

A proposed methodology for the teaching of information technology ethics in schools

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Introduction

Professor Terry Bynum, from the Southern Connecticut State University, in his keynote address to the Australian Institute of Computer Ethics Conference, held in Melbourne during July 1999, suggested that Norbert Wiener (Bynum, 1999, pp9-10) laid the foundation for the study of computer ethics when he stated the following three questions in 1950;

1. what will be the social and ethical consequences of introducing ultra-rapid computer machines into society?
2. how can human beings anticipate and cope with the social and ethical consequences of automatization in ways that serve and preserve human values?
3. what are the special obligations and responsibilities of people who are engaged in automatisation and the creation of computerised automata?

Bynum concluded that;

In short, everyone must come to terms with a new world. The computer revolution - predicted by Norbert Wiener fifty years ago - is now unfolding world-wide. The 'information age' is emerging - 'morphing' into existence before our eyes. (Bynum 1999, p. 13).

There are numerous ethical challenges facing students, teachers and parents as information technology (IT) finds its way into mainstream education and the life experiences of us all. Students' moral development now takes place within the context of a rapid increase in the use of IT in schools and in the home. From an early age students, as they explore the use of IT, make decisions and choices that require the application of ethical and moral judgements. This is particularly true as they explore the virtual world of the Internet: a world that is unfamiliar to their parents and many of their teachers. The virtual world or cyberspace of the Internet can be viewed as a distant world where it is not always possible to have a clear understanding of the likely consequences of one's actions. Often decisions concerning the validity of information must be taken in isolation and require a high level of individual responsibility as traditional quality controls over information such as literary classifications,

refereed journals and textbooks are absent. Effective supervision and verification of the types and motivations of users is difficult to implement. Recently, a report in *The Age* ("Paedophile contact", 1999) newspaper. Melbourne, Australia, in which a paedophile was able to make physical contact with two young children after initial contact had been made via an Internet chatroom, is a warning sign that we need to be cautious.

How then should we try to assist children in developing ethical behaviours that will help guide them in utilising IT? This is the key question addressed by this paper. I will argue that many of our traditional ethical guidelines are still appropriate. However, it is important to actively engage students in reflective activities that require them to work through ethical issues by engaging in activities that stress the importance of considering the consequences of their actions and self regulation. The proposed methodology asks students to explore issues from various view points and develop parallel real world examples of the situations they find when using IT. For example, a lost disk is no different to a lost wallet, if you find a lost wallet or computer disk you should return it and this is what you would expect the person to do who finds the wallet or computer disk. Parallel situations provide a way for students to explore the ethics of a new situation in relation to another more familiar one. The method is based on the parallel space methodology as proposed by Morris (1999) and stresses the importance of exploring both differences and similarities, otherwise, as Johnson (1994) warns, we may by use of analogy focus only on similarities.

Colero (1997) from the University of British Columbia's Centre for Applied Ethics offers the following as fundamental **personal ethical principles**:

- Concern for the well-being of others
- Respect for the autonomy of others
- Trustworthiness & honesty
- Willing compliance with the law (with the exception of civil disobedience)
- Basic justice; being fair
- Refusing to take unfair advantage
- Benevolence; doing good
- Preventing harm

Deborah Johnson's 3 P's principle (Johnson, 1994)

- Privacy of personal and others information
- Propriety ownership of personal and others information
- a(P)propriate use

The Computer Ethics Institute has published 'The Ten Commandments of Computer Ethics'.

1. Thou shalt not use a computer to harm other people.
2. Thou shalt not interfere with other people's computer work.
3. Thou shalt not snoop around in other people's computer files.
4. Thou shalt not use a computer to steal.
5. Thou shalt not use a computer to bear false witness.
6. Thou shalt not copy or use proprietary software for which you have not paid.
7. Thou shalt not use other people's computer resources without authorisation or proper compensation.
8. Thou shalt not appropriate other people's intellectual output.
9. Thou shalt think about the social consequences of the program you are writing or system you are designing.
10. Thou shalt always use a computer system in ways that insure consideration and respect for your fellow humans.

Student scenarios highlighting ethical issues

To introduce readers to the challenges that confront students a list of scenarios are shown below. The list is by no means exhaustive. For other examples please refer to Doug Johnson's (1999) web site, the address is given in the references. Doug Johnson is the district media supervisor for the public schools of Minnesota and has written widely on the subject of IT ethics in schools. To assist the reader to think about the issues raised by these scenarios consider the following sets of ethical principles and suggested code of ethical practice. After each scenario the ethical principle(s) and ethics commandment implicated are listed in italics.

