Freshman Students' Attitudes Toward Issues of Computer Ethics

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Abstract: Computers and Internet have become a part of our life. Our dependence on these technologies has been continuously and rapidly increasing. Computers and Internet use also has become a necessity for instructional purposes in academic environments. Although the widespread use of computers and Internet has many benefits for almost everyone, it has also increased the use of these technologies for illegal purposes or unethical activities such as piracy and privacy invasion. Taking these issues into consideration, the main purpose of this study is to explore freshman students' attitudes toward several issues of computer ethics. This study was conducted using a survey method and data were collected among freshman students in the Department of Business Administration at a public university in Turkey. Hypotheses were tested for investigating whether age, gender and duration of computer usage in a week have a significant impact on freshman students' ethical judgments regarding computer and Internet usage.

Keywords: Computer ethics, freshman students

Introduction

Computers have become a part of society. Computers and internet change the way we live, the way we communicate, the way we get education, the way we make business. Societies are changing with information and communication technologies. Many businesses depend on computers and Internet for its operations. Computers and Internet have increasingly become necessity in education and industry as well as in daily life. There is no doubt that these technologies have had considerable impact on our lives. However, the tradeoff between the benefits and dangers for a person or a society is controversial. Today's advanced information and communication technologies have enlightened many people but, also have increased the use of computers for illegal purposes or unethical activities such as piracy, privacy invasion, unauthorized access and use of computer systems (Banerjee et al, 1998; Mason, 1986; Sedlet, 1999, Lee and Chan, 2008; Maslin Masrom and Zuraini Ismail, 2008; Akbulut et al, 2008, a).

Technological developments create new opportunities for action and new sets of choices that are ultimately of a moral nature (Mullen and Horner, 2004). As living in the information age, also known commonly as the computer age or information era, we constantly confronted with important technological changes and the need to create new attitudes towards new situations arose from the computer technology (Maslin Masrom and Zuraini Ismail, 2008). Technological changes penetrate societies faster than new attitudes are formed for them or legal and ethical codes are adopted (Bercu, 1991).

As the use of computers and Internet has become widespread, misuses of these technologies have increased dramatically (Banerjee et al, 1998). The easy of reaching, storing, changing and transmitting information provided by Internet has made unethical behaviors much easier, particularly among students in academic settings (Abdul Karim, Zamzuri, and Nor, 2009). Internet has provided a new dimension to human computer interaction. There is no doubt that proper use of Internet is beneficial to both, students and academicians. However there is no code of ethics for users in the Internet. There is an ethical vacuum in cyberspace (Laudon, 1995). According to Sackson (1996) as the general public becomes increasingly 'computer literate', the gap between technology and peoples' intellect noticeably shrinks.

Students enter universities from different backgrounds and with different experiences. Many students are unaware of ethical issues of computer usage such as software piracy (Cohen and Cornwell, 1989). According to Calluzzo and Cante (2004) many if not most, students had misconceptions about what represented ethical and unethical behaviors in the use of software and information technology and systems. It is important to measure the

level of computer ethics awareness in the first year of undergraduate education to take necessary measures about ethical computer usage among students before graduation.

Teaching computer ethics is a critical task in the Department of Business Administration. There are several reasons computer ethics is an important issue for students in the Department of Business Administration. It is possible that if college students are uncertain about what constitutes appropriate and inappropriate behavior then this uncertainty will be carried forward into their workplaces after graduation (Calluzzo and Cante, 2004; King and Case, 2007). Employee abuse of company information technology resources can slow a system's network, hurt the productivity of all workers trying to access information on the system and even dangerous network can be infected by a downloaded virus. These cases may generate huge losses for company and can result in lawsuit or dismissal (Perreault and Keith, 2004). Even though some organization adopted code of ethics for members, not every computer user and information system professional is a member of these organizations, and therefore does not necessarily follow these codes (Harris, 2000). Computer abuse is widespread issue around the world. To prevent financial losses from computer abuse, companies need to employ people who are aware of ethical computer usage (Pierce and Henry, 1996). Since many companies depend on people who are computer literate and computer users face ethical problems everyday in the work-place. For these reasons college students should be aware of ethical computer usage before graduation (Pierce and Henry, 1996; Calluzzo and Cante, 2004).

