PROBLEMS RELATED TO COMPUTER ETHICS: ORIGINS OF THE PROBLEMS AND SUGGESTED SOLUTIONS

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ABSTRACT
Increasing use of information and communication technologies (ICTs) help individuals to solve several everyday problems, which used to be harder, more complicated and time consuming. Even though ICTs provide individuals with many advantages, they might also serve as grounds for several societal and ethical problems which vary in accordance with the contexts and purposes of ICT use. The most evident of these problems are privacy of personal information in the virtual environment, accuracy of the information used, intellectual property rights and equal access rights (Moor, 1985). These much ignored problems grow larger gradually, which requires ICT using individuals to be aware of ethical problems and urges practitioners to discuss these problems in a way to create a consensus that sustains equality and justice with regard to access, storage and distribution of information (Charlesworth, 2000). In this regard, the current study aimed to determine problems related to computer ethics with a reference to privacy, accuracy, property and accessibility; to investigate the origins of such problems; and to propose suggestions regarding these problems through the help of practitioners who had an ICT background. Qualitative data were collected through semi-structured interviews from a purposeful sample of K-8 computer teachers in Eskişehir, software experts in Anadolu University Division of Computer Based Instruction, and software experts in Anadolu University Computer Center. After reliability and validity measures were taken, content analysis was conducted followed by the interpretation of findings along with direct quotations from the data. Findings revealed that ICT professionals were not sure of a working definition of computer ethics, and described the concept through providing unethical computer using behavior examples. They all agreed on a consensus regarding the importance of the issue, but considered computer ethics primarily as a component of Internet ethics. They provided several precautions to prevent unethical computer using behaviors. Implementations and suggestions for further research were provided.
Keywords: Computer ethics, intellectual property, accuracy, privacy, accessibility

INTRODUCTION

The increasing choices and opportunities provided by information technologies have been an important step in the interpretation of ethics in recent years. In most developing countries, individuals like to have advanced technologies parallel to technological developments. Among these, computers and Internet have been adopted in all areas of the society bringing them to an influential and unique position in these areas (İşman et all, 2004; Yaman, 2007). Using computers to store and process information and using the Internet to access information have become rapidly developing habits in society. In this regard, developing and sharing policies to implement these technologies carry utmost importance as they are quite influential in individuals' current practices and future lives. Manipulating technology in a way to use information correctly and realize information flow effectively is a necessity (Moor, 2004). However, ineffectiveness of policies to guide individuals while using computers to serve for the greater good allows unique ethical problems to emerge. Such problems urge all individuals to consider computer ethics in a more meticulous way.

Computer Ethics

Incorrect use of information technologies in a way to disturb privacy and property create several ethical dilemmas, which lead to ethical problems regarding technology use. Ethical problems stemming from computer technologies are basically investigated within the framework of computer ethics. This term was first used in the middle of the '70s as an application field of professional ethics, which was transformed and somewhat deteriorated through the appearance of computers (Maner, 1996). Computer ethics can be defined as a dynamic and complicated field of study involving facts, concepts, policies and values regarding rapidly increasing computer technologies. The notion was not considered as an entity of either computer technology or computer sociology till the '90s. However, recent years have witnessed a transformation in our understanding of computer ethics which has led the field to involve applied ethics, computer sociology, technological values, computer crimes and many related fields. In this regard, computer ethics does not involve a set of rules to follow. Computer ethics is neither a list of ethical principles to obey, nor a technology deprived of certain values while implementing those principles. Thus, computer ethics urges scholars to revisit computer technology and its

values. Even though computer ethics is a field related to and in between science and ethics, it is a unique and holistic discipline providing principles for understanding, conceptualization and computer technology use.

Computer ethics focuses on human endeavors influenced or directed by use of computer technologies (Kizza, 2002). Computers have a commonplace influence on decision-making processes assumed by most individuals. Sending an e-mail, writing a program script, creating a database, generating graphics, designing software, processing information and buying software are such behaviors carrying ethical problems within their natures.

Computer technology is a rapidly developing field which makes it difficult to predict what is coming next. However, it is clear that the information society and individuals within this society will go on confronting radical technological and societal developments leading them to generate new patterns of behavior to accommodate these developments (Namlu & Odabasi, 2007). In this regard, while shaping these behavior generation processes, the notion of computer ethics should be emphasized as well as the notion of professional ethics (Kilicer & Odabasi, 2006). In addition, the concept of computer ethics should not be examined within the framework of ICT-related professional ethics. Rather, it should be examined within the framework of personal ethics to be followed by all individuals of the information society (Bowyer, 1996; Namlu & Odabasi, 2007).

Ethical Problems of the Information Society

Development and competition in an information society is maintained by individuals' ability to access information rapidly and easily. In addition, the consumption, production and interpretation of information carry importance. In this regard, information access tools have a crucial place in information societies. Information technologies not only influence and transform the way individuals live, but also the way societal rituals are realized. There are both pessimists and optimists regarding this transformation. There are those who believe that there is a reciprocal relationship between technology and society leading to the assumption that technology might be used for either positive or negative purposes. It is clear that technology provides individuals and the society with several benefits accompanied by serious ethical problems. When ignored or neglected, these accompanying problems might even interfere with the societal values and moral mechanisms.

Mason (1986) lists four ethical issues of the information age: privacy, accuracy, property and accessibility (PAPA). The growth of the information technologies with their capacity for control, communication, information processing, storage and retrieval; and the increased value of information in decision-making might lead decision makers to try to acquire our personal information by invading our privacy. Accuracy is related to the correctness of information delivered through ICTs. Information might be used to mismanage people's lives particularly when the party using inaccurate information has more power and authority (Mason, 1986). The most confronted and complicated of ethical issues is the question of intellectual property rights. Information can be quite costly to produce in the first instance. Transmission and reproduction of the information might be problematic as it could invade the rights of the producers. In addition, there might be problems in allocating the access to this information. Finally, accessibility refers to the conditions under which a person or an organization can have a right or privilege to obtain information. These principles constitute the starting point. It is necessary to determine rules and principles and to create a consensus within the society through conducting evaluations based on these principles,

RELATED RESEARCH

This section discusses research findings on computer ethics. This discussion is followed by the influence of specific background variables on perceptions related to computer ethics. Particularly, the influence of age, gender, computer experience and socioeconomic status is examined, and the gap in the computer ethics literature is illustrated.

Multifarious research studies on computer ethics have been conducted in Turkish higher education institutions in comparison to other indicators of ICTs. Uysal (2006) administered the Unethical Computer Using Behavior Scale (UECUBS) developed by Namlu and Odabasi (2007) to 559 pre-service teachers enrolled in a Turkish education faculty. Findings revealed that pre-service teachers described their computer and Internet using behaviors as ethical. It was observed that participants' perceptions regarding intellectual property and net integrity were weaker in comparison to other constructs. It was revealed that unethical computer using behaviors varied according to gender and program of study. More specifically, women reported to be more ethical in terms of all constructs of the scale. In addition, teacher trainees in the department of computer education and instructional technologies had lower scores in terms of the items addressing information integrity.