1. A student downloads a shareware game

from the Internet. The free trial period is set at 30 days after such time a license fee of \$30 must be paid. Ethically what should you do after thirty days? (*compliance with law, taking unfair advantage, being fair, stealing, Propriety ownership*)

2. A student finds a disk on the floor that has no name on it. Should the student open the disk using a computer to try and identify the owner? If the student does, what should the student do if he or she discovers something on the disk that is not expected e.g.: the disk belongs to a teacher and you find it has a pornographic image on it? (*trust, fairness, respect autonomy, snooping, and privacy: this is a complex ethical problem*)
3. Using a graphics program a student places the head of a teacher onto the body of a nude person and sends the image to a website and tells other students where to view it. On seeing the image the teacher has a severe asthma attack. (*respect, basic justice, preventing harm, think of social consequences, privacy, appropriate use*)
4. A student collects the email addresses of their classmates and without telling them sends the list to a person on the Internet. Junk mail is then sent regularly to all the students on the list. One junk mail contains a message from a racist organisation that lists the students' email addresses as a group of people who support the views contained in the junk email. (*respect, preventing harm, thinking of social consequences, privacy*)
5. A student enters a computer laboratory area and notices that a computer has been left logged in and the email system is still running. The student thinks that it might be funny to send out an email using the person's login name to a group of other students and teachers. The message says 'I support person x, please vote for them at the next election'. Person x happens to be a very right wing politician who advocates extreme racial views. (*concern for well being, respect, trust, bare false witness, privacy, appropriate use*)
6. A student, whilst using the Internet at school, comes across a pornographic

site and explores the site for over an hour. When they return home they continue to explore the site by accessing the Internet from their bedroom. (*respect for fellow humans, honesty, concern for others, appropriateness of use*)

7. A school operates a shared disk storage area. The area is freely accessible via a network and students store games along with a range of other material that is probably not connected with school work. Many students copy games from the area and take them home etc. (*respect, trust, compliance with law, not use computer to steal, use of computer resources etc*)
8. A student attempts to guess the school's system administrator password and access the administrative system i.e. unauthorised access or hacking. (*compliance with law, doing good, respect, trust, snooping*)
9. A student copies an essay they find on the Internet and submits the essay as their own. (*respect others, basic justice, appropriate others intellectual output*)

One of the immediate reactions to the above scenarios is to simply conclude that it is necessary to closely regulate how students use IT and restrict what information they are able to access. Apart from questions of whether we should monitor and in what ways this could be done, it is extremely difficult to monitor closely the actions of the students listed in the above scenarios. Hence I would argue that we need to encourage users of IT to develop self regulatory ethical attitudes. Many of the ethical problems result from the free and uncensored nature of the Internet.

The world is now entering a new censorship debate over the content of the Internet. Australia's Federal Government has recently passed a law, The Broadcasting Services Amendment Bill of 1999, that attempts to censor information available on the Internet. The law is hotly debated and is thought by many to be unworkable and unnecessary. Barry Steinhardt from the American Civil Liberties Union was reported recently in The Age newspaper as saying "Australia's

new law is the most censorious measure in effect in any democratic nation" (Steinhardt, 1999) and that "The Internet is a global medium. It is perplexing that an enlightened nation like Australia would want to shut itself off from the rich content of the Internet" (Steinhardt, 1999). These are complex issues that have broad implications for society as a whole and are linked to democratic notions of freedom of speech, thought and association. However, further discussion is outside the intended purpose of this paper.

How do we guide students to develop self regulatory ethical principles that will enable them to respond in a responsible way to the variety of ethical issues raised above. The difficulty with controlling how IT will develop and the way it will be used seems to imply that IT users will need to develop high level conceptual understandings about the ethical issues involved. But, as William Damon (1999) who is the director of the Centre of Adolescence at Stanford University has pointed out recently, few people reach these abstract levels as described by Kohlberg's six stages of moral development: we tend to rely on rules and some form of enforcement.

