

Ethical Issues Related to Internet Development and Research

Report of the ITiCSE'98 Working Group on Ethical Issues in Computing Curriculum

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ABSTRACT

This paper discusses ethical issues concerning Internet development, presentation and research. A brief overview of the major ethical issues related to computing is followed by a discussion of ethical issues specific to the use of the Internet. We will look at the implications of these issues for particular population groups such as children, women, disabled persons, and the low socio-economic class. Finally, we offer suggestions for how these issues can be brought into the computer or information science classroom in a way that stimulates critical thinking skills.

1. INTRODUCTION

At last year's ITiCSE conference the Working Group on Social and Ethical Issues created a report about using information technology to integrate ethical issues into the

computer science curriculum [17]. Their report includes an extensive list of resources. Our report builds on the previous report, giving special consideration to ethical issues related to the Internet, and how these can be raised in the classroom.

Ethical issues related to computer science include privacy, responsibility, ownership, and professionalism. Excellent resources on this general topic include Johnson [22]; Martin [30, 31]; Gotterbarn [16]; Huff & Finholt [19]; Dejoie, Fowler, and Paradice [7]; Ermann, and Williams, & Gutierrez [10]. Bynum, Fusco, and Senical [4] have assembled a comprehensive bibliography of papers and books on this subject. These issues are also pertinent when discussing use of the Internet, although the context is somewhat different and our understanding of these issues is strained when viewed in the Internet's realm of international, intergenerational, and interfaith usage.

Many computing students enter jobs in which they will be expected to develop Internet resources. They should enter this market with an understanding of the ethical issues that this technology entails. Neumann [34] points to the mixed signals that most students of computer science receive: "The 'best' work is that which extends the technical state of the art, and computer scientists should not care about how

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(or whether) the fruits of their work are used.” However, computer science professionals cannot afford to avoid the issue of how their works are used. Computer science educators have an obligation to prepare students to understand the ethical and legal implications involved in developing software. Examples of questions instructors should raise in class include:

- How will information gathered via the Internet be used and how should students prepare themselves for requests to write code to collect this data?
- Does it matter if participants in a data collection study are aware that they are being studied? How can our students learn to protect participants from harm?
- What legal issues arise when qualitative data is gathered? How should professionals prepare for requests from an employer for software that may violate these issues?
- What kinds of software projects are likely to violate human rights? How can students learn to recognize and prevent this violation?

In this paper we outline the major ethical concerns in the context of computer science and information technology. We describe the ways these problems arise in the Internet arena and the development of software and facilities for use on the Internet. We look at the implications of these issues for particular population groups such as children, women, disabled persons, and those from a low socio-economic class. Finally, we offer suggestions for how these issues can be brought into the classroom in a way that stimulates critical thinking skills.

The members of this working group are all citizens of the U.S.A. Since this paper touches on many issues that are also of concern in the global community, we realize that, due to our homogeneous background, we may have overlooked some important points or even misinterpreted certain customs. We invite readers to contact us with reactions and corrections.

2. MAJOR ETHICAL ISSUES

Most computer science, information systems and information technology faculty members do not have an extensive background in the study of ethics or the law. Faculty need to have more exposure to the theories and practices of these areas in order to share this knowledge with students. New technologies and advances have made these topics an even greater challenge for the computer science faculty member. [46]

2.1 Miller’s Taxonomy of Ethics

A first step is an understanding of Miller’s taxonomy of ethics [32]:

- **Personal Ethics:** The study of personal ethics addresses the philosophy of ethics, and as such is outside the realm of this paper. Various aspects of

personal ethical theories are given in Baase[2], Bowyer[3], Ermann[9], and Johnson[22].

- **Professional Ethics:** Many professional organizations provide their members with a code of ethics. Two such organizations in the United States are the Association for Computing Machinery (ACM) [1] and the Institute of Electrical and Electronics Engineers (IEEE) [21]. Both of these organizations recognize the importance of ethical and moral behavior in the workplace, and their codes help the practitioner to understand what is expected in the way of ethical behavior. Educators in computing need to share these professional codes with their students. Many other countries, professional organizations and companies have developed sets of ethical guidelines for computer professionals. The Appendix includes URLs for some of these codes
- **Privacy and Property:** Privacy concerns and property rights to computer information are two of the most publicized ethical issues. Privacy in particular is a notion that has sparked much interest and sometimes causes alarms to be raised, especially when reports of privacy violations are cited in the popular media. There is little consensus on what privacy and property rights actually mean in operational terms, even among computer professionals. For example, consider the following difficult questions:

1. Is personal email always private or does an employer have the legal right to examine and even take action against an employee based on objectionable content of the employee’s email when the email resides on employer-owned equipment and is located at a company work site?
2. What responsibilities does a company have regarding information that it has gathered about its customers?
3. Is it okay to download an attractive background design or icon from someone else’s Web page and use it without receiving prior permission?

Most computer professionals do not give these and similar issues much thought until an incident occurs that has a direct impact on themselves. Various factors contribute to this situation. Employers are very uneven in their practices of adopting and distributing codes of acceptable behavior that employees are expected to follow. Perhaps of even greater concern is the lack of treatment of such issues by educational institutions that prepare people to be computer professionals or information workers. There is such demand for programs of study to concentrate on developing technical knowledge and skills that all too often the treatment of ethical issues falls by the wayside despite the best intentions of educators.

- **Responsibility, Liability, and Accountability:** Many students fail to understand the effects of their work in

the real world. In fact, programmers must accept responsibility for the effects of their work. They may be found liable for unforeseen problems that result from their work, and they may be held accountable for these results. Students should also understand that there are differences between the ethical correctness of a decision and the legality of a decision. Decisions can be:

1. ethical and legal: This might include such decisions as firing an employee who has not followed company policy.
 2. ethical, but not legal: This might include participating in an illegal “blue flu”, i.e. an agreement among co-workers to call in sick on the same day, when they are protesting a “just” cause.
 3. not ethical, but legal: This might include using data legally obtained about individuals without their knowledge.
 4. not ethical and not legal: This would include using pirated software.
- **Access:** As use of the Internet increases internationally, new questions arise about its impact on society. The relatively new technology of the Internet is theoretically universally available, but the actual usage, when measured demographically, falls far short of this ideal. Difficulties arise due to educational level, socio-economic class, gender, age, geographic location, and physical ability. We will examine some of these questions in the following sections.

