

Journal of

INDUSTRIAL TECHNOLOGY

Volume 15, Number 4 - August 1999 to October 1999

***Issues in Information
Ethics and Educational Policies
for the Coming Age***

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KEYWORD SEARCH

*Administration
Curriculum
Ethics
Legal Issues*

Reviewed Article

The Official Electronic Publication of the National Association of Industrial Technology • www.nait.org

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Abstract

Given the availability of helpful technology in the information age, more and more people are using computer networks or telecom systems to communicate. Use of computers has created new problems involving hardware theft and infringement of software copyright laws. Information-oriented software products are costly, and it is often easy to copy software illegally to avoid paying high costs for software. Many people engage in this activity. In fact, copyright infringement and other illegal uses of software have constituted a social disturbance severe enough to warrant strict and harsh legal penalties. Because of the problems caused by such misuses of resources,

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educating young people about information ethics issues is of paramount importance.

Unfortunately, few countries have included this subject in secondary school textbooks. Lessons on information ethics cannot be found in Social Studies or Moral Education textbooks used by most secondary schools in countries including the United States, England, Taiwan, or Japan. The research to be presented in this paper has uncovered a serious lack of information ethics education in these advanced countries.

Although some American high school teachers believe that their “Honesty Education” can prevent students from cheating, and although Japanese and Chinese Confucianism regulates people to some extent, those influences are not sufficient in all cases. It is a fact that society in these countries is highly individualistic and competitive, and that fact undermines any true guarantee that people—especially students—will abide by the rules of that society. Students at younger and younger ages now have access to computers and, with knowledge of how to operate them, can potentially misuse software resources. People misusing this software are sometimes aware of the rules they are breaking, and sometimes they are not. As a way of stopping illegal practices before they become habitual, a mini-course on correct information ethics for young people is presented in this paper.

The body of the paper discusses general information laws, such as copyright, intellectual property protection, and patent laws. Some violations and their corresponding penalties are presented in an attempt to demonstrate the severity of the illegal action, its effect, and the penalty corresponding to taking such an action. Activities

directed at improving students’ computer ethics are suggested, including: using the problem-solving method and brainstorming to draw student-interest; enacting a mock legal case involving information law violations, which can be presented through the role-play teaching method; and using extracurricular activities like visiting a courtroom or patent office to enable students to effectively understand the litigation process and the ethical concerns underlying it. This course of research seeks ultimately to lower the rate of occurrence of these information ethics violations by students in these nations.

Keywords: information ethics, copyright, intellectual property, patent, mini course

Introduction

The infusion of computer technology into developed countries has undeniably impacted the way we live. Although many benefits are derived from the use of computer hardware and software, some negative issues accompany these benefits. The infringement of copyright laws, the unlawful acquisition of private information, disputes over software patents, and the spread of electronic viruses across networks, are a few of these negative issues. Several reports have related the activities of a skilled group of, often-juvenile, computer “hackers” destroying files and “hacking” into computer networks. One study reveals that the number of juvenile violators has increased every year, and that the information crime rate has also risen gradually (5.7% in Taiwan, Ministry of Justice, 1996). When perpetrators were caught and prosecuted, some did feel guilty for breaking information protection laws. Educating these young, computer-literate people to ethically use information has become a serious problem in

most post-industrial nations. Not only is it a problem of educational policy, it is also a matter of successful implementation of this policy.

A survey of some curricula in the United States, England, Japan and Taiwan revealed a lack of ethics education in textbooks and course topics. Currently in the United States, one unit in a "Contemporary Issues in the Computer Sciences" course offered for three credits in the spring semester, 1999 at the University of Texas at Austin covered the topics of ethics and social issues in the information age. This course is offered to college students, and no non-college age students were placed in contact with this information. In England's high school curriculum, a non-compulsory subject on Information Systems deals with the effect of information technology (IT) on personal privacy. Only one section of the Commercial Laws course taken in the Commercial Vocational High School in Japan mentions Intellectual Property Protection. Similarly, just one unit of the subject on Commercial Laws concerns the penalty for abusing other intellectual property in the Taiwan Commercial Vocational High School. As was the case with the Computer Science course mentioned above, general high school students did not take this course in Taiwan. Generally, an observable lack of information ethics education was apparent in their general high school requisite courses.