Given these issues, this study was conducted among freshman students in the Department of Business Administration at a public university in Turkey to gain insight about their awareness and understanding of the computer ethics issues.

Literature Review

Computer ethics awareness among undergraduate students in different fields of study has been the subject of several studies. Different dimensions of computer ethics have been addressed by these studies. Cohen and Cornwell (1989) conducted a study on college students to determine their attitude toward copying of computer software. They determined that 58% of the college students, who are participated the survey, had personally pirated. Cohen and Cornwell (1989) determined that an overwhelming majority of students feel that software piracy and other forms of information system unethical behavior are acceptable, also many students feel that it is okay for them to pirate software but they feel that piracy is normative behavior.

Athley (1993) surveyed sixty-five computer science and computer information systems students to determine their ethical beliefs on seven scenarios and nineteen ethical problems. She found significant differences between high-tech students and computer experts based on ethical beliefs in computer-related situations.

Harris (2000) investigated information systems ethical attitudes among college students with a survey including ethical situations of 20 individual situations. He found that there is a difference in attitudes as students mature through the educational process in 12 of the 20 individual situations, and between genders in 8 of the 20 individual situations.

Siegfried (2004) investigated student attitudes on software piracy and related issues of computer ethics. He determined from the study that students generally felt that copying commercial software and downloading music from the Internet was acceptable and found that there was no significant correlation between student attitudes and their school's religious affiliation or lack thereof. He found that a small but significant percentage of responding students considered the other questionable behaviors as ethically acceptable. Students do not see any problem with downloading music over the Internet. Siegfried (2004) determined that there is no sense among college students that the unauthorized copying of commercial software is wrong.

Calluzzo and Cante (2004) conducted a research among graduate and undergraduate students to gain insight into their attitudes, perceptions and understanding of ethics in information technology and software use. They found that the sample were quite ethical in those behaviors associated with personal privacy, personal property or outright theft. This study couldn't find significant differences among genders based on ethical judgements.

McCarthy, Halawi, and Aronson (2005) studied to determine whether there are significant differences between undergraduate and graduate students in their perception of information technology ethics. The study found that significant differences do not exist between undergraduate and graduate computer information systems students but significant differences existed between male and female computer information systems students in their ethical beliefs related to information technology usage.

Gan and Koh (2006) examined perceptions of software piracy and studied to discover its underlying factors in three universities at Singapore. They found that while age was negatively related to software piracy, computer experience or computer usage demonstrated an ambiguous relationship to software piracy.

Halawi and Karkoulian (2006) investigated ethical attitudes of business information systems student toward information systems. They found that there is a difference in perception to ethical situations between undergraduate and graduate students as well as between females and males in certain ethical situations.

King and Case (2007) investigated undergraduate student behavior and perceptions about e-cheating. They founded that even cheating is common among undergraduates only four percent of students admit to cheating on exams using information technology.

Masrom, Ismail, and Hussein (2008) investigated the ethical awareness of computer use among undergraduate computer science students at two public Malaysian universities. They found that the ethical awareness of computer use of the students differ most significantly on the basis of the university itself. They found no major differences across gender, age and duration of computer use.

Namlu and Odabasi (2007) carried out a survey with 216 undergraduate students from Anadolu University, Turkey computer engineering and computer and instructional technologies teaching departments and developed unethical computer using behavior scale (UECUBS). Akbulut et al (2008, b) investigated influence of gender, program of study and PC experience on unethical computer using behaviors of Turkish undergraduate students from five different departments (not including the Department of Business Administration) at Anadolu University using UECUBS. Akbulut et al (2008, a) explored the types and reasons of Internet-triggered academic dishonesty among undergraduate students in department of education at Anadolu University and developed Internet-Triggered Academic Dishonesty Scale (ITADS). Beycioglu (2009) conducted a study aimed to determine prospective teachers' unethical computer using behaviors at a faculty of education in Turkey. Beycioglu (2009) in his study concluded that prospective teachers undermine ethical computer use. The results revealed that female candidate teachers were more concerned about ethical issues than male candidate teachers and that prospective teachers who had up to five years of PC experience considered ethical computer use more than those with five years and beyond.