2.2 Rogerson’s Ethical Instruments

Simon Rogerson, director of the Centre for Computing and Social Responsibility in Leicester, UK, advocates the need for a comprehensive set of ethical instruments that will promote good practice. He has created a set of seven questions for the professional to ask when making an ethical decision [42,43,44]. These are [32]:

1. Is it honorable? There should be no one from whom you would like to hide the action.
2. Is it honest? It does not violate any agreement, actual or implied, or otherwise betray a trust.
3. Does it avoid the possibility of a conflict of interest? There are no other considerations that might bias your judgment.
4. Is it within your area of competence? Your best effort will be adequate.
5. Is it fair? It must not be detrimental to the legitimate interests of others.
6. Is it considerate? It does not violate confidentiality or privacy, or otherwise harm anyone or anything.
7. Is it conservative? It does not necessarily squander time or other valuable resources.

In addition, Rogerson feels strategies should be developed for ethical conduct which can be broken down into three major areas [42,43,44]:

1. Ethical development – the use of development methodologies and the consideration of ethical dilemmas, user education and professionalism.
2. Ethical technology – using advances in technologies and the likely ethical issues they raise as they are applied to business and societal problems.
3. Ethical application – developing ethical strategies that allow technology to be exploited in an ethically acceptable way.

3. ISSUES SPECIFIC TO INTERNET AND WEB DEVELOPMENT

The following section deals with the areas of copyright, research, privacy and security pertaining specifically to the World Wide Web. Each section will illustrate some of the potential problems inherent to the Web as well as practical ways of dealing with these problems.

3.1 Copyright

The legal issues of computing include identifying the laws that apply to this field and what types of entities these laws effect. These include 1) real property, 2) personal property, and 3) intellectual property. In the United States, federal courts have jurisdiction over science and the arts and cover all domestic disputes dealing with patents, copyrights, and trademarks.

Before the advent of multi-media and the World Wide Web, most computing-related copyright issues dealt with literary works (text only). With the explosion of graphics, pictures, video and sound, most areas of copyright are seen on the World Wide Web [56,57].

Exclusive rights for an author granted a copyright include the right to:

1. make copies of the work
2. produce derivative works
3. distribute copies (rental, lease, lending)
4. perform the work publicly
5. display the work publicly

Thomas G. Field of the Franklin Pierce Law Center states that copyright arises automatically as soon as some aspect of a protectable work has been fixed in a tangible medium (such as an Internet server) [12]. The issues of copyright on the Internet involve some additional considerations. First, copyright is the right to exclude, not to publish. As mentioned previously in the list of exclusive rights, a copyright holder is the only person who has rights for distribution and usage. This is a way of excluding others from such use. However, copyright does not give its owners the right to sell or distribute a work that is libelous. This is the point of not having the right to publish those

things which can cause the copyright holder (or distributor) to be sued for libelous material.

Second, the commercial use of another's work is normally a copyright infringement. What if emails or list-serves imply an endorsement of a commercial product but the authors have not given permission for inclusion in the email message or listserv? Where do we draw the line? Forwarding email messages without explicit permission may be treading on the edges of copyright infringement. Depending upon the type of email received, intellectual property can become a "gray" issue for the receiver. Most people receiving email would not categorize it as intellectual property. However, all email users need to be aware of the potential of copyright infringement depending upon the content of an email message. This problem is more of an awareness issue for email users.

3.1.1 Fair Use

One of the most complicated areas of copyright law concerns "fair use". This doctrine allows the use of copyrighted material without explicit permission of the author depending on the purpose or the character of use, the nature of the work, the amount and portion used in relation to the whole work, and the effect of the use in the marketplace [2]. Most students understand the basic rule "I cannot legally copy software", but do not understand the intricate workings of intellectual property.

Questions to ask when dealing with fair use are [46]:

- 1) Am I creating something new or just copying an existing work?
- 2) Am I competing with the source I'm copying from?
- 3) Do I understand that just giving credit to the author may not be enough for copyright infringement?
- 4) Do I understand that the more I use, the less I am able to claim fair use?
- 5) Do I understand that the quality of the material I've copied is as important as the quantity?

3.1.2 Proposed Copyright Law

In 1993 a Working Group on NII (National Information Infrastructure) was created under the auspices of the U.S. Patent and Trademark Office and the Department of Commerce to discuss the issues of intellectual property on the Web. This group created the proposed NII Copyright Protection Act of 1996. During 1994, focus group meetings were held to "fine tune" the Copyright Act of 1976 to be technologically neutral. A white paper was written about communicating across telecommunications networks. This white paper stated that these communications would be equal under the law for all types and sizes of networks. Small companies would be afforded the same benefits as large companies for network usage. Two days of hearings were held in February 1996 and negotiating sessions were begun in March 1996. The new

law would take away most of the fair use which currently exists for educational institutions [47].

The central issue is notice. If a copyright owner gives an on-line service provider (OSP) a statutorily prescribed notice that his/her material is being infringed on by the on-line service provider's facilities, the OSP would be required to block the transmission or remove the material. In this case it would not be liable for infringement. Schools, colleges, and libraries that provide Internet access for students and maintain servers come under the category of an OSP. Such organizations are thus obligated to follow these steps if faced with a situation where a user has infringed on a copyright. Failure to block or "take down" the challenged material would expose the OSP to liability. Public institutions are not comfortable with this approach since it infringes upon the concept of academic freedom and the Fair Use provision of the 1976 Copyright Act. Many educational institutions believe that if the new act is passed, the end of "fair use" will occur. On-going discussions are still taking place concerning the new act [47].