Akbulut, Uysal, Odabasi and Kuzu (2008a) used the dataset of Uysal (2006) to investigate whether gender, program of study and PC experience had an impact on ethical judgments of undergraduate students regarding

ICTs. Findings did not reveal any significant differences among different programs of study and between high and low experienced PC users. As mentioned above, the significant difference between males and females remained. Interestingly, findings revealed an interaction between gender and program of study indicating that the difference between males and females did not follow a similar pattern across different programs of study. More specifically, females' judgments regarding computer ethics were found to be consistent across different programs of study while males' judgments varied according to the field of study.

Some studies focused on the triggering role of Internet on academic misconduct whose theoretical background in Turkey was established by Birinci and Odabasi (2006). Following the idea that Internet served as a ground for academic misdemeanors, Akbulut et al. (2008b) investigated the extent of involvement of Turkish university students in academic dishonesty practices facilitated through Internet. A measurement tool named Internet-Triggered Academic Dishonesty Scale (ITADS) was developed through the help of guidelines proposed by Anadolu University Scientific Ethics Committee (BEK, 2003) and The Scientific and Technological Research Council of Turkey (TUBITAK, 2006). After administering the scale to 349 pre-service teachers in a relatively populated Turkish state university, researchers conducted two factor analyses. The former led to the constructs constituting common types of e-dishonesty which were named as fraudulence, plagiarism, falsification, delinquency and unauthorized help. The second analysis revealed individual and contextual factors triggering e-dishonesty which were named as individual factors, institutional policies and peer pressure.

As one of the preliminary research regarding computer ethics in Turkey, Çevik and Kuzu (2006) investigated problems experienced in K-12 computer laboratories regarding computer security along with solutions proposed by computer teachers. The most cited computer security problems were unauthorized access to others' personal files (92%), and removing somebody else's files from a shared computer (82%). Findings suggested that K-12 students were not informed sufficiently about ethical issues regarding ICTs. Types of unethical computer using habits were also investigated in business settings. For instance, Mollavelioğlu (2003) investigated the ethical use of information technologies in small- and mid-size enterprises along with the perspectives of managers and vice-managers regarding computer ethics. Findings revealed that more than half of the enterprises (53.3%) used unlicensed software. Forty percent of the managers thought that their employers had little working knowledge on computer ethics. The majority reported to be exposed to computer crimes (86.7%). Most managers (76%) thought that controlling and checking the contents of employers' e-mails was inconvenient. In addition, they considered employers' chatting (72 %) and surfing adult websites (93%) quite inconvenient even if employers did not hamper the work. Most enterprises did not have any formal precautions regarding computer ethics. Finally, a relationship between education level and the degree of tolerating unethical behaviors could not be found.

Some well-established studies in the field primarily focused on computer-related fraudulence. For instance, Friedmann (1997) conducted a study with 212 undergraduate students to investigate intellectual property and privacy issues. Software fraud was examined under three headings: Fraud for personal use, for friends' use and for profit. In addition, privacy construct was examined under three headings namely accessing computer files without reading, accessing files with the aim of reading the contents, and accessing files with the aim of altering the contents. Findings revealed that undergraduate students' perceptions regarding computer related fraudulences was different from their perceptions regarding the same fraudulences in other areas. More specifically, they were more careful about privacy issues when the files were not on computer. However, in terms of accessing computer files, the level of consciousness was lower. It was suggested that since accessing computer files was easier than other types of fraudulences, since the guilty was not aware of the harmful results of their actions, and since the mistreated was not aware of the fraudulences, such behaviors were more common.

Computer users' perceptions regarding ethics have been well investigated through focusing on ethical dilemmas. Bergem (1993) conducted interviews with 65 pre-service teachers regarding their opinions on professional ethics through using ethical dilemmas. Findings revealed that participants' social sensitivity and moral judgment skills had an effect on their analyses of ethical dilemmas. After training was given to participants, it was revealed that participants' judgments regarding ethical dilemmas were more constructive. It was suggested that formal education regarding ethical dilemmas had an influence on increasing participants' theoretical and practical knowledge and helping them to solve ethical dilemmas in a more constructive way.

Perceptions of users have also been investigated with regard to differences among professionals from different backgrounds. Parker, Swope and Baker (1990) conducted a study in Cape Town University to investigate differences between ethical perceptions of information system students and practitioners. It was revealed that students had different points of view regarding computer ethics in comparison to practitioners actively working in the field. More specifically, students were more tolerant of unethical behaviors in comparison to practitioners.

It was also revealed that as the level of experience increased, practitioners responded in a more ethical way. Such a finding suggested that experience might have an effect on ethical judgments of individuals.

Similar to the Uysal (2006) and the Akbulut, Uysal, Odabasi and Kuzu (2008a) studies, several studies investigated the influence of gender on ethical decision making in addition to several other background variables. For instance, Conger and Loch (1996) conducted a comprehensive study to examine whether unethical computer behaviors varied according to gender, attitudes, social norms, computer literacy level, age, occupation, and socioeconomic status. The results of an exploratory survey were presented identifying user's attitudes and behavior when ethical issues were encountered. Findings revealed that both attitudes and social norms played a significant role in determining individual's acts relating to privacy and ownership. Men and women used different decision cues in forming their intentions toward such computing acts. For instance, in terms of taking technical application files, women acted according to norms whereas men acted according to attitudes. In terms of running a program for a friend, women acted according to norms and attitudes, whereas men acted according to attitudes, computer literacy levels and norms. In terms of reading others' e-mails, women acted according to norms, level of computer literacy, age, occupation and socioeconomic status whereas men acted according to attitudes, age, occupation and socioeconomic status.

Khazanchi (1995) investigated whether gender had an influence on defining unethical computer behaviors during ICT use and development stages. While interpreting seven different scenarios involving different issues as professional responsibilities, social responsibilities, accuracy, preserving privacy an personal responsibilities, women tended to be more successful in defining unethical instances. On the other hand, Adam (2000) suggested that women seemed to be more ethical in some instances whereas no difference was found between men and women in some other instances. It was suggested that there was not any study indicating that men were more ethical than women. Such arguments were partially supported by the study of Bissett and Simpson (1999) maintaining that women paid more attention to others' feelings which led them to be more ethical. Similarly, several studies revealed that females' ethical judgments were more appropriate than those of males in many areas (Bear, 1990; Dawson, 1995; Gattiker & Nillegan, 1988; Ghazali, 2003; Gutek & Larwood, 1987; Kreie & Cronan, 1998; Mert, 2003).