Damon goes on to state;

How does a young person acquire, or not acquire, a moral identity? It is an incremental process, occurring gradually in thousands of small ways: feedback from others; observations of actions by others that either inspire or appall; reflections on one's own experience; cultural influences such as family, school, religious institutions and the mass media. The relative importance of these factors varies from child to child (p. 61).

Thus, ethical IT education in schools needs to be of a continuous kind. It will be important to allow for reflection and input from others, and use a range of educational formats and settings.

A methodology for teaching IT ethics

At the AICEC99 conference Professor Walter Maner (1999) of the Bowling Green State University of Ohio provided a comprehensive overview of a range of methodologies that could be used as aids to deciding on an appropriate

course of action involving an IT ethical problem. The full range of methodologies are available via the web site shown in the references. The important aspect of the methods reviewed by Maner is the notion of providing a way for users of IT to react to unforeseen problems by working through a series of questions and reflections. As a sample consider the method termed 'Worksheet for ethical decision making' (Maner, 1999, p.8). The steps in this method are listed below.

1. What is the ethical issue or problem?
2. What immediate facts have the most bearing on the ethical decision you must render in this case?
3. Who are the claimants in this issue and in what way are you obliged to each of them?
4. What do you think each of these claimants would prefer that you do regarding this issue?
5. List at least 3 alternative courses of action.
6. Are any of your alternatives supported or rejected by ethical guidelines?
7. Determine a course of action based on your analysis
8. Defend your decision in the form of a letter addressed to your most adamant detractor.

Maner points out that this procedure requires an "in their shoes" or empathy step. I feel that this reciprocal way of thinking is important for children.

The Josephson Institute of Ethics (see references for web address) lists the following three familiar ethical principles that are also relevant to students:

Golden Rule: are you treating others as you would want to be treated?

Publicity: would you be comfortable if your reasoning and decision were published?

Kid-On-Your-Shoulder: would you be comfortable if your children were observing you?

In a similar manner Chris MacDonald (1995), a research associate at the university of British Columbia's centre for applied ethics, states that it is important that people ask and answer this question when considering the nature of

some form of action, "am I comfortable with this decision?"

He goes on to suggest that these subsidiary questions also need to be asked.

- If I carry out this decision, would I be comfortable telling my family about it? My clergyman? My mentors?
- Would I want children to take my behaviour as an example?
- Is this decision one which is a wise, informed, virtuous person would make?
- Can I live with this decision?

Parallel space methodology

To conclude this general review of methodologies I would like to briefly outline Morris's (1999) parallel spaces methodology. He refers to the real and virtual worlds as parallel worlds. This is a very useful and important notion because it gives us a way to focus on what the similarities and differences are between the two. The virtual world is vastly more familiar to the younger generation than to the older generation. Of concern is the fact that ethical systems that have developed over many centuries may be found wanting in helping the young (and the old) to make decisions about the new situations they may be confronted with in the virtual world. The virtual world seems to introduce an element of distance and secrecy that are different to the real world. To help explore these differences, Morris introduces the idea of externalising an Internet (cyberspace) setting to a real setting and internalising a real space setting to an Internet (cyberspace) setting. He considers the case of a virtual rape and makes the point that from an internalised viewpoint the rape could be viewed as more of a defamatory or humiliation action. In other words, not as 'bad' as a real physical occurrence of rape. He goes on to suggest that we need another level, which is termed staged analogy and interpretation, to enable the externalised and internalised view to be understood. For example, in terms of the virtual rape case, you would image a situation where all parties are together and witness the rape on a 'stage'. In this case the viewers of the rape would be powerless to intervene and the victim would certainly suffer more than just feelings associated with

defamation.

The steps associated with the parallel space methodology are as follows:

1. identify parties and their interests
2. explain the ethical problem
3. construct an external and internal analogy
4. for each analogy identify the values and outcomes
5. devise a staged analogy to highlight contrasts
6. select an appropriate course of action

The advantage of this method is that it requires the comparison of the virtual and real world situations by use of a parallel worlds analogy. This key feature is built in the method to be introduced in the next section.

The proposed methodology

Before outlining and justifying in terms of the preceding discussion a methodology suitable for school use, I believe it is important that a school undertakes what I have termed precursor steps. It is important to develop a code of ethical practice that will help guide students and teachers in understanding the rules and regulations as set out in the acceptable usage agreement. A set of principles is outlined below and these are consistent with those principles outlined in an earlier section of this paper by Colero, Johnson and MacDonald. Additionally, it is important that the school has an effective security system and that users are informed of how it functions and what legal obligations exist.

