incorporation of ethics and reflexivity into technical work and application usage. The high level recommendations are to:

- Incorporate ethics into ICT research and development;
- Facilitate ethical reflexivity in ICT projects and practice.

It is important to understand the role of these recommendations with regards to the ethical framework developed earlier as well as the examples of emerging ICTs outlined in the preceding section. They are meant to provide a framework in which the different levels of ethical concepts can unfold and are allowed to interact and to support the incorporation of ethical thinking into ICT development. The framework thus has a broad reach that needs to be understood in order to see how it relates to the more specific task of ethics education in IS.

4. TEACHING REFLEXIVITY: EDUCATIONAL ANSWERS TO EMERGING ETHICAL CHALLENGES

A reflection on the above recommendations leads the paper back to the question of education with regards to ethics in IS. By developing the ethical framework early on, the paper has shown that ethics is a subject that requires a detailed understanding of different types of discourses. Ethics is not only a matter of fact but predominantly one of reflection. This means that teaching IS students about ethics cannot mean that they are told what is right and what is wrong. The simple reason for this is that this is impossible to discern and that it is likely to change over time.

Instead of factual instruction, ethics instruction needs to cover the different levels of normative engagement. Much teaching of ethics in IS is based on a case study approach. Such case studies have the advantage that they allow engaging with the different aspects simultaneously. Bynum & Rogerson (2003), for example, develop a teaching approach that integrates the different levels of abstraction, integrating descriptive case studies that allow students to explore their own moral intuitions, to make them explicit and to find out about ethical theories that allow them a differentiated evaluation of the different normative positions. Another suitable approach would be that of project-based

learning, which has already been suggested as a way of teaching ethical issues in IS development (Tero Vartiainen, 2010).

In the light of the ethics of emerging ICTs and the recommendations outlined above, one can interpret these as attempts to allow future practitioners to develop a certain level of reflexivity with regards to ethics. Such reflexivity means that individuals understand their own position and can reflect explicitly on their views and analyze them from different positions. In practice this will mean moving away from simple prescriptions or proscriptions of particular activities and moving towards a context-sensitive understanding of the moral qualitative of a particular technology use within a particular situation.

Reflexivity will ideally even move to a higher level and allow reflection on the reflection. This means that individuals engaging with moral issues not only understand their own position and are conscious of it, but that they are in a position to formulate and critique their own position from a more detached viewpoint. Or, to put it differently, that they not only are aware of the ethical theoretical positions underlying their moral views but that they can engage in meta-ethical reviews of their own position.

Achieving this is a tall order and goes in many ways beyond what we current expect students of IS, or most other subjects, to achieve. It can be a challenging experience because it requires students to take a detached position with regards to themselves. If, for example, a student draws on religion as the source of moral conviction, then the development of higher levels of reflexivity will require them to unpack the underlying structure of the religious arguments, to compare them with other alternative sources of normativity and be able to critically evaluate the validity claims of such different positions. This can be a deeply uncomfortable process that some individuals may not want to engage with.

On the other hand, the development of ethical reflexivity among professionals dealing with IS is required for any of the above recommendations to be successful and thus for us to be in a position to proactively engage with emerging ethical issues of ICT. This is most obvious for the last point, for the development of ethical reflexivity within ICT development projects. This clearly requires ethically reflective individuals to work on these projects and promote ideas of reflexivity and embed them into project processes and structures. The same is true for the incorporation of ethics in ICT research and development. It requires ethically reflective individuals to recognize that ethics cannot simply be implemented in some algorithm but that it requires ongoing debate, engagement with stakeholders, critical discussion and openness to new thinking.

Just as the recommendations to industry and professionals require ethical reflexivity within individuals, the higher level policy recommendations will only be fruitful if they are carried by people with this reflective capacity. A requirement to undertake an ethical impact assessment will need to build on individuals' understanding of the complexity of normative issues. The ICT ethics observatory will only be a community-owned success if it finds users who understand its purpose and are willing to contribute to it. Finally, the stakeholder forum will need qualified input from different types of stakeholders and it will require

individuals who understand the technology but who are also able to take new positions seriously and engage with them in a fair and even manner.

While it is thus easy to argue that ethically reflexivity should be an aim of the education of ICT and IS students, it is much more difficult to say how exactly this is to be achieved. Beyond the earlier references to case study or project-based learning, it is difficult to give clear prescriptions on how to achieve this outcome. To some degree it runs counter to established educational procedures which aim to instill knowledge and test its existence. Ethical reflexivity does not offer clear answers and will not lead to simple solutions. It requires an ability and willingness to engage in discourses and to question one's own position. On a positive note, this is arguably what university education has always aimed for. The downside is that it is difficult to achieve and even more difficult to measure or assess.

The present paper should therefore be read as a call for the development of teaching approaches that allow the development of ethical reflexivity. The earlier discussion of the concepts of ethics and morality and the outline of emerging ICTs should give educators pause to think about whether these could be accommodated in their thinking and teaching. This is not because they are the only way of seeing ethics or represent the only future ethical issues, but rather because they represent some aspects of the complexity that future practitioners will have to deal with. This paper should provide a basis for the discussion and evaluation of teaching strategies for ethics in IS.

5. ACKNOWLEDGEMENTS

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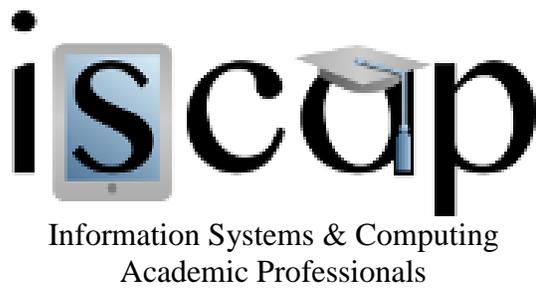
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