Additional topics that affect the use of the Internet and the law are patent, trademark and trade secret. See Baase [2], Boywer [3], and Johnson [22] for additional information and references.

3.2 Research on the Web

Many issues arise with the ability to do research on the international scale provided by the facilities of the Internet. Many people with an interest in researching humans, from social scientists to advertisers, are jumping on the Internet research bandwagon. The methods used to collect data range from simply reading and interpreting the writings of participants in such facilities as newsgroups, to automatic collection of addresses from hits on Web pages.

Major issues with this kind of Internet research concern privacy and ownership. It is impossible for developers of systems that collect data used in this form of research to know the use to which such data will eventually be put. While some users may employ the systems in a reasonable way, others users may use the data that they collect for highly unethical purposes. Even systems that are created for exemplary purposes can later be applied in unethical or even in illegal ways. Future system developers must anticipate the potentially unethical uses of systems they design.

Many social scientists believe that they are helping to create a better world by fostering a better understanding of human behavior. However, if they do this by collecting data from arenas that are not clearly public, they may well be violating the privacy of individuals. Two issues that arise are the ownership of writings and the privacy of communication; neither is easy to resolve. While writing is generally considered to belong to the writer, the perception of the ownership of writing in a public forum, such as a

newsgroup or an electronic mailing list, is less concrete. Because the text is available to the entire Internet population, it seems to many people that there is no reason why the writer must be informed of how the writing will be used. Schrum's list of considerations for doing electronic research of social settings [50] helps define situations in which there may be an ethical problem.

In looking at how the various facilities of the Internet can be used, there are many examples of apparent contradictions. A number of views of ethics and the Internet are given below. While incomplete, this list underscores the need for clarity when discussing these matters with students.

- The ProjectH group has studied the use of electronic mailing lists and Usenet groups [39]. Their stance is that publicly available writings can be used freely by anyone who wishes to study them. "We believe the issue of informed consent of authors, moderators, and/or archiving institutions does not apply to the ProjectH quantitative content analysis, as we intend to analyze only publicly available text." (p. 17)
- L. Schrum [50], an expert on qualitative research methods when they are applied in the new context of the Internet, believes that the ethical standards that apply to face-to-face research methods also apply to this new context. In particular, she disagrees with the claim that the ProjectH group makes on public access to newsgroups and electronic mailing lists. "Researchers should negotiate their entry into an electronic community, beginning with the owner of the discussion, if one exists. After gaining entry, they should make their presence known in any electronic community,..., as frequently as necessary to inform all participants of their presence and engagement in electronic research." (p. 1)
- An ongoing project at Georgia Tech to "measure" the Web [39] has received public acclamation from computer scientists, but the ethical issues of this effort have been discussed little. Since participants volunteer to offer information, this seems to be a perfectly reasonable and ethical data collection effort. However there is little or no information about exactly how the information will be used.

Copyright law appears to be on the side of a person who writes an electronic note, but a note published on the Internet is more susceptible to theft than in almost any other medium. In fact, even music, which has a long history of copyright infringement through the use of audio tapes, is more likely to be used illegally on the Internet. Many educators do not understand what is legal and what is not, let alone what is moral and ethical with respect to published items on the Internet. So how can they explain this to their students?

The potential effects of Internet research are so far unknown. If research on the opinions of Internet users is used as the basis for major policy decisions, then much of the world's population may be left out of the equation. Surveys about the demographics of web users, like the one at Georgia Tech [39], could help rectify this problem.

It is possible and relatively easy to track the use of Internet facilities for any user. Since copies of email may exist in a number of locations between their point of origin and their eventual target audience, it is a simple job to keep information taken from the messages and their headers. If the target of surveillance is left unaware of the presence of the surveillance, there is clearly an ethical issue. Normally a user expects the same privacy in Internet correspondence that has long been associated with the use of regular mail, the telephone, and other forms of personal communication. However, Internet-based surveillance software can bring a person's entire interaction history under scrutiny. Arguments for and against the use of this type of surveillance abound, with most of the claims that it is reasonable coming from employers who want to track their employees' use of company computers.

3.3 Privacy

The Internet, and more specifically the Web, offers the software developer a work environment with conflicting traditions that influence standards of behavior. One tradition is the "old" Internet with its value of pooling and sharing that says "what's mine is yours, and what's yours is mine." This is the Internet of the 1970s, 1980s and early 1990s that was largely controlled and funded by public agencies. Acceptable behavior was monitored and enforced by largely informal means involving a strong dose of peer pressure applied to those who crossed the lines. There were relatively few "rules", and much of the sharing of information and resources was done without prior consent. The fact that browser software readily permits access to HTML and JavaScript code of retrieved documents is a tacit invitation to adopt or modify such code for one's own use. This is a far cry from the traditional software industry in which only the object code is available to the customer.

A new tradition has appeared following the rise of the Web and the privatization of the Internet in the mid-1990s. The new view emphasizes the Internet as a primary infrastructure for doing business through electronic commerce. Here the concerns are mainly proprietary in nature. Copyrights and trademarks are more likely to be enforced, and a Web page, rather than standing on its own, has become the user interface that connects a customer or client to a complex purchasing or service system involving backend databases and application software that are hidden from view. This second tradition is the one that most graduating computing majors will be entering.

3.3.1 *Codes of Conduct of Today's Computer Professional*

Given this ambiguous situation, what model of behavior should computer professionals be expected to follow? Due to a lack of awareness, the computer professional of today more often than not does not see his or her duties in ethical terms. In a recent study on privacy and ethics among computer professionals, it was reported that 43% of the respondents did not know if their company had a formal set of guidelines related to the ethical use of computers. There was a lack of consensus on many basic issues as well. For example, on the question of whether "it is acceptable to access computer based information, not required to do your job, about your organization as long as no harm is done," 16% strongly agreed while 17% strongly disagreed [29]. The same study reported that only 5% of those surveyed believed that their companies adhere to any of the codes of conduct adopted by leading professional computer organizations such as the ACM or IEEE. Thus, today's computer professionals find themselves at sea in search of ethical guideposts. Companies are not providing clear direction on ethical matters, and the influence of professional computer organizations appears to be weak.