In addition to gender, several studies were conducted to investigate the relationship between ethical decision making and age (Dawson, 1995; Haidt, Koller & Dias, 1993; Turiel, 1983; Turiel, Killen & Helwig, 1987). Findings generally revealed that age was a significant predictor of ethical decision making process as children tended to be more ethical than adults. To our knowledge, there is not a specific study merely focusing on the influence of age on computer related ethical decision making processes. However, there seemed to be a relationship between computer attitudes and age indicating that younger people were more inclined in using computers whereas elders had negative attitudes (Igberia & Parasuraman, 1989). On the other hand, Kelley et al., (1994) found a positive relationship between attitudes and age. Both studies suggested some kind of relationship between the two variables. Since attitudes had a role on ethical decision making as mentioned above, such a relationship between age and ethical decision making might be found as well.

There are also studies focusing on the influence of computer experience or socioeconomic status on ethical decision-making. For instance, Loch and Conyer (1996) found a positive relationship between computer literacy and ethical decision making regarding technical application files. In terms of using a computer program for a friend, or in terms of reading others' e-mails, a negative relationship between ethical decision making and computer literacy was found. As for socio-economic status, Haidt, Koller and Dias (1993) revealed that individuals from high socio-economic classes had more tolerance towards the violation of ethical rules. In contrast to above studies, Gattiker and Kelley (1999) suggested that computer experience or socio-economic status did not have an effect on decision-making processes regarding ethical dilemmas.

A recent study conducted by Mert (2003) investigated the influence of both gender and socio-economic status on decision making processes regarding ethical dilemmas. Mert asked which thinking styles predicted undergraduate students' responses to specific ethical scenarios. Findings revealed that females' perceptions were better than those of males. In addition, perceptions of education faculty students were better than those of other faculties. A significant relationship between socioeconomic status and ethical perception levels was found. More specifically, ethical perception scores were higher in low-income participants whereas scores decreased as the income level increased. It was suggested that, as the income increased, students felt more comfortable and flexible in violating rules.

PURPOSE

The current study aimed to determine problems related to computer ethics with a reference to privacy, accuracy, property and accessibility; investigate the origins of such problems; and propose suggestions regarding these problems through the help of practitioners who had an ICT background. Following research questions were addressed to realize this purpose:

1. What are the opinions of ICT professionals regarding computer ethics?
2. What are the opinions of ICT professionals regarding four ethical issues of the information society: intellectual property, accuracy, privacy and accessibility?
3. What kinds of solutions were suggested by ICT professionals regarding intellectual property, accuracy, privacy, and accessibility problems?

METHODS AND PROCEDURES

Participants

Participants of the study consisted of 20 computer professionals. Ten of them were graduates of computer education and instructional technologies departments, who worked as computer science teachers in Eskişehir, and the other ten were graduates of computer science departments who worked as software experts in Anadolu University Division of Computer Based Instruction, and in the Anadolu University Computer Center. All participants pursued a professional career in information technologies and computer science. Fifteen of the participants were male and five were female. Purposeful sampling procedure was applied to determine participants. In addition, computer professionals volunteered to participate in the study were selected. Participant names were replaced with pseudonyms in accordance with the principle of privacy, and these pseudonyms were reported while interpreting the results.

Data Collection

Semi-structured interviews were conducted with participants to determine their opinions regarding research questions. Interviews were arranged separately with each participant in time slots and places they determined. Data collection tool consisted of an interview form including seven open-ended questions developed by the researcher. In order to make sure that the interview form was appropriate and sufficient to address the research questions of the study, the researcher resorted to expert opinions provided by four professionals working in the field of computer education and instructional technologies. The form was revised based on expert opinions and made ready for implementation as suggested by leading methodology sources in the field of qualitative research (Miles & Huberman, 1994).

Data Analysis and Interpretation

While analyzing data, content analysis was implemented by using recent reference books on qualitative research design and data analysis (Glesne, 2006; Grbich, 2007; Lindlof & Taylor, 2002; Marshall & Rossman, 1999). In the analysis, data were coded, themes were found, data were arranged in accordance with codes and themes, and findings were interpreted (Strauss & Corbin, 1990). That is, inductive coding procedure was implemented. The purpose was to describe data and expose hidden facts enjoyed by the data (Yıldırım & Şimşek, 2005). The data which were described, interpreted, scrutinized with regard to cause-and-effect relationships and drawn to some conclusions were also supported with direct quotations to reflect participants' ideas properly.

Initial data coming from semi-structured interviews were audio-taped, transcribed, reviewed sentence by sentence, and transferred to interview forms. Statement patterns that occurred in the data were listed by the researcher and an independent scholar in the field to generate themes related to research questions. The themes were transformed into a coding key, which was used by the researcher and an independent rater to mark these themes on the data sheets. Then, the reliability of the coding key was examined through the formula proposed by Miles and Huberman (1994, p.64) (i.e. reliability = number of agreements / total number of agreements + disagreements). The reliability coefficients were .94 (Question 1), .96 (Question 2), .94 (Question 3), .98 (Question 4), .100 (Question 5), .98 (Question 6), and .96 (Question 7). All inter-coder reliability coefficients were above .70 suggesting that the coding procedure was reliable.

Findings

Opinions Regarding Computer Ethics

Participants' opinions regarding the question addressing their understanding of the computer ethics concept are classified under the following themes:

Table 1: Themes regarding opinions on computer ethics

Themes
Inappropriate behaviors regarding computer ethics
The necessity to generate ethical principles
The need for education on ethics
The need for legal sanctions
Security problems
Economic results

It was observed that none of the participants had working knowledge regarding what constituted computer ethics. Five of the participants asked for additional explanation when they were asked about the concept. However, additional explanations did not lead to a plausible opinion regarding computer ethics either.

Participants mostly explained computer ethics in terms of using unlicensed software and security problems. Sample definitions emerging from the data are given below:

"ehh. I don't have quite much information regarding computer ethics. What comes to my mind is mostly Internet ethics. I think of things like stealing information or sending viruses, things done by hackers." [Elif]

"Computer ethics is a concept, which can influence relationships among people." [Gonca]

"I think of computer ethics, I mean ethics, as moral conducts, a general definition covering all things done with computers, software, security issues. I think computer ethics is a general concept which covers all these things." [Murat]

Participants stated that computers were used in all areas of their lives leading to several societal problems. İsmail stated that computer ethics was not different from ethics in general:

"I think computer ethics …ehh… is not so different from the ethics concept we use in our daily lives. …ehh… the only difference…before that I want to talk about the thing…Ethics, in terms of the thing, in terms of accessing information I think a doctor should be accessed by all means, this is ethics. On the other hand this information should not be available to all on the Internet or through computers, this is ethics as well. Like I said the only difference of computers, the only difference of Internet is that information spreads quite easily through these." [İsmail]

Elif and Mehmet on the other hand, relates computer ethics to Internet ethics directly:

"Computer ehh while you are working I mean (…) while storing something I did, something I created , while storing it on the Internet, I thought somebody else might have taken and used it." [Elif]

"Internet is commonly used by all. So, I think, it is important to generate ethics regarding what should be done, what should not be done in this area. So, I think it is necessary to organize a field of study, or some legal sanctions." [Mehmet]

Participants preferred to explain computer ethics by stating unethical behaviors. According to participants, unethical behaviors were copying file or programs, showing disrespect to people's work, accessing secret or personal information of individuals and publishing this on the Internet, showing disrespect while communicating on the Internet, reading or downloading others' files and e-mails, visiting adult web sites, video-recording individuals' sexual lives and publishing on the Internet, hacking and sending viruses.