Precursor steps:

- Involve staff and students in the development of a code of ethical practice using the principles outlined below that underpins the rules and regulations outlined in an acceptable usage agreement;
- Ensure staff are aware of the ethical and legal issues associated with the use of IT;

- Ensure that the security aspects of the schools network are well documented and understood; and
- Ensure that parents are informed about the above.

Ethical code principles

These principles can be used to word appropriate ethical codes in schools:

- Respect for the privacy rights of self and others;
- Respect for ownership of information;
- Respect software ownership rights;
- Respect network security arrangements;
- Respect the need to avoid harming others;
- Respect the freedoms of others;
- Respect the need to exercise personal responsibility for appropriate action;

“Many of the ethical problems result from the free and uncensored nature of the Internet.”

- Respect laws related to IT use; and
- Respect the values of trustworthiness and truthfulness

The ethical principles are based on the need to balance personal rights and the rights of others in a local and global society. Key word principle is that of mutual respect.

In many situations it will be simple to establish that someone has done something that is clearly wrong, for example, deleting another persons file and there will be no ethical dilemma as such. In these cases, the methodology can be useful as way to have people experience the wrong doing from another point of view. In other circumstances the situation will be less clear cut in terms of the rights and wrongs and in terms of unforeseen consequences. For instance in scenario number 2 where pornography is found on a disk belonging to a teacher. Pornography in general is not illegal to possess and

hence a teacher has rights. A student in such circumstances would be faced with a difficult ethical situation.

The steps of the methodology are stated here and expanded upon and justified below:

Step 1: Establish who the people involved are and their interests?

Step 2: For each person or groups identified in step 1 describe the ethical problem from their point of view.

Step 3: Contrast the views of the ethical problem by considering each others point of view.

Step 4: Describe the ethical problem in terms of a real life problem that is similar.

Step 5: Construct an open situation where all parties are able to see each others actions.

Step 6: Select one solution and justify the choice.

Explanation of the steps of the model

The methodology outlined above is based on the parallel space methodology described by Morris and also draws on requiring students to consider what Maners' (1999) described as the "in their shoes" view point.

Step 1: Establish who the people are involved and what are their interests?

In the first step the aim is to determine who is involved by answering these three questions:

Who is the instigator of the problem?

Who are the people directly involved?

Who are the people indirectly implicated?

This is an obvious first step and one used by all of the methods described by Maner and Morris. However, when dealing with students of all ages, it is important to get them to consider the wide picture so that their actions can be placed into the broader perspective.

Step 2: For each person or groups

identified in step 1 describe the ethical problem from their point of view.

In the second step the aim is to determine how each person is affected by the problem situation. This can be done by considering the factors listed here or by applying other relevant ethical principles. Consideration could be given to these factors:

- Infringement of a person's right to privacy e.g.: As an instigator I have infringed a person's privacy.
- Infringement of a person's ownership of information
- Damage to a person's image or standing
- Government laws, codes of ethics or usage agreements have been broken?
- A person's trust has been broken?
- Standards of decency have been infringed?
- An untruth has been told i.e. someone has lied?

Add other ethical principles as required.

This step asks the student to apply the ethical principles and relevant laws to the situation under consideration. It also requires the student to be quite detailed and to consider the view point of all people involved, but does not ask them yet to contrast these viewpoints.

Step 3: Contrast the views of the ethical problem by considering each others point of view.

The aim in this step is to highlight differences and similarities that will arise from comparing the contrasting views. For example, the case of scenario three, which involved the head of a teacher on a nude body on open display, could lead to a situation where the instigator is able to see the action as having invaded personal privacy. And, that actions can have unintended consequences of a severe nature. The step involves the application of Maner's "in their shoes" rule and of principles suggested by the Josephson Institute of Ethics such as the golden rule, publicity or kid(parent/friend)-on-my-shoulder and asking of the question raised by MacDonald: "is this decision one which a wise person would make" will be helpful thinking tools for students to use.

Step 4: Describe the ethical problem in

terms of a real life problem that is similar.

This step is intended to encourage students to translate the IT bound problem to a familiar setting and to explore both the differences and similarities. If the two situations are the same then one should not act differently. For example, are the ethics of the open playground very different from those that should apply to chatrooms? Where differences are exposed, further investigation and discussion would be necessary by consideration of appropriate ethical principles.