This creates a rather interesting situation for computer educators. In most cases, they are responsible for preparing students with knowledge and skills that are commonly used in the workplace. For example, students will graduate from college knowing object-oriented programming, database technology, or systems analysis and design methodologies that are directly applicable to professional practice. On the other hand, employers rarely ask job candidates questions about professional ethics or codes of conduct during a job interview. Although employers want employees to be "of good character", the only code that really seems to matter is program code.

Given this state of affairs, educators have an opportunity to show leadership that may positively affect the workplace and strengthen the professionalism of the computer field. Partly because businesses do not expect knowledge of codes of acceptable behavior, college computer education programs have not given high priority to ethical issues in the curriculum. The professional computer associations have strong positions on ethical codes of conduct, but a review by the authors of ten leading database textbooks reveals no mention of ethical standards in the handling and management of data.

The Appendix lists a set of Web sites where the reader can find many professional codes.

3.3.2 *Privacy of Electronic Mail*

Although email has existed independently of the Internet for decades, the rise of the Internet has led to email becoming a commonplace means of global communications. As a result, electronic mail privacy is a growing issue in many companies. Recently publicized

events have created a heightened awareness of the access issues involved with sending, receiving and storing electronic messages. A recent example is an employee at Pillsbury who was fired based on the content of his stored email messages. [48]

The main issue is whether companies have the right to inspect email, with or without the employee's consent when the email is stored on company-owned equipment. In order to protect their companies, many lawyers and, more recently, human resource managers, have been strong proponents of written policies. These policies explicitly state that the company owns the communication system, that the system is intended for business purposes only, and that the company can monitor any information stored on the system. This position, coupled with recent court decisions, indicates that in the United States a company can review stored email messages on its systems at any time and without cause or prior notification. Yet "more than 50% of the respondents to a Society for Human Resources Management survey didn't provide confidentiality training for IS (Information Systems) staffers who might have access to email" [6]. Thus, it is no surprise that the previously mentioned survey of computer professionals found that 46% of all respondents disagreed with the statement that "My company has the right to access personal computer-based information (such as email) that I maintain at work" [29].

This access ability can be abused and can lead to unauthorized access as well. Computer professionals frequently gain access to massive amounts of corporate and individual information. Misuse of the information may cause serious damage to organizations and individuals. It is therefore very appropriate to emphasize proper behavior with respect to privacy in ethical codes for the profession [35].

3.3.3 *Privacy and E-Commerce*

Great predictions have been made regarding the dramatic growth in electronic commerce expected in coming years. The forecasts of consumer online spending by the year 2000 in the U.S. alone ranges from \$6.6 billion to \$29.1 billion [25]. Not only are the sales volumes large, but the nature of the shopping experience and the manner in which service is rendered to customers is expected to fundamentally change.

One of the hallmarks of this new paradigm of buyer-seller interaction is "personalization." This is the idea of the seller learning the buyers' likes and dislikes through repeated interactions. The seller also may explicitly ask the potential buyer to provide demographic and preference information. The seller analyzes the data to discern a pattern of buying behavior. This information is stored and used to alert the buyer of future products and services that correspond to the ever-growing profile maintained by the seller. The advantages to both buyer and seller of this arrangement are obvious.

Employers may have the right to periodically access and examine email and other files belonging to their employees. However, an Internet marketer does not have the same legal or ethical standing when it comes to accessing, analyzing and, in particular, selling information about the preferences and Internet behavior of its customers without their prior consent. Yet it is a common practice in today's frenetic e-commerce world.

For example, GeoCities, an ad-supported "virtual community" with 2 million members, recently settled a privacy issue with the U.S. Federal Trade Commission. The company was charged by the FTC with misrepresenting its use of data collected when members apply for a free personal home page. The GeoCities application asks for data including name, address, income, marital status, occupation and hobbies. Although GeoCities stated on the application that such data would not be released to anyone, the data was shared with other companies interested in target marketing. The settlement requires GeoCities to post a privacy policy spelling out how personal information is used [33].

Seeing that trust is a central issue to public acceptance of purchasing products and services over the Internet, organizations such as TRUSTe[54] have been formed to provide assurances that privacy rights of customers are being respected. TRUSTe is an independent, non-profit initiative whose mission is to build users' trust and confidence in the Internet by promoting the principles of disclosure and informed consent. Self-regulation, as opposed to government regulation, is the prime motive here. Member sites agree to disclose information practices and have their privacy practices reviewed and audited for compliance by TRUSTe. Web sites displaying the TRUSTe mark, are expected to provide visitors to the site with the following information:

1. What visitor information the site gathers or tracks;
2. What the site does with the information it gathers or tracks;
3. With whom the site shares the information it gathers or tracks;
4. The site's policy on correcting and updating personally identifiable information;
5. The site's policy on deleting or deactivating names from our database.

As information technology specialists graduate from college, whether their backgrounds are in computer science or information systems, they will often be employed to develop software used to sell products and services via the Internet. In their roles as software developers, they are likely to confront issues related to collecting, managing, analyzing, and transferring consumer information. If computer educators include such issues when talking about the Internet software development cycle, their students will

enter the job market already sensitized. To bring life to these issues, lessons can draw on situational case studies and open discussions, rather than on dry recitation of general principles and codes of conduct. The reader is referred to section 5.2.

3.4 Security

Stories abound of situations in which the security of computer systems has been compromised by break-ins using the facilities of the Internet. One of the primary functions of a system administrator is to ensure full security where there is any connection to the outside world. Popular movies and books illustrate fictional disasters that can occur when the security of a computer system is lax. Our future network administrators need to have a very clear idea of how great an effect on society a small security risk can have.

Neumann's book of risks [34] is an excellent source of true stories about how things can go wrong with computer systems. Many of the stories either involved computer networks or can be related to Internet facilities. The most obvious problem in this area is the potential for break-ins with resulting loss of data or compromise of privacy. Many computer science students think that such break-ins show a degree of cleverness. The social atmosphere of the typical computer laboratory may well foster such ideas. In an interesting story of a woman who pretended to be a hacker in order to find out how the hacker sub-culture interacts, she became the target of the animosity of the group [15].