"… well I don't know ehh using software with cracks, copying mp3 files …"[Burhan]

"…here they might be problems related to interpersonal communication or accessing people's personal information, or specific work used in the work life or secret information of a company might be exposed to other external people by some people." [Gonca]

"…ehh this might be the use of e-mail services for different purposes ehh or Internet pages might be used for different purposes. I mean bad purposes for example accessing porn sites or (…) ehh I see some events in our environment, on television, on radio, here and there. Some people's obscene views are

recorded and distributed without permission ehh I think such behaviors are against personal rights and these are not ethical." [Funda]

"Ehh in terms of computer ethics, of course it is necessary to respect people's work. Plus people should respect each other, for instance, I want to give a sample. I get into Mynet, I play games, there is a place with a lot of cursing, I do not open that I mean people have communication problems I think. Besides, people should respect each other, because we cannot get anywhere with curse words." [Aykut]

Participants suggested that it was necessary to generate ethical principles to prevent unethical behaviors, to provide education to computer and Internet users regarding ethical behaviors, and to support academic studies regarding ethics:

"Computer ethics is a concept which can influence human relationships. Besides, it can influence the system or relationships among people who are working in a company. Here there can be problems related to interpersonal communication, or related to access to personal information. Some people might provide access to secret information of a company, or current work of the company. I think such things should be prevented. Maybe some standards regarding this might be generated; however, I don't have a clear idea whether these will be applicable." [Gonca]

"Internet is a commonly used field. Su, it is important to generate ethics regarding the behaviors to follow and behaviors not to follow." [Mehmet]

"Today, when we say technology the first thing comes to our mind is computer and Internet. It is a must to deliver right or wrong things to people, things related to computer use, Internet use or technology use. People should be informed about this subject. Computer ethics should be a must course. Like a normal computer course, people should be educated on the purposes of computer use, what is right and what is wrong." [Yavuz]

"… some studies conducted in academic fields are positive I think." [Selim]

However, they suggested that some problems might not be prevented with such principles. Thus, participants asked for legal sanctions and proposed that every individual should take their own precautions as well:

"If necessary, a field of study might be created for this, if necessary some legal sanctions etc. etc. might be generated." [Mehmet]

As individual precautions, frequent backing up, using assistive programs and antivirus software were suggested. As organizational precautions, participants thought that preserving personal information was the responsibility of the system manager:

"I think, for this, computer users particularly while keeping their information in their personal computers, if they need to share this information on the Internet, they should take the first steps as precautions like using assistive programs, virus software, personal back-ups. Ehh for their own security." [Mustafa]

"Besides that in terms of ethics, the responsibility somewhat belongs to the network managers because every manager in a company can access to information of users and their workers. It is not difficult to track their e-mails, web surfs. This is up to the managers, ethics is in their control. Besides that, these are individuals' own responsibilities. [Mustafa]

Burhan stated that if individuals followed unethical conducts, several fields might be harmed from that:

"Economically you harm producers of these because buyers pay a specific amount for this. If they do not pay, the company cannot develop new things. Since this does not happen, the company go to bankrupt and then there is nothing more to share. Ehh economically it is a harmful thing, clearly not pleasant." [Burhan]

Opinions Regarding Intellectual Property Problems

Participants' opinions regarding the question addressing intellectual property problems are classified under the following themes:

Table 2. Themes regarding intellectual property problems

Themes
Problems
Using unlicensed software
Unauthorized access to personal information
Unauthorized sharing of personal information
Unlicensed information
Not acknowledging the resource while quoting
Origins of the problems
Internet
Financial problems
Desire to get the ready-made material
Insufficient awareness regarding computer ethics

Participant responses to this question are classified under two themes as intellectual property problems and origins of these problems. Most participants thought that using unlicensed software was the basic problem regarding intellectual property. For instance, Selim stated that Turkish users resorted to unlicensed software more than users in other countries:

> *"Ehh. As far as I know, in terms of producing and distributing unlicensed software, Turkey ranks among the firsts in statistics." [Selim]*

Participants considered unauthorized access to personal information as a serious problem of intellectual property. They stated that accessing and getting information without effort was not ethical. They complained that it was easy to distribute information accessed without authorization, and no precautions were taken for this problem:

> *"In our country people do not like to pay for computer products, information technology products. Ehh regarding this we also confront with several problems I mean ehh we should have the ownership of our information. Getting this information without an effort, without a contribution is really sad. Particularly this is common in Turkey. Street venders provide us with any software with fewer prices. Sometimes you do not need to pay either. You can download the program from the Internet and then use." [Selim]*

> *"… the use of a creative idea I own is being used by somebody else for other purposes without informing me…" [Yavuz]*

> *"In this regard, as I said before people's ideas and work might be used by somebody else and might be used as if these are their own property. Personally I did not experience such a thing but we see such things on the Internet. There are websites for assignments or theses. People use these sites as resources or use the complete work as if it is their own work. I heard such things." [Gonca]*

In this regard, Elif stated that online shopping was not secure as people could access their personal information:

> *"I mean, till now I did not experience a stealing instance, like file theft. I did not experience such a thing. I do online shopping as well, I use my credit card but I do not use it everywhere. So something bad did not occur to me so far." [Elif]*

As the origin of intellectual property problems, participants considered financial problems, Internet and the desire to get the ready-made material easily:

> *"Particularly this is common in Turkey. Street venders provide us with any software with fewer prices. Sometimes you do not need to pay either. You can download the program from the Internet and then use." [Selim]*

Hakan believes that insufficient awareness regarding computer ethics was the source of intellectual property problems:

> *"…When it comes to intellectual property, people are alone. They are alone with their conscience in a sense. So, the only solution to intellectual property problems is increasing awareness regarding computer ethics." [Hakan]*

Proposed Solutions for Intellectual Property Problems

Participants' suggestions regarding the solutions to intellectual property problems are classified under the following themes:

Table 3: Proposed solutions for intellectual property problems

Themes
Legal sanctions
Preserving intellectual property with laws
Buying copyrights
Individual precautions
Generating a mutual moral structure
Using digital signatures
Critical and skeptical approaches
Hardware and software security precautions
Acknowledging the source of the information

Participants believed that individual and legal precautions might be taken to prevent intellectual property problems. Two suggestions emerged in terms of legal sanctions. Murat and Faruk proposed legal action whereas Vedat believed that such problems might not be prevented through legal actions:

"… umm my solutions are… things that are created should be preserved with legal actions, such as individual patent rights. This is the definite solution, but this should be implemented very well. Today several pirate software programs are on sale easily. Through Internet precautions or through personal computers these things should be prevented, this is a recommendation for the software world." [Murat]

"…Uhh on this subject legal precautions should be taken ehh people who earn through these illegal things, or people who duplicate others' work should be punished I believe." [Faruk]

"ehh in terms of intellectual property ehh you cannot prevent others' distributing information through Internet. Internet influences the computer ethics in a most negative way. You cannot prevent its distribution. I mean you cannot differentiate what is ethical what is unethical, or what can be used what cannot be used through law." [Vedat]

Mehmet and Vedat believed that using digital signatures might help solving intellectual property problems:

"Now recently several users began to use digital signatures. This, I believe, might solve many problems. When you give a digital identity to what you have created, you prevent duplication or unauthorized use of that material at least partially. Now, I believe more people should tend to use digital signatures, should get their unique digital signatures as a solution that first comes to my mind." [Mehmet]

"… plus a second event that will come on stage soon is the use of digital signatures, I mean rather than encouraging digital signature use gradually, it should be a rule out of a sudden. Everybody should know about the source of that information, the owner of it, how much of it can be used. I believe this can be solved after this system improves." [Vedat]

Mustafa and Yavuz believed that buying copyrights might be a solution to intellectual property problems:

"ehh when we think about intellectual property, we try to produce something, say a research software, information we publish on the Net, it is necessary to register these through an organization and to buy copyrights …" [Mustafa]

"… like other inventions and discoveries, having a patent or getting a license might be a solution …" [Yavuz]

Duygu proposed that acknowledging the source of information might be a solution:

"ehh I mean any information on the Internet should be acknowledged in terms of who searched it, who prepared it. If everybody mentions who created the information, who uploaded that information to the Web and on which date, or which resources were used, this might be better." [Duygu]

Generating a mutual moral structure was proposed as a solution to intellectual property problems by Mehmet and Vedat:

"… As I said before the only solution to prevent this is to create a unique moral structure over individuals. How can we create this? I can give you an example from my field. If you see that a person duplicates without authorization, you should exclude that person from your field. I mean employing that person again, I mean, some other firm should not employ such a bad person. Or if you have such a colleague, you should personally give that person a cold shoulder." [Mehmet]

"There needs to be an auto-control mechanism. I mean people need to be sensitive. They should first think about using somebody else's productions. Auto-control solves many problems." [Vedat]

Mustafa and Burhan referred to security precautions related to hardware and software:

"Well, as I said before, individuals should maintain their own security first. Ehh they should re-check information they are about to publish on the Internet before they publish it." [Mustafa]

"…Updates, virus software, using firewall programs." [Burhan]

In the previous question, Internet was considered as a source of intellectual property problems. Mustafa maintained that being critical and skeptical might be helpful while dealing with such problems:

"Besides that while working in a company other than their place, both the functionality of the working place and the positions of the managers should be evaluated in a critical manner maybe by means of their own observations. I mean what if our data is transmitted to somewhere else; such a skeptical approach might prevent such unauthorized information transmission."[Mustafa]

Opinions Regarding Accuracy Problems

Participants' opinions regarding the question addressing accuracy problems are classified under the following themes:

Table 4. Themes regarding accuracy problems

Themes
Problems
Incorrect information on the Internet
Origins of the problems
Ease of information publishing
Trusting in Internet information
Insufficient control of information on the Internet

Most participants maintained that since the source of information on the Internet was not clear, and since people resorted to this information without questioning the source, they were skeptical about Internet-based information. For instance, Selim, Elif and Ferda stated their opinions as follows:

"ehh we can access a lot of information in a short span of time. I think the amount of correct information is quite small. I mean I think it is a huge garbage dump. I have real trust issues with the Internet" [Selim]

"… I do not trust in most websites on the Net. I mean ehh even something is put there by mistake; many people cite that information as if it is correct." [Elif]

"Particularly, I do not trust in resources I found on the Internet. I feel the need to confirm from a book what I found on the Net. I believe what you find should be confirmed through some other resources." [Ferda]

However, İsmail trusted in information related to technical subjects and Burhan trusted in information provided in the official websites of specific brands:

"In terms of accuracy, yes, actually since I conduct searches on technical subjects, I rarely confront with incorrect information" [İsmail]

"I believe that official websites of brands involve credible information whereas I am skeptical about others." [Burhan]

In addition, participants believed that Internet did not have a control mechanism. Since everybody could publish information as if it was correct, the amount of correct information was quite small:

> *"ehh now as the areas of use are quite large everybody has the chance to get in and publish any information they want on the Internet as if that information is correct." [Mehmet]*

> *"ehh Internet ehh our ehh we can easily access it ehh so we feel more comfortable there. I mean eh introducing ourselves ehh we do not have to reveal ourselves and this comfort is motivating for dangerous purposes sometimes. I mean we think nobody can catch us there. We do not have to prove that a piece of information is credible or correct, or we do not have to account for to anybody." [Selim]*

One of the origins of accuracy related problems was a lack of control mechanisms or insufficient supervision of information on the Internet as stated by Faruk:

> *"…Unfortunately, there is not an organizational body or mechanism controlling the credibility of information given to, transmitted to people. I believe this issue should be examined seriously. I mean when people get into Internet for information, to access correct information, there they are misinformed. Or they access the wrong information. I want this to be controlled strictly." [Faruk]*

Proposed Solutions for Accuracy Problems

Participants' suggestions regarding the solutions to accuracy problems are classified under the following themes:

Table 5. Proposed solutions for accuracy problems

Themes
Critical and interrogating point of view
Control or research of information accuracy
Legal precautions
Generating legal sanctions
Security precautions
Trusting in known websites
Using digital signatures and certificates

Most participants believed that it was necessary to have a critical and interrogating point of view to deal with accuracy problems. In this regard, they suggested that information should be compared with print materials and other resources, or should be approved by expert organizations and individuals:

> *"… I mean it is necessary to know the real source. To understand the credibility of information, it is necessary to be skeptical a little. Is it really true? I read this, but is there really an accuracy problem? I should check other resources, do they say the same? Definitely such an approach is necessary." [Mustafa]*

> *"ehh personally if you want a personal solution I can suggest you check from a couple of different sources. I mean rather than using information from the first place we see it, I suggest checking its accuracy at some other places and then use it." [Selim]*

> *"There is so much information isn't it? So much information is around; there are hundreds of libraries on different subjects. Hundreds of pieces of information ehh some places to get information on specific subjects. All resources do not say the same thing sometimes. In this regard, universities and some firms in the computer sector have significant responsibilities." [Vedat]*

Another solution was that correct and credible information should be limited to official websites or known sources:

> *"…a carefully built and well-organized website seems to provide us with more credible information I think." [Elif]*