As Laver (1989) pointed out, "the operation of the wisest laws is imperfect and precarious. They seldom inspire virtue, they cannot always restrain vice, and useful legislation could be enacted to require certain categories of IT systems to be designed and implemented by licensed practitioners only. Other less-sensitive projects could remain open to all." In other words, information ethics education is a better approach than simply threatening legal action to force some kind of ethical character in young computer users. Some developed countries such as the USA, Japan, and England have, to a limited extent, promoted information ethics in their informal education system and, to a lesser extent, in their

formal curricula. By comparing the extent to which information ethics is detailed in secondary school textbooks, several conclusions have been drawn in this paper and a mini-course has been designed for improving information ethics education.

A General Description of Information Ethics

Information ethics is one aspect of a much larger philosophy known as social ethics. It deals with the moral conduct of information-users based on their responsibility and their accountability. Free moral agents, individuals, organizations, and societies ought to be responsible for the actions they take. Individuals, organizations, and societies should also be held accountable to others for the consequences of their actions. In most countries, a system of laws codifies and regulates the most important and significant ethical standards, and provides a mechanism for holding people, organizations, and even governments accountable for unethical activity. However, rapid development in the information technology arena has created many gray areas left undefined by law. This lack of regulation leads individuals, organizations, and perhaps even societies to act unrestricted legally and, more importantly, ethically. On the other hand, IT tends to create ethical problems, such as infringement of others' privacy, and these ethical problems produce unexpected dynamics. At the same time, increasing processing power, storage capacities, and networking capabilities in IT can greatly extend the reach of individual actions and magnify their impact. As a result, information technology may present new temptations with the potential to make huge and disastrous impacts (Laudon and Laudon, 1996).

The two major issues of information technology involve the conflict between observing others' privacy, and the simultaneous pursuit of individual freedom and autonomy. Privacy is the moral right of individuals to be left alone and in charge of the information they let others know about them. However, governments, private organizations, and often, single individuals

are interested in learning individuals' personal information. Where should the line be drawn between an individual's right to privacy and an organization's interest to know more about the person? New information technology complicates this question by making the collection, storage, retrieval, and analysis of information much, much easier. In addition to these issues concerning the ownership of personal information, new information technologies pose problems for the protection of intellectual property (Branscomb, 1995).

Intellectual property includes all the tangible and intangible products of the human mind. There are three forms of intellectual property protection: patents, copyrights, and trade secrets. Patents protect inventions in machine processes, including underlying principles behind patented inventions. Copyrights protect the expression of ideas but not the underlying idea itself. Trade secrets protect any intellectual product, such as formulas, product ideas, methods of doing business, computer programs and database compilations. People should know the laws protecting intellectual property so they do not intrude upon other's rights to privacy.

According to the Data Processing Management Association (1996), generally speaking, one shall:

1. Protect the privacy and confidentiality of all information entrusted to the computer user;
2. Use one's skill and knowledge to inform the public with top-quality products in all areas of one's expertise;
3. Support, respect, and abide by all appropriate local, state, provincial, and federal laws;
4. Not use information of a confidential or personal nature to achieve personal gain.

Types of Information Illegally Used on Campuses

As computer technology proliferates and more students become familiar it, the potential population of abusers grows. In the 1980's, students played games or used instructional courseware on stand-alone PCs. As information

technology advanced into the multimedia network era of the 1990's, students began to exploit this technology for illicit purposes using on-line systems. Computer crimes can happen on any terminal of a networked system. Counting the number of computer crimes committed or the number of students who engage in this activity is a very difficult task. However, those who commit computer crimes must be held responsible for their actions even though they are ignorant about what constitutes a computer crime. After a lengthy discussion in the latter half of 1996 among ten research faculty members who have taught computer science, computer programming, or civil law courses at the university level, several types of computer-related abuse on campuses were categorized as follows:

1. The most prevalent type of computer copyright infringement on campus is the copying of new software for self-convenience. Copying a new software package is considered as an easy way to save money. Some compressed application software for students is distributed without any key pro or security protection, giving students the opportunity to copy unprotected application software easily, as long as there is no intervention on the part of authorities.
2. A second abuse involves viruses. Some students are creating computer virus programs and copying them to hard drives and floppy disks to destroy other programs. Newer viruses can even penetrate and disrupt networks. Guarding a network from a mutating network virus is a very difficult chore. According to statistical data from the PC-cillin Virus Protect company (Trends, 1997), at least 11,000 presently existing computer viruses can unexpectedly destroy any information system.
3. Stealing a computer version of term papers and assignments is another form of technology abuse. Some students copy others' finished homework without the owner's permission because it is

available to them after being saved in computer disks (or in an address of a network system). It is incredibly simple for students to copy other's finished homework and then make some modifications to submit it as their "own".

Teachers often do not distinguish original homework from the "hacked", "cheater's" version.

4. The Internet, BBS, web browsers, telnet and E-mail are very useful for data communication. However, some students utilize the Internet to gamble. One instance resulted in fighting between student fraternities. Vengeful students tried to open another's network account to disrupt the contents.
5. As computers and their components have become smaller, they have become easier to steal. Students have stolen entire microcomputers from their schools. For their own personal use, students have taken interface cards, pointing devices, printers, and even cables. It is not possible to guard every computer all the time. On a small scale, during CAI (Computer Aided Instruction) activities, diskettes distributed to students are sometimes not returned if teachers are not alert.

Most of the aforementioned unlawful behaviors may be undertaken with minimal experience and skill. Some students admit events happened after a long deliberate plan, while other events were described as unplanned. Often, violators cannot be charged unless relevant evidence can be presented, and that evidence is difficult to establish. In general, the school board can only give violators a warning or reprimand because it is expensive or unreasonable to prosecute young people who have engaged in this type of behavior.

Information Ethics Education in the USA, England and Japan

Three weeks of interviews with representatives, teachers and principals from foreign high schools in Taipei

yielded the information that follows. More information has been collected through reviews of current high school textbooks from these three countries. The principals and information teachers of the Taipei Municipal American School and Taipei Japanese School were asked about their teaching material. Two visiting high school teachers and five high school graduate students from England were asked about their information ethics education. Although the sample of objects of interview was limited to the point of being negligible, most have more than ten years teaching experience, with their textbooks having been renewed every year they taught. In general, they admitted that mass media such as television, radio, and newspapers are a better means for disseminating information ethics education. American high school principals believed that traditional honesty education is the best policy for information ethics education. However, Japanese high school principals felt that even Confucius' philosophy could not keep people from cheating.

About 30 high school textbooks used in the U.S. concerned with computer science, computer literacy, computers and society, and ethics were reviewed, in addition to 5 high school-level computer-related textbooks in London, 3 similar texts in Japan, and 20 in China, were reviewed in this research. In reviews of these textbooks, several results were found, organized here by country:

1. American high schools:

One section is titled "Ethical and Social Issues in the Information Age" in a selective course on Information Technology intended for the 11th grade. The major issues it discusses are reduced as follows:

- a. A framework for ethical decision making;
- b. Professional and corporate codes of conduct;
- c. Privacy and freedom;
- d. Property rights;
- e. Computer crimes;
- f. Safeguarding information systems.

2. British high schools:

Two sections in the textbook used in the selective course for the GCSE, stage 4, cover Information Systems. The major points raised about information ethics are listed below.

Unit 8.1: Security problems:

- a. Danger to files;
- b. Hacking and protection against “hacking”;
- c. Viruses and protection against viruses.

Unit 20.4: The effect of Information Technology on personal privacy:

- a. Personal data files held on many people;
- b. Sending data from one computer to another;
- c. The rights that people expect and deserve;
- d. The Data Protection Act.

3. Japanese high schools:

Strictly speaking, Japanese general high schools offer no courses on information ethics education. Their educational philosophy involves letting students figure out how to decide on their own. In their moral education practices, the Japanese discipline young people who do not respect others’ privacy. In the vocational education system, only one course (Commercial Law) discusses information ethics in the department of Commercial Administration. It focuses on the area of law including civil law and foreign trade law. Aspects included are the media and its value, law of mass communication, copyright laws, patent protection, and intellectual property protection.