This step is important as we are moving from the cyberworld to the real world and borrowing on Morris' notion of externalising a cyberspace setting into a real setting to assist students to consider ethical actions in terms that are familiar to them from their everyday life.

Step 5: Construct an open situation where all parties would be able to see each other's actions.

This step requires the students to undertake a simulation of an activity that mirrors the ethics of the situation. In this way, for instance, the distant nature of the Internet can be investigated. The situation could be a class play, a discussion or a story. It is important to discuss how each party reacts to the ethical situation and to then determine what possible courses of action could be taken to resolve the ethical problem. This step is based closely on Morris' staged analogy. The importance of this step, as Morris suggests, is to have the students explore both similarities and differences between the real life situation and the one involving information technology. As a teaching tool it enables students to actively participate and caters also for those students who prefer this mode of learning.

Step 6: Select one solution and justify the choice.

The final step is to select and justify a course of action. One possible way a school could apply this methodology is to involve all students in an open discussion about the operation of Internet access within the school and attempt to get the students to develop their own code of ethics and set of rules. In this way the students will develop ownership of the

situation and not just be required to respond to a set of imposed rules and regulations.

Maner points out that it is important that a method requires the formulation of an action and that this action is justified in some way. In terms of students and classroom activity this gives the method a specific end point so that discussion ends in some form of summary activity where the student is asked to justify their chosen course of action in terms of the ethical principles discussed earlier.

Conclusion

Schools need to be made aware of ethical issues relating to the use of IT. Many of our traditional ethical precepts are still appropriate. However, it may be that the virtual and real worlds pose different ethical problems. The suggested methodology requires schools to develop codes of ethics along with acceptable use agreements and to inform students about the security arrangements and implications for the student of breaching these. The methodology presented asks students to look at issues from different view points and to engage students in simulated activity so that ethical discussions are not left in the theoretical sphere. The use of IT by students provides a rich environment in which they have first hand experience of ethical issues. And it is one we should be able to use to actively engage students in ethical discussion.

However, it is important that we do not adopt overly negative and restrictive processes that unduly inhibits the potential of IT to enhance learning. We should aim for a balance and stress the need for ethics and personal responsibility. As Nancy Willard, an IT Internet consultant in the US, says;

IT is best served by people who value individual freedom, but recognise that individual freedom must be balanced by personal responsibility, respect for others, and concern for the common good (Willard, 1996, p.1.).

This should be our aim and I hope the methodology outlined above may assist in this endeavour. o

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Internet provision of enrichment opportunities to school & home

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This paper provides insight into the creation, evolution and future direction of the TalentEd Virtual Enrichment Program (TEdVEP). The rationale and philosophy that underpin the program are discussed. Technological and pedagogical issues associated with setting up this innovative Internet based program of enrichment and extension activities are examined, with an emphasis on the use of technology as a tool for learning rather than the use of technology for technology's sake.

The TalentEd Virtual Enrichment Program uses computer technology to provide enrichment courses in various subjects and topics to high interest and high ability students of all ages, regardless of geographic location. Course notes are provided on the Internet and communication between the students and their course leader and among the students is by e-mail, moderated e-mail list, chat rooms and forums. Students may undertake a course either as a school initiative or working from home.

Internet provision of enrichment allows participation by students who may not otherwise have the opportunity due to social or geographic isolation or physical

disability. On-line provision allows for asynchronous participation to accommodate student-preferred work pace and school, family and student schedules.

Rationale

The advent of an information society (Tiffin & Rajasingham, 1995 p.48) is resulting in personal computers becoming commonplace in Australian schools and homes. Widespread Internet access, particularly the world wide web (WWW) and electronic mail (e-mail), are providing the opportunity to bring world information resources, learning opportunities and expertise into the classroom and home.

Stuckey (1997) advocates the use of learning technology and communication technology to empower student learning by bringing the world of information from primary sources right into the classroom. Roschelle (1995) describes the possibility of education in which computer communication technology is used by educators and learners collaboratively in the construction of shared resolutions to problematic experience. He acknowledges the potential power of collaborative technology as the instrument of mutual knowledge construction.

While there is a computer in almost every classroom in Australia, and all New South Wales public schools have Internet connection, the educational potential of these tools and the opportunities they