> *"I mean the solution might only be realized through trusting in big corporations. They should inform people that hey have a control mechanism; they provide information in a secure way, so that a solution might be arrived." [Murat]*

"… If I am supposed to offer information, and if that information will be searched from the Internet it should be an official organization, it can be a university, an official company, or something like that, I do care about that… I mean I am careful whether it is an official body, like university, government, etc. …" [Alper]

However, Murat and İsmail believed that information on the Internet could not be supervised. Mehmet on the other hand, was against such a control mechanism on the Internet. Rather, the information should be controlled by internal mechanisms of organizations and individuals rather than an overseeing body:

"The solution is actually hard to be realized on the Internet. It is all around the world, controlling is almost impossible." [Murat]

"ehh actually I cannot provide much solutions for this because it is against the logic of Internet, I mean technically because technically it is impossible to control it. Technically it is a umm scattered structure; it cannot be controlled from a single source." [İsmail]

"Now this confirmation is actually I do not think that it is correct for third or fourth parties to control this. As a result, you publish content, if this content is not correct, users will notice it somehow and will not resort to that source again. This problem solves itself I think. So, I do not think it is necessary for third or fourth parties to interfere with this process." [Mehmet]

Selim and Duygu proposed generating legal sanctions to prevent problems regarding accuracy:

"… regarding the control of the content I think there should be some legal arrangements I mean some countries generate laws to regulate the use of content on the Internet, we know this. I believe such a thing does not exist in Turkey. I do not have definite information but such precautions should be taken here as well." [Selim]

" …if the source of an Internet article is not given, if the source of a piece of information is not provided, publishing such things on the Internet is forbidden, but there is not a legal sanction regarding this. But within the legal framework, such things might be arranged I mean anonymous resources or information whose researcher is not known might be prevented." [Duygu]

Hakan believed that digital certificates and signatures could be a solution to accuracy-related problems:

"…In order to be sure of the source of the information there are some technical solutions, digital certificates, digital signatures, etc. if these applications spread ehh and become standardized, applied correctly, at least we could know the source of information. This contributes to credibility." [Hakan]

Opinions Regarding Privacy Problems

Participants' opinions regarding the question addressing privacy problems are classified under the following themes:

Table 6. Themes regarding privacy problems

Themes
Problems
Unauthorized access to personal information
Fear / anxiety
Surveillance of IP addresses
Origins of the problems
Shared PCs
Curiosity

The most stated privacy problem was unauthorized access to personal information. Participants stated that Internet was not a secure place to store personal information. Malicious people might easily access personal information through Internet, for instance, through online banking applications, which might publicize secret personal information. They also stated that personal work should not be stored in shared computers in offices or other places. Some websites required users to provide some personal information. In spite of being limited, such

information might lead to other information about individuals. For instance, Ferda explained a problem she experienced as follows:

> *"For instance, when somebody enters my national identity number, they can find the place I work or for how many years I have been working there. Finding the national identity number is not a big problem. Anybody who knows your name, your mother's and father's name and your birthplace can access to several pieces of information about you. There is no limitation to this on the Internet. Actually, I am quite inconvenient about this issue." [Ferda]*

Alper thought that surveillance of IP addresses while surfing is a violation of privacy rights:

> *"Well, for example ehh the fact that people know your IP address ehh means that they can know which server surfs which websites." [Alper]*

The most evident result of privacy problems was that participants did not trust in Internet and lived with a fear and anxiety of revealing their personal information to malicious people, who can share this information without authorization. In addition, they experienced a fear of revealing personal information so that other people can steal their information or access their e-mails:

> *"Internet is not a secure place. Ehh so it is not hard for somebody else to access personal and important information hidden in our computers. I mean all computers are connected to each other in a network, so ehh anybody who works on this for a while, any hacker can easily access to your personal computer. Besides that ehh I mean this person can even be your colleague. I mean while you are out for lunch during the lunch break he can sit on your chair, access your financial information or get some information related to your bank accounts. This is I think ehh I mean this is not an issue like you can close your eyes, turn your back and leave." [Selim]*

Burhan believed that people had a weakness of curiosity regarding personal information of others which led to privacy problems:

> *"People think that cracking somebody else's password and accessing personal files is a big confidentiality. If you take the precautions I just mentioned, risks are fewer. If you do not, it is quite likely that you see your personal information everywhere. " [Burhan]*

Hakan stated that he was quite uncomfortable with the practice of signing in specific databases, which asked them to give some personal information. Such personal information might be used as a key to other information about an individual:

> *"There are databases which might cause my personal information to be accessed by some others. I do not want to talk about these pieces of information, but through using Internet and some pieces of simple information, you can find more detailed information about a specific person. These detailed pieces of information might help you to go beyond. " [Hakan]*

Proposed Solutions for Privacy Problems

Participants' suggestions regarding the solutions to privacy problems are classified under the following themes:

Table 7. Proposed solutions for privacy problems

Themes
Security Precautions
Using advanced ciphering methods
Using security software
Not providing personal information on the Internet
Not storing personal information on shared computers
Legal Precautions
Generating legal sanctions

The most evident solution regarding privacy problems was using advanced ciphering methods. Participants believed that databases containing special information should be accessed through advanced passwords. In addition, even the storage of these data should be realized through advanced ciphering. They also maintained that only a few authorized people or managers should access to storage of these databases.

"Besides that, databases I mentioned should not be accessed easily, there should at least be a password to confirm user identity, and everybody should not access all others' information." [Hakan]

"I mean technically ciphering methods might be used I mean maybe I do not know how easy, how difficult or how expensive is this, but while these are stored somewhere, they should be stored with passwords as well, or only one person or very few people can access that storage, so a more secure thing might be applied. " [Gonca]

"My solutions regarding this ehh actually there is such a thing ehh there are small password tools particularly for Internet banking. These tools ehh produce passwords in every 30 seconds or once a minute. If we are allowed to use such tools on the Internet while shopping, etc. or if people are urged to use such things ehh people stealing passwords might not access personal information because he doesn't have the password tool. This might be a solution." [İsmail]

"You are going to ask for a solution. There might be a ciphering system, which we use right know. But there are hackers who can crack these passwords. This is somewhat related to individuals' personal moral values I think." [Funda]

Hakan also indicated that Internet services for communication purposes such as e-mail, forum and chat should be more powerful in terms of technical issues to prevent such privacy problems:

"We said these issues might stem from technical problems as well. Particularly services with communication purposes like e-mail services or anything with communication purpose should be technically powerful and be robust to abuse." [Hakan]

Using cookies as a security precaution, using security software, providing incorrect information for website memberships, giving secondary e-mails rather than frequently used ones, obtaining fake e-mail addresses to use when necessary, and not reading e-mails when the sender is not known were other precautions as exemplified below:

"I think with antivirus programs with Trojans etc. here as an upper level of our personal computers firewalls installed to server computers, software, computer software to prevent such things, these might be solutions I think." [Mustafa]