Even when all security problems appear to have been addressed there may yet be the potential for harm. When two or more computer databases are employed to match user identifiers it is possible that the cross product of data may produce far more information than either database can provide alone [51]. Shared data is already in use for various law enforcement situations as well as for advertising purposes.

4. IMPACT ON SPECIFIC GROUPS

In this section we consider the implications of the issues discussed in the previous section, for particular population groups such as children, women, disabled persons, and those in a low socio-economic class.

4.1 Age

4.1.1 Issues Related to Children

A persistent tension in modern society is between our desire for a free society in which we can express our ideas without fear and our desire to protect children from material that we find offensive. The legal aspects of child pornography and related issues are briefly summarized in Rosenoer [45] and illustrated by Lytle[28]. Recent suggestions at the federal level have proposed protection of any data about underage Internet users even given the great difficulty of enforcement.

4.1.2 Older Persons

Another “age” issue is the ability of older persons of any nationality and in any culture world-wide to get access to the Internet, and given such access, to be able to understand and use computer network technology and information. It would be wonderful if computing graduates could patiently relate to such uninitiated users and explain these technologies to them. Perhaps community service experiences with local care-giving centers for the elderly would help sensitize students. Additional discussions can be found in Gergen[14] and Evans[11].

4.2 Gender

Gender appears to make a difference in several areas of Internet use. Schollmeyer, Janz, and Gattiker [49] presented data collected by means of a Web-based survey designed to look for gender differences in perceptions of the need for privacy protection and in attitudes to privacy violations. For some of the issues investigated by their survey such differences were found. While there was no statistically significant gender difference in responses to a question about violating another’s privacy, men were significantly more likely to believe that “a privacy commissioner should have access to personal data in police data bases” (p. 72). A gender difference also appeared in responses to a question about the right of employers to access employees’ computer accounts, with women believing that these accounts are private. All of the responses revealed a high degree of concern about privacy by both men and women, but women appeared to be more concerned about personal communication than men.

On the Internet, no one has physical presence. Thus, many of the methods that people normally use to gain trust of other humans are rendered useless. In Kumbruck’s study of women’s concerns about this anonymous facility for communication and collaboration [27], she describes the differences between a physical link between people (a “facework commitment”) and an electronic one (a “faceless commitment”) (p. 80). Her empirical study found that a major concern for women is the inability to trust the digital signature provided by typical systems. Although there has been much concern about the reliability of the digital signature with respect to financial transactions, for many women, full confidence in the signature is also a necessity in order to make full use of the Internet.

A major use for the Internet is communication among individuals, and there is cause for concern about women’s ability to make the best use of this medium. Ebben & Kramarae [9] and Kramarae & Taylor [26] both discuss problems that can occur when women attempt to discuss women’s issues using the communication facilities of the Internet. Camp’s article [5] shows the benefits of a women-only discussion forum for women’s professional concerns. Pohl and Michaelson’s [40] study questioned whether classic gender patterns of communication are exhibited while using email. They found that while most of

the communication was not characterized by gender-specific styles, there were examples of “typical macho behavior” (p. 94), and some conversations showed evidence of typical gender patterns. Many studies, including Herring’s [18], have resulted in very different findings that indicate that mixed male and female discourse can be undemocratic.

Taguchi and Yoshimura [53] worked on a project to set up the Women’s Online Media in Japan. This was the first Web “server set up entirely by, for, and on women” (p. 136). The issue of “Women and Media” was determined to be a critical area of concern by the Beijing Platform of Action at the international conference on women in 1995. This facility for women is intended to empower them in “advancing women’s status and gender equality” (p. 145) and supporting networking and information dissemination.

Other concerns about gender and computing abound. The Huff & Cooper [20] study found that instructional software designers tend to have male student in mind when they invent new programs. Gilboa [15] told her personal story about breaking into the world of hackers and finding herself in danger due to stalking. Many resources are available for the study of these issues both on-line and in print. More information is available from the authors.

4.3 Culture

As mentioned in the introduction of this paper, the working group members are all from the United States. This has introduced a natural bias concerning cultural opinions. During the conference poster session, the working group was able to collect opinions from several computer professionals from other countries to include in this paper. Four questions were asked of each respondent. We also asked respondents for permission to include their responses as either direct quotes or paraphrased remarks in this report.

Thirty-seven questionnaires were completed. The four questions, all open ended in form, and some of the responses follow.

Question #1: What is your primary concern about the social effects of the Internet in your country/community?

The first question dealt with the individual’s primary social concern(s) related to the Internet. The top responses were:

- 43% (16) said accessibility to all or equity of access was the key issue. This number was consistent between North American and non-North American respondents.
- 16% (6) said that inappropriate material (including pornography and racially biased materials) was their major concern. In this case almost all respondents were non-North Americans.
- 11% (4) said there were no social concerns (two non-US and US).

- 11% (4) said unreliability of material on the Internet was their primary concern.
- 8% (3) said the decrease in face-to-face communication was an issue.
- 5% (2) were concerned with the commercialism of the Internet.
- The remaining responses were individual. The two most intriguing raised concerns about government revenue and government intervention.

These results point out that several major issues are important across the global village, specifically equity, appropriateness, and reliability. Some of these concerns appear to be universal while others tend to be split between the United States and the rest of the world.

Question #2: What do you view as the most crucial issue in the development of software and presentations for the Internet?

There were almost as many different answers to this question as there were questionnaires returned. They can be grouped, in decreasing order of emphasis, as follows:

1. Ease of use. Phrases such as compatibility, fast downloading, intuitive, and cross-platform were mentioned. Browser independence, including text browsers, was mentioned.
2. Quality. Included here were comments about clear goals, standards, structure, and careful web page design.
3. Finding what is wanted. Keywords, indexing, and navigational aids were counted here.
4. Validity of information. Comments such as source, ownership, reliability, verifiability, and traceability were included.
5. Mentioned once or twice each were control, security, property rights, cost of keeping up with changes, and overcoming deficiencies of the hypertext model.