Research Methodology

Hypotheses

In this study three research hypotheses were stated to guide the research. These are as follows:
$H_{0(1)}$: 18-19 years old students and 20-24 years old students have the same ethical beliefs about computer usage.
$H_{0(2)}$: Female and male students have the same ethical beliefs about computer usage.
$H_{0(3)}$: Students with less computer usage (1-4 hours) and students with more computer usage (more than 4 hours) in a week have the same ethical beliefs about computer usage.

Participants

The study was conducted in the spring semester in 2009. 143 full time freshman students in the Department of Business Administration participated the study. The total number of questionnaires used after the exclusion of missing values was 110. Respondent students (excluding missing values) consisted of 36% of all freshman students in the Department of Business Administration (309). Sample characteristics are provided in Table 1.

		Frequency	Percentage
	Gender		
	1) Male	49	44.5
	2) Female	61	55.5
	Age		
	18-19	57	51.8
	20-24	53	48.2
a Week	**Duration of Computer Usage in**		
	1-4 hours	52	47.3
	> 4 hours	58	52.7
	Internet Experience		
	1-4 years	57	51.8
	> 4 years	53	48.2
	E-Mail Users		
	Yes	97	88.2
	No	13	11.8
	Internet shopping		
	Yes	13	11.8
	No	97	88.2

Table 1. Participants' characteristics

Instrument

The questionnaire used in this study consists of two parts. The first part was developed to collect demographic information. The second part comprised of 28 items measuring computer ethics awareness. 10 items in the second part of the questionnaire are adapted from "Ten Commandments of Computer Ethics". Remaining 18 items are adapted from "unethical computer using behavior scale (UECUBS)" developed by Namlu and Odabaşı, 2009. Respondents answered each item in the survey on a five-point scale ranging from 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree) to 5 (Strongly Agree).

Results

The results indicate sensitivity toward unethical behavior in various situations among freshman students. The highest mean score (Q12: 2.44, with standard deviation (SD): 1.345) regarded "Copying licensed CDs, DVDs", second highest mean score (Q6: 2.15, with SD: 1.322) regarded "Copy or use proprietary software for which you have not paid". Other high mean scores were "Using crack programmes" (Q11: mean: 2.05, SD: 1.244), "Using materials like pictures, animations, etc., without the consent of the owner" (Q14: mean: 2.03, SD: 1.207). The lowest mean score (Q23: mean: 1.11, SD: 0.367) regarded "Sending pornographic mail to people without request". Other low mean scores were "Use a computer to steal" (Q4: mean: 1.13, SD: 0.386), and "Deliberately sending a virus by e-mail" (Q24: mean: 1.15, SD: 0.473). Table 2 shows descriptive statistics of the items.
The results of the hypotheses testing are summarized in the following paragraphs. The results of t-test are shown in Table 3 and the group means are presented in Table 4.

Age Differences

The first hypothesis is about whether students in different ages have the same ethical beliefs about computer usage. Respondent students were grouped according to age as 18-19 years old and 20-24 years old. The results show that 5 of the 28 items resulted in differences between 18-19 years old students and 20-24 years old students. Table 3 shows where there was a difference among group means between 18-19 years old students and 20-24 years old students for the items. In all cases but two, mean score of 18-19 years old students is higher than mean score of 20-24 years old students. This finding coincides with the results to other studies (ie. Masrom, Ismael and Hussein, 2008). Age is an important factor for students to their understanding of ethics become mature. Two groups believed that use a computer to harm other people is unethical (Groups' mean scores are 1.26). There is no difference between age groups regarding to "Copying licensed CDs, DVDs" and "Copy or use proprietary software for which you have not paid" items. These items have the highest mean scores for these groups. "Sending pornographic mail to people without request" item has the lowest mean score for two age groups. There is no statistically significant difference between two groups regarding to this item.

Gender Differences

The second hypothesis is about whether female and male students have the same ethical beliefs about computer usage. The results show that 15 of the 28 items resulted in statistically differences between male and female students. Table 3 shows where there was a difference among group means between male and female students for the items. In all cases, mean score of male students is higher than mean score of female students. Female students are more sensitive than male students regarding to unethical use of computers. The lowest mean score of males is 1.12 (1.11 for females) related to "Sending pornographic mail to people without request" item. Male and female students accept this as an unethical behavior. The highest mean scores of males are 2.78 and 2.71 related to "Copying licensed CDs, DVDs" and "Copy or use proprietary software for which you have not paid" items. Female students' mean scores of these items are 2.16 and 1.7 respectively.