" … I did not give very important information it says birthday and so on I do not provide them correctly. I mean I do not know what occurs from these but for example, I always have a fake e-mail address, I always give that. (…) It says they are going to give me a card and ask for our mother's maiden name. I do not know who is at the other side, maybe they are going to use it when I give it. I am trying to be careful in this regard." [Elif]

"ehh in this virus attacks etc. ehh the simplest attacks occur through e-mails. You should take the same pain with your e-mails as you take in your snail-mails and letters. You should not open e-mails coming from unknown senders or unnecessary content." [Mehmet]

Legal actions constituted an important part of the dataset. Majority of the participants asked for legal precautions to prevent privacy problems:

"In this regard legal actions should be taken I mean there should be a legal solution, there is not any other solution, I suppose, it should be prevented by law." [Alper]

"In this regard again laws should severely punish. I do not know whether these are applied now but there are many fraudulence cases on the Internet and I have never heard of people who have been punished if we think of Turkey. I mean these laws should be strict, I mean they should be punished even if it is too severe." [Murat]

"Like I said, the solution for all is legal sanctions for those who publishes or uses content without authorization. I mean these things are in their own nature like I said before. If you do not get into these websites, it is over. Solutions are not logical. As it is literally an abuse of personal rights and freedoms, severe punishments are necessary." [Mehmet]

Participants also suggested that documents containing personal information should not be kept in personal computers. In addition, mutual information should be stored in a shared place on the network, personal information should not be given on the Internet and personal precautions should be taken.

Opinions Regarding Accessibility Problems

Participants' opinions regarding the question addressing accessibility problems are classified under the following themes:

Table 8. Themes regarding accessibility problems

Themes
Problems
Economic problems
Internet infrastructure
Inequality of opportunities in accessing information
Origins of the problems
Economic problems
Foreign language proficiency
Infrastructure differences among countries

The first problem mentioned by participants regarding accessibility was relatively higher cost and slower speed of Internet access in Turkey. In addition, since having a computer is a must to access Internet, they tended to use Internet cafes. Most databases asked for a price which prevented them from accessing information:

"…you see resources like computers and Internet access are resources with a certain cost. Financially these resources cannot be obtained every time and everywhere. In this regard, a problem of equality comes into stage." [Hakan]

"Individuals want to access a certain piece of information through Internet, but they might not have computers and they might need to go to Internet cafes. This is a problem. Not having a computer can be a problem." [Elif]

Participants also thought that the current infrastructure and the quality of service were quite weak being quite behind what customers needed. People in other countries could access information faster which created a problem of inequality:

"ehh but of course this is not provided to us with appropriate conditions. If you say why, we use a low speed with a high cost. I think Turk Telekom provides this service with excessive price and this is a low quality service. In addition, ehh after we buy the service, additional service we need is quite bad ehh technical support and service supports are bad. They do not provide it in a quality way I think." [Selim]

"ehh now Turkey's… in Turkey… our Telekom infrastructure actually does not work for the good of the information technology sector I mean does not meet the needs." [Mehmet]

"I do not believe in the equality of individuals in terms of the equality of information, because it is not so. For instance, access of an American to information is different from my access, because, to say it simply, I can use ADSL at home. Normal users can only afford to pay for it. Ehh it can provide I think utmost 2048 Megabits. For instance a user in America can use Internet faster with a lower price and access information." [İsmail]

Participants stated that Internet was an easy way of accessing information, there was somewhat equality of access as the information was open to all; however, knowing how to access information was a must. That is, ready-made information was not possible, which required research:

"Ehh. If that information is on stage and clear, then Internet is the easiest way. You do not pay anything for this; it is already open to all. You just take a permission to enter. So you enter and use it. I mean you should make use of every site on the Internet which is not asking for a password." [Vedat]

"Here, illiteracy and insufficient education, not knowing the subject and nothing else. Actually, virtual environment is something provided to all. Those who know how to use it use it, others just look." [Burhan]

Mustafa, Duygu and Mehmet stated that most websites providing important information asked for registration. These sites provided information, services and opportunities to real users in return for a price. Thus, some information could only be accessed by the richer, which led to inequality:

"When you connect an educational site they offer you the basics regarding their education, they just give you a demo or tutorial. In order to access subsequent steps, you need to register or pay some…They give you limited service, but offer the complete service to real subscribers." [Mustafa]

"You see, they ask you to register to get a piece of information. You see you need to register, you need to pay some to get more." [Duygu]

"You know the equality of individuals, you see, now to connect Internet and use good computers to do your jobs require some financial resources. Of course, as the financial situations of individuals are not equal, in our country people who are financially wealthy can make use of comfortable communication services and Internet services more." [Mehmet]

"No equality, I mean, actually there should be equality. Now I mean in our Turkey some regions have Internet and some do not have an idea about it. These should become widespread around Turkey. I mean everybody should be equal I think. Everybody should access information directly." [Murat]

Participants stated that the origins of accessibility problems were financial problems, insufficient resources in Turkey and infrastructure differences among countries. Opinions regarding financial problems and infrastructure differences can be seen in above quotations. The opinion regarding the language of resources is exemplified below:

"… regarding accessibility, but the only problem is the Turkish content. I mean when you check, good writings and articles are all English, there are few Turkish contents, and this is problematic. …" [Alper]

Proposed Solutions for Accessibility Problems

Participants' suggestions regarding the solutions to accessibility problems are classified under the following themes:

Table 9. Proposed solutions for accessibility problems

Themes
Economic Precautions
Developing freeware
Free access to Internet
Free access to databases
Institutional Solutions
Institutional support for access
Increasing bandwidth
Infrastructure improvement
Governmental support to education
Individual Solutions
Self-development

The most evident solution was taking economic precautions. Among these were free Internet access and freeware:

"You see, maybe it is somewhat utopia but maybe with the government support, computer environments might be created where everybody can access Internet every time and these places might become widespread. This can sustain digital equality." [Hakan]

"If the Internet access in Turkey become widespread, if people ehh can access it with less cost, this inequality will be removed. I mean again ehh the problem stems from the service provider company and the service itself." [Selim]

Duygu and Ferda stated that accessing databases should be free of charge:

> *"I mean, you see, as I said commercial worries should be lessened ehh in order to access something, you need to register, you need to become a member, you need to know the password, such things should not be asked. Ehh because if it is published on the Internet, it is there for people to access it, I believe. This should be like that. I mean less price should be asked, additional costs should be eliminated. Or at least less cost should be asked to access information …" [Duygu]*

> *"In this regard, I opt for more equality. Me I mean there should be flexibility in accessing databases, accessing information on the Internet." [Ferda]*

As institutional precautions, participants referred to governmental support to schools for access, increasing bandwidth, improving infrastructure and governmental support for educational ICT use:

> *"I mean, the solution is simple. More bandwidth, like the ones abroad. They need to invest a bit on infrastructure. I mean I had to install and cancel ADSL connection several times. Every time I do this, they have a cliché "no port", I confront with that cliché. I mean, I already pay for this service. Why don't they use that money to invest for a new port for a new user? I wonder this. I think Telekom should work a bit more."[Selim]*

> *"Our solution is governmental policies should support education more. I mean they should support this more, all schools should use Internet ehh I mean all individuals in Turkey should have equal rights." [Murat]*

As individual precautions, participants maintained that even though opportunities and services varied among individuals, individuals should strive for self-development:

> *"ehh when we look at the situation from people's perspectives, I mean they completely are limited by the services provided to them. Sharing might be important I mean rather than accessing things on the Internet in an unethical way, for instance, an individual in another university can communicate with an individual in this university, can ask for ideas or for resources they have, by communicating and improving relationships these problems might be solved in a more ethical way" [Gonca]*

CONCLUSION

The current study identified problems related to computer ethics with a reference to privacy, accuracy, property and accessibility; investigated the origins of these problems; and proposed several suggestions regarding these problems through the help of ICT practitioners. Findings revealed that even ICT professionals were not aware of a working definition of computer ethics. However, they all agreed on a consensus regarding the importance of obeying ethical conducts with computers and the Internet. It is clear from the data that participants interpreted computer ethics as Internet ethics. In addition, they explained the concept of computer ethics through resorting to unethical computer using behaviors such as using unlicensed software, copying files or programs without authorization, showing disrespect to people's work, accessing secret or personal information of individuals and publishing this on the Internet without authorization, showing disrespect while communicating on the Internet, unauthorized reading or download of others' files and e-mails, visiting adult web sites, video-recording individuals' sexual lives, publishing these records on the Internet, hacking and sending viruses. Even though all participants were graduates of departments focusing on computer sciences, who were working as either teachers or software experts in privileged information technology positions, they had problems in describing the concept of computer ethics adequately, and resorted to unethical behavior samples rather than defining the concept. This might stem from the fact that they did not take undergraduate course(s) on computer ethics. As suggested by Bergem (1993), formal education on ethical practices and implications might help them to develop their theoretical and practical background on computer ethics, and generate better solutions for ethical dilemmas. In this regard, offering a must course like Computer Ethics in undergraduate computer science programs might be an effective solution.

Participants suggested that several ethical principles should be developed to prevent unethical computer and Internet using behaviors. In addition, they asked for better training and education regarding computer ethics along with higher support for academic endeavors focusing on computer ethics. Legal precautions were proposed quite frequently along with several personal precautions such as frequent backing up of files, using assistive programs and antivirus software programs. It was suggested that organization administrators had the responsibility to sustain security of secret information. The fact that they asked for ethical principles which

should be taught to computer users, they asked for additional training and education regarding computer ethics, and they asked for support to academic endeavors on computer ethics demonstrated the high value they attributed to the importance of education. In addition, participants accompanied computer ethics with Internet ethics, which revealed that they did not consider computer ethics in a vacuum. Rather, they thought of computer as a technology helping them to access Internet suggesting that participants thought of computer ethics and Internet ethics as sub-dimensions of the same concept.

Almost all participants were consistent with the problem of intellectual property reporting that they had no problem with this issue. They supported the idea of intellectual property whose most serious dimension was using unlicensed software. This problem was followed by unauthorized access to personal information. This finding was partially in line with the findings of the Friedmann (1997) study indicating that undergraduate students did not give enough importance to unauthorized copying of software. In addition, findings blaming legal looseness for unethical misconduct were parallel to the findings of Friedman as well. Intellectual property problems and proposed solutions revealed that participants accounted individuals for computer misdemeanors rather than third or fourth parties to control such behaviors. It was unfortunate to find out that even ICT practitioners were able to get unlicensed software whenever and wherever they wanted. This is somewhat caused by the socioeconomic status of computer users as the current income levels were far behind the position to get all necessary software programs with a license. In this regard, as mentioned by participants, socioeconomic status might be an important indicator of unethical computer using behaviors, particularly in terms of the intellectual property issues.

In most ethical problems, participants resorted to legal sanctions in addition to personal, organizational and technical precautions. Some personal precautions might be quite technical for average computer users. In addition, proposed legal sanctions might lead to endless constrains which should rank them last as a precaution. For instance, the well-known website, YouTube, has been shut down for several months in Turkey. Hundreds of websites similar to YouTube have been prohibited as administrators did not trust in individuals' own control mechanisms. Participants asked for an overseeing body or organization to control for the accuracy of information. Both precautions, overseeing control mechanism and legal restrictions, might create the consequence of over-limiting individuals' rights. It is unfortunate that participants, who were all university graduates, thought of restrictions and constraints as solutions rather than individual and societal precautions.

Accessibility problems mentioned by participants might be supported with several studies and theoretical work pieces in the literature. The digital divide among countries has been cited in several studies like the well-known Campbell (2001) study and the Alampay (2006) study. A thorough integration of ICTs into current everyday practices requires a well-established infrastructure. Infrastructure problems have been cited as a primary problem interfering with ideal ICT integration to everyday practices and educational settings (Akbaba-Altun, 2006; Clarke, 2007; Göktaş, Yıldırım & Yıldırım, 2008; Gülbahar, 2008; Odabaşı, 2000; Ololube, 2006). In this regard, complaints of the participants were found to be acceptable whereas suggested solutions seemed to be depending on governmental bodies and service providers, which were somewhat beyond practitioners' control. In brief, participants were right that since they did not have equal opportunities with their equals developed countries, they were in a disadvantaged position in creating knowledge and transforming this knowledge into wisdom.

In terms of accuracy, findings revealed that most participants considered Internet-based resources as unreliable. In addition, as Internet is a platform where information is disseminated without an effective quality control mechanism, participants did not trust most of the resources found on the Internet. This finding supported the Toprakçı (2007) argument maintaining that the accuracy of Internet-based information causes problems, particularly in instructional settings, since students begin to come to classroom with incorrect or invalid approaches. Participants in the current study suggested that such a problem could only be solved through an effective control mechanism which is somewhat impossible for the time being. Participants suggested that Internet-based resources should be supported and validated with print resources. In addition, they trusted in some official websites where digital signatures and security sertificates were strictly adopted, which was considered plausible in the current study.

The current study contributes to the research literature, which were mostly conducted in a quantitative methodology revealing 'whats' but somewhat leaving a gap in terms of 'whys'. However, the current study was conducted with limited number of participants. In addition, its scope might have excluded several ethical problems and dilemmas experienced in the information society. In this respect, more detailed studies through both qualitative and quantitative methodologies and mixed-method researches are seriously sought for to diagnose other ethical problems of the information society and to propose a variety of feasible solutions.

Moreover, the study is primarily based on ICT practitioners' self-reports, which should be triangulated with other data collection methods and procedures during further research endeavors.

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