Question #3: What issues do you see arising due to differences in the availability of Internet access to people in different circumstances related to age, socio-economic class, etc.?

Roughly one half of the responses to this question mentioned in one form or another the danger of creating information-rich versus information-poor segments of society, both within and between countries. Some saw this as a potential force lending to social unrest. Noting this possibility, many spoke of the need for countries to invest in infrastructure and education to overcome these disparities. They felt that this would be a major public policy debate in coming years.

Another group of responses, however, was of the opposite opinion. They expressed the belief that, as the Internet becomes more pervasive, the disparities to Internet access

will decrease and no longer be an important issue. One person cited television as a once exclusive technology that now is available to virtually all. Another saw the rise of the Internet in more fundamental terms, and referred to accessing the Internet “as the new literacy”.

Question #4: What do you believe is the greatest ethical implication of the growth of international electronic-commerce?

The responses to our fourth question varied widely with respect to both the importance of this issue and the ways in which it has the potential for problems. The major areas of concern are the rights of consumers, the lack of taxation in this environment, the security of transactions, and the type of company that would choose to do business in this way. Other issues that were mentioned were the loss of face-to-face consulting before a purchase, enforcement of local legal and ethical considerations, and the ability to hide wealth and power. Concern over the type of company doing this business was dichotomized into fear of greater control of huge, transnational corporations and fear that smaller businesses might disappear. Some respondents found no reason to worry about this issue. Some of the more interesting comments were:

“There is a need for some legal framework to protect consumers...” (Mike Fulles, Canterbury Business School, University of Kent, U.K.)

“ ‘fly by night’ operations exploiting the purchaser” (Pat Byrne, National University of Ireland, Galway, Ireland)

“Third World countries that need time to develop their own commerce may not get it...” (Mark Plumbly, King’s College, London, U.K.)

Cultural issues relating to the Web are often overlooked in the areas of e-mail, research, privacy, education and the law. The following sections will discuss these five areas.

4.3.1 Cultural Issues and E-mail

The use of E-mail between members of different cultures can raise many problems. Most writers of email do not “think” about the cultural identity of the person receiving the mail. In fact, communication is usually done through the eyes of the sender only. Assumptions about the meanings of words or phrases, or even about the style of acceptable dialogue, can lead to miscommunication and even offense. [6]

It is common practice in many companies to have a standard list of “unused words” for production of documentation. These words do not translate well into other languages, and companies realize that such terms can cause confusion. Computer professionals in these companies recognize the need to be cognizant of the use of particular words in all professional documentation. However, these same professionals would probably think nothing of using these words in email messages to colleagues in other countries, or colleagues in their own

company who are from a different cultural background. This is not confined to companies. Universities and colleges have students, faculty and staff from many different cultural backgrounds.

In addition, concern about anonymity becomes an issue, both with email and to a lesser degree research. The problem of not knowing a sender's gender or cultural background can lead to possible unknown injury or slight. Calling someone "he" rather than "she" because the receiver doesn't know the language of the sender, and therefore doesn't know names associated with different genders doesn't seem that problematic, but the sender may be mildly offended. In the extreme, the media report of cases where people have been seduced or influenced by a sender claiming to be something he or she is not. It behooves computer professionals and computer users to be aware of this problem and to strive to the best of their ability not to offend others through their email correspondence.

4.3.2 Web-based Cultural Issues in Research

One of the basic problems encountered when doing research through data gathering on the Web concerns anonymity, as mentioned previously. Another basic problem deals with a cultural bias. Humans tend to feel most comfortable with things they recognize, which leads them to prefer authors with culturally familiar last names. This, in turn, might lead them to filter material based on the culture represented by the author. This creates the danger of a subtle bias, since those with a different view may be less likely to appear.

4.3.3 Cultural Issues and Privacy

Privacy becomes a cultural issue when the individual from a different culture does not understand privacy from the point of view of the host country. Many cultures have different views of individual privacy versus governmental or industrial privacy. It becomes necessary to understand and educate those of different cultures to the laws, ethics and regulations of privacy in the host country. As educators, we need to be knowledgeable and sensitive to privacy concerns, not only of our own culture, but other cultures as well.

4.3.4 Cultural Issues in Education

The Internet has evolved from an essentially white, Anglo, English-speaking background yet has become world-wide in scope. This raises a number of issues:

1. To what extent should the Internet foster a one-culture world (versus fostering and nurturing, and even cherishing, separate languages, traditions, and cultures)?
2. Is the "have" vs. "have not" gulf, said to be widening, a function of culture, or really a function of relative poverty? What really causes various cultural groups to

appear to be underrepresented in the community of Internet users?

3. How do we deal honorably with conflicting views within various cultural groups -- between those who want to preserve language and group identity, and those who want their children to be "first class citizens" able to participate fully in the "dominant" culture? (Recent discussions about the role of bilingual education in the United States are a case in point.)

Kidlink [8], which has reached about 100,000 children in 90 countries around the world, has faced this problem, and resolved it by conducting discussions among children in a number of languages. In each language it strives to keep certain ideals alive: How do I want the world to be a better place when I grow up? What can I do now to help bring this about? Technical issues include the ability to use character sets other than the Roman Alphabet, and the ability to translate accurately among languages.

4.3.5 Legal Issues and Cultural Considerations

As mentioned in Section 3.1: Copyright, it is vital for computer professionals to understand legal issues such as copyright, patent, trademark and trade secrets. However, it is equally important to realize that different countries have different laws pertaining to these issues. Companies spend time and money getting software copyrighted or patents claimed in countries where they plan to do business. Computer professionals need to be made aware not only of the laws of their own country, but those of other countries as well.

4.4 Ability/Disability

A subtle form of possible discrimination is related to the ability/disability of a computer user. Most computer professionals recognize the need for hardware that accommodates disabled users, but fewer professionals think about the need for special presentation software for the disabled. With the ability to put most software on the Web, new problems have arisen.