After reviewing these examples of high school curricula, it is clear that curricular designers generally neglect information ethics. Therefore, it is not surprising that their high school students will repeat “Do not copy licensed software” by rote when asked about information ethics. No one knows the copyright laws, intellectual property protection laws and patent protection laws. In high schools, the number of information ethics violations might be reduced if students were informed about the concerns these laws protect against, and the punishments

Table 1: Day One

Time	Subject	Location	Instructor
0800-0900	Introduction of the Course, Instructors, and Students	Computer Lab	Course Leader
0910-1000	The History of Information Technology	Media Lab	IT Instructor Service Group
1000-1020	Tea Break	Corridor of Media Lab	
1020-1200	How Information Technology Influences Our Lives (Group Discussion)	Media Lab	Instructor Team
1200-1300	Lunch Break	Cafeteria	
1300-1400	Information Systems in Business	Computer Lab	Information Business Manager
1410-1500	Ethical Issues in the Information Age	Computer Lab	Information Technology Instructor Service
1500-1520	Tea Break	Corridor of Computer Lab	
1520-1700	Intellectual Property and Privacy Protection (Case Studies)	Computer Lab	Group Lawyer
1700	Class dismissed		

Table 2: Day Two

Time	Subject	Location	Instructor
0800-1200	Visiting Bureau of Standards (Discussion)	Bureau of Standards	Course Leader, Patent Professionals
1200-1300	Lunch Break (outside the school)		
1300-1700	Visiting Court of Civil Cases (Discussion)	Court	Course Leader Computer Crime Inspectors

Table 3: Day Three

Time	Subject	Location	Instructor
0800-1200	Privacy and Freedom (Panels of Opposing Viewpoints)	General Classroom	Social Studies Instructor
1000-1020	Tea Break	General Classroom	
1020-1200	Role Playing - Judgement for a Computer Crime		Service Group Instructor
1200-1300	Lunch Break		
1300-1500	Student Presentations on Topics	General Classroom	
1500-1520	Tea Break	General Classroom	All Instructors in this Course Service Group Course Leader

therein associated. Kids must see the seriousness of these offenses, which will result in severe consequences. In

this age of the widespread use of electronic books, multimedia CD-ROMs, electronic bank accounts, and

news networks, the security of private information cannot be well-maintained unless people acquire an adequate information ethic, and practice what they learn.

A Mini-Course for Information Ethics Education

In order to establish a reference-standard of morality in the information society, a mini course spread over three days has been constructed and will be presented in this section. One lawyer, one businessperson in the field of information technology, one software trader, one Social Studies teacher, and two Information Technology teachers were invited to design a course on information ethics for high school students in Taiwan. A mini-course was developed and given to a junior high school (Ming-Chyuan Junior High School) and a senior high school (Kuang-Chi High School) for testing. The results showed the effectiveness of this course to be highly positive. Most students (97%) gained the ideals of information ethics and felt satisfied with the curricular design. The course left a deep impression among these students in regard to information ethics and the character required to be aware of and to respect the rights of others.

The size of every class depends upon the size of the classroom or computer lab. Fifty is the suggested size-limit for each class. It is recommended that the three-day mini-course be scheduled on the last three days of a week. The course's content can be more meaningful if real examples and case studies are presented. According to our experience, asking students "Why should this be done legally?" and "How can this be done legally?" is a better practice than telling them what not to do and expecting them to learn ethics from that type of instruction.

Encouraging students to think by themselves is generally better than thinking for them.

Conclusion

Following comparison of high school textbooks from three countries, it is obvious that few courses in these countries offer information ethics discussions. Statistical data show that the number of juvenile violators is increasing every year, and the information crime rate is rising as well. It is urgent that information ethics be taught and stressed among young people. After a three-day mini-course experiment in a high school and a junior high school, more than 97% of students surveyed reported that they had gained plenty of knowledge of and experience in proper information ethics from the course. The results showed that this compact course on information ethics could prove helpful for understanding information-related laws and establishing the foundation of a character necessary for living ethically in the information society. In order to reach the objectives of information ethics education, it would be much better if information technology teachers can remind students using every possible means to use computers within the bounds of information laws.

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