Some blind computer users access information using programs that "read" the information on the screen to them. One problem can be the ability of the presentation program to translate the material. Doing searches on the Web only exacerbates the difficulty in this area. Many search engines make it difficult for the presentation software to translate what it "sees". Graphical interfaces, which are very good for the seeing user, are nightmares for the blind user. The tendency on the Web toward more and more graphical presentation of information has only hindered the visually impaired user.

Users who have audio (hearing) impairment do not have this problem. In fact, computer technology has enhanced their ability in many ways.

Physically disabled users get the most use out of presentation software that allows them to have the fewest key strokes possible. Many times point and click GUI interfaces of are very usable. The problem can occur with the amount of granularity in the presentation. Small movements of a mouse or mouth stick are very difficult for those who have trouble with muscle control. Large graphics that can be clicked on rather than small text make access easier. Generic software needs to address as many of these types of concerns as possible. Software on the Web now reaches many more disabled users than ever before.

4.5 Pre-College Education

The rapid growth of computer use in Education, especially the use of the Internet, has given rise to many ethical problems. From the college and university point of view, people being trained to be Computer Science teachers or Instructional Technology Coordinators in the K-12 environment should be prepared for social responsibility and ethical issues in the computer world. Further, with the rapid growth of technical knowledge on the part of children, the importance of their teachers acquiring wisdom about how to use this technology is also growing.

The issues raised elsewhere in this paper apply at the pre-college level also: copyright, fair use, intellectual property, privacy, security, etc., which will not be further elaborated here. Issues receiving special attention in pre-college education include:

- Equity of access to all schools.
- Equity of access to all students in a school.
- Acceptable use policies: what can/cannot be done on a school machine. Pornographic material is of special concern.
- Quality of information. What is backed up by solid scholarship? What is propaganda?
- Pedophilia.
- Education reform: achievement, accountability: what uses of the computer result in better accomplishments for students?
- Parental guidance for computer use outside of school.

5. METHODS AND TOOLS

5.1 Teaching Techniques

Many students do not understand that clever language and faulty logic can obscure the real concerns that underlie an ethical issue. Problems that the instructor must face in helping students to overcome this lack of understanding fall into three categories:

- Students must understand how inconsistencies in logic can be uncovered.
- The instructor needs an understanding of the process required for a student to arrive at a rational and informed point of view.

- The instructor must know how to ask questions and give assignments that will lead students through this process of arriving at their own positions.

5.1.1 Identifying Faulty Logic and Reasoning

Bowyer [3] gives an excellent overview of ways in which students can experience or suffer from language problems and faulty reasoning during discussions with their peers, who will be their future colleagues, customers, and supervisors. Problems such as unreasonable assumptions, circular arguments, diversion from the true point, masking of facts, and ambiguity of terms can cloud one's ability to fully understand an ethical dilemma. A current example of a faulty argument is a television commercial shown frequently on US networks that claims one style of personal computer is faster than another. While this argument may be true for a particular set of circumstances (a particular program running a specific set of data), it may not be true for all programs run on that pair of computers.

5.1.2 Teaching Critical Thinking Skills

Paul's program on teaching critical thinking [37] gives a framework for understanding the elements of a thinking process that leads to conclusions that are based on logic. Knowledge from many areas affects how a particular statement creates meaning. Students must be prepared to uncover the source of factors that lead them to their own conclusions. A summary of Paul's framework requirements is:

- A purpose for solving the problem should be evident.
- The problem itself must be clear.
- All possible sources of data and facts must be available.
- Students must interpret the information and form conclusions.
- The implications of conclusions must be examined for inconsistencies.
- The assumptions on which conclusions are based must be reasonable.
- Individual point of view must be considered, since it contributes to conclusions.
- Justifications for a conclusion should explain how each factor contributes to the decision-making process.

5.1.3 Questioning Techniques

Both Bowyer's text [3] and Paul's program on Socratic questioning [38] provide ideas for useful questions to induce thought and discussion. In order to help students learn more accurate methods of problem solving, the instructor must be able to mine their thought processes. In following their thought processes, the instructor can help the students uncover inconsistencies. The instructor can then ask students questions that mirror the possible problems that lead to faulty conclusions. Students may

have trouble being clear, accurate, precise, making relevant statements, providing sufficient breadth or depth, with the underlying logic, and or in finding the significant points. Some examples of questions taken from Paul's Socratic-questioning program [38] are:

- Could you give me an example?
- How could we find out whether that is true?
- Could you give me more details?
- How does that bear on the question?
- What factors make this a difficult problem?
- Do we need to consider another point of view?
- Does what you say follow from the evidence?
- Is this the central idea to focus on?

5.2 Scenarios

Scenarios are an effective way to help students to understand the dilemmas they may face in their professional lives. Many texts in this area include scenarios that are intended to stimulate thought and discussion. Johnson [22], Kallman & Grillo [24], Forester & Morrison [13], Spinello [52], and Bowyer [3] include such scenarios in many chapters. Neumann's book [34] is composed mainly of a list of actual events in which computers caused problems. Parker's book [36] contains scenarios along with analyses of the ethical dilemmas posed by those scenarios. They can be used for classroom discussion, for formal debate, or for research projects. They can be the basis of assignments designed to discover standard practice and the legal aspects of the situations, as well as ethical aspects. We include below some brief scenarios we have created, that can be used as the basis for more complete stories and situations for assignments and discussions. One effective method for using scenarios in a classroom is to assign groups to different points of view. Another is to require students to find information on the Internet that explains the legality of the issue described by the scenario. Listservs are an effective method for extending student discussion outside the classroom. We do not include any answers to our questions because these scenarios are intended as a basis for discussion and debate rather than as problems with hard and fast solutions.

Scenario 1:

Carl Smith works in the computer operations division of a small manufacturing company in which all employees have access to the company computers for email. Carl's supervisor expects him to write a program that will capture the return address of all incoming email to the employees of the company. The purpose for creating this database of email addresses is advertising the company's products.

1. Have any ethical principles been violated here?
2. Should Carl go ahead and write the program?

Scenario 2:

LeSean Cheeks does some programming and a great deal of instruction on computer use for a major university. One of the researchers at the University wants the Computer Services Department to explain how to use software to analyze the contents of the past two years of email messages from the employees of the university, of which she has copies.

1. Should LeSean explain the software to the researcher?
2. Has the researcher violated any ethical code?
3. Does LeSean have any ethical obligations here?

Scenario 3:

Li Chen works for a major corporation in the information services division. Her supervisor wants her to design and install a filter that will search all outgoing email for a list of keywords. Any message containing the keywords would be copied to a file in his subdirectory for his personal use.

1. Should Li question her supervisor about this?
2. Have any ethical principles been violated?

Scenario 4:

Bill Wallace works for the state government, which has a large number of employees at locations scattered around the state. There is an intranet in place and there is a new demand that all employee claims for health benefits will be submitted on-line. This data will be secured by a password. They also want functions to be built in that will order all employee records by the amount of their annual claims for health benefits and will produce detailed reports on the top ten users of the health benefits.

1. Do you see any problems with this practice?
2. Should Bill question this policy?

Scenario 5:

Amish Patel is a database programmer working for a small mortgage firm. A new project for low-income housing has become available and Amish is creating the database for on-line applications for this project. As Amish is reading the specifications for the new project he notices that the specs call for only those people who meet certain cultural criteria to be considered for loans. As Amish digs deeper in the documentation, he finds that families of Asian descent are not allowed to apply for these loans. Amish questions this with his manager and is told that it is "the decision of the housing developer". Amish takes this to the Vice President of the bank and is told not to worry about it because the bank really wants this project.

1. If Amish creates this database will any ethical laws be broken?
2. Will any laws be broken?
3. What should Amish do in this situation?

Scenario 6:

Becky Morrow has just graduated from her local university with a degree in computer science. She has taken a job with a local woman's retail clothing company. This company has decided to list their products in a catalog on the Internet and wants Becky to develop the code to do this. Becky develops the catalog and includes references to vendor Web sites. After several weeks, Becky is called into the President's office to explain why vendors have been complaining about inquiries that were forwarded from Becky's company.

1. Did Becky behave unethically?
2. Did she violate any laws?
3. What, if anything, could Becky have done differently?

Scenario 7:

A university student "newspaper", *The BLL U Bugle*, publishes on the school Intranet but is also available externally to alumni and other interested persons.

1. What responsibility does the university have for the school newspaper content, if any?
2. What about questions such as defamation of character, privacy of personal information, etc.?
3. Are the issues any different than if the newspaper is only printed in hard copy form on the local campus?
4. What if the paper is printed in two forms for internal and external distribution?
5. Are the issues really any different from the traditional circulation of media information?

Scenario 8:

A bright university student, I. M. Knighted, decides to impress his friends by breaking into his own university's system, circumventing a firewall, and advertising in a "Chat Room" that he will provide "free copies" of some popular commercial software products. The university stumbles across this information.

1. What should the administrators do?
2. What liabilities do they, the university, and the student have as they relate to this activity even if the student has never actually provided any software to respondents?
3. What action(s), if any, should the university take in response to this incident (from restricting student computer access, to expulsion, to reporting to civil authorities)?
4. What if the student is an IS major and requires computer access?

Scenario 9:

A well-known computer science professor is quoted in a major national publication, making very uncomplimentary remarks about the uses of computers in schools. While there is evidence that in some cases he may be right, that

money now being spent on computers might in fact have been better spent on something else, there is also ample evidence of benefits derived from computer use in schools. A number of Computer Science professors as well as educators feel the blanket attack was unwarranted and may have damaged serious development efforts underway.

1. Does the professor in question have the right to say anything he wants regardless of consequences?
2. Does expertise in one area make a person an expert in another area?
3. Does ability to teach computer science well in a university context make this person an expert in education?
4. What should his professional colleagues say to him about this situation?

Scenario 10:

A student, Valis Palenko, submits a personal position paper on some Internet ethics issue. All four of her/his citations are from Web sites. The professor decides to randomly check student paper sources. The instructor determines 3 of the 4 citations to be non-existent or thoroughly discredited.

1. How should the instructor confront Valis, if at all?
2. Should a student paper only have Internet resources?

6. CONCLUSIONS

In view of the contradictions among various sources, each claiming the status of "authority" on the subject, it is worthwhile to try to determine how computer science faculty might introduce their students to the issues involved in Internet ethics. Our working group remains committed to further study of these issues and we invite anyone with similar interests and concerns to contact our co-leaders for information about a continuing dialogue.

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Appendix

On-Line Resources

There are many existing codes for ethical conduct used by organizations and professional societies. The interested reader can find details about some of these codes at the web sites listed below.

Accreditation in the Computing Profession

www.info.acm.org/education/accreditation

ACM Code of Ethics
www.acm.org/constitution/code.html

ACM Computing and Public Policy statement
www.acm.org/serving

ACM Committee on Computers and Public Policy
www.csl.sri.com/neumann/ccpp.html

ACM Copyright Information
www.acm.org/usacm/copyright

Association for Information Technology Professionals
www.aitp.org

Association for Practical and Professional Ethics.
www.ezinfo.ucs.indiana.edu/~appe/home.html#why

Bath University Computing Services: The Ten
Commandments of Computer Ethics
www.ccsr.cms.dmu.ac.uk

British Computer Society
www.bcs.org.uk

British Computer Society
Code of Practice
www.bcs.org.uk/aboutbcs/cop.htm

British Computer Society
Code of Conduct
www.Bcs.org.uk/aboutbcs/coc.htm

British Data Protection Act
www.open.gov.uk/dpr/dprhome.htm

Center for Computing and Social Responsibility
www.ccsr.cms.dmu.ac.uk

Center for Critical Thinking and Moral Critique, Sonoma
State University.
www.sonoma.edu/cthink

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