Duration of Computer Use in a Week Differences

The third hypothesis is about whether students with less computer usage and students with more computer usage in a week have the same ethical beliefs about computer usage. The results show that 14 of the 28 items resulted in differences between students with less computer usage and students with more computer usage in a week. Table 3 shows where there was a difference among group means between students who use computer 1-4 hours in a week and students who use computer more than 4 hours in a week for the items. In all cases, mean of students who use computer more than 4 hours in a week is higher than mean of other group. These results indicate that more computer experienced students show less ethical attitudes toward computer usage. The highest mean score for these groups is also related to "Copying licensed CDs, DVDs.". Mean scores of this item are 2.81 and 2.02 respectively. The lowest mean score for more computer experienced students is 1.16 and it is related to "Use a computer to steal.". The lowest mean score for less computer experienced students is 1.02 and it is related to "Sending pornographic mail to people without request.".

In this study, we couldn't find statistically significant difference between groups in 5 of 28 items regarding all three hypotheses. These items are Q5, Q8, Q19, Q20, and Q25.

Conclusions

As computer and Internet use continues to grow, users and institutions face some ethical and legal issues related with using these technologies. The aims of this study were to test three hypotheses regarding freshman students' attitudes toward issues of computer ethics. To achieve these objectives, authors collected data from one hundred and ten freshman students in the Department of Business Administration.

The study found that there were significant differences in ethical attitudes about computer usage between 18-19 years old students and 20-24 years old students. 20-24 years old students were more aware about ethical behavior using computer than 18-19 years old students.

In terms of gender factor, the results of this study indicated that significant differences existed between male and female freshman students. It is found that, female students' attitudes about ethical computer usage better than

male students in all 28 cases. The study showed 15 of the 28 items resulted in statistically significant differences between male and female students.

The study shows that more computer experienced students show less ethical attitudes toward computer usage. In all cases, mean scores of students who use computer more than 4 hours in a week is higher than mean scores of students who use computer 1-4 hours in a week. The results show that 14 of the 28 items resulted in statistically significant differences between students depending on duration of computer usage in a week.

There are some limitations of this study. The respondent sample of the study is composed students in the Department of Business Administration. Students in other departments may show differences. Another limitation is that study is conducted in a public university in Turkey. Besides all the limitations, this study makes meaningful contribution to field of study in computer ethics awareness among undergraduate students.

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	Mean	SD
Privacy		
Q1) Use a computer to harm other people.	1.26	0.585
Q2) Interfere with other people's computer work.	1.53	0.786
Q3) Snoop around in other people's computer files.	1.41	0.782
Property		
Q4) Use a computer to steal.	1.13	0.386
Q5) Use a computer to bear false witness.	1.17	0.446
Q6) Copy or use proprietary software for which you have not paid.	2.15	1.322
Q7) Use other people's computer resources without authorization or proper compensation.	1.50	0.843
Q8) Appropriate other people's intellectual output.	1.50	0.886
Q11) Using crack programmes.	2.05	1.244
Q12) Copying licensed CDs, DVDs.	2.44	1.345
Q13) Selling licensed CDs, DVDs which are reproduced against regulations.	1.62	0.948
Q14) Using materials like pictures, animations, etc. without the consent of the owner.	2.03	1.207
Social Impact		
Q9) Do not think about the social consequences of the program you are writing or the system you are designing.	1.51	0.763
Q10) Do not use a computer in ways that ensure consideration and respect for your fellow humans.	1.28	0.608
Q15) Disturbing people by using the advantage of virtual environment.	1.38	0.69
Q16) Carrying a propaganda in Internet that threatens social peace.	1.23	0.501
Q17) Allowing children to play computer games of violence.	1.53	0.936
Q18) Permitting children to enter inappropriate sites on Internet in Internet Cafes.	1.28	0.731
Q19) Web masters' delivering the personal information of members to other people.	1.20	0.503
Safety and Quality		
Q20) Deliberately damaging the hardware of computers designed for public use.	1.16	0.418
Q21) Copying the data in a computer without the consent of the owner.	1.27	0.573
Q22) Sending a private mail to others without the consent of the sender.	1.49	0.875
Q23) Sending pornographic mail to people without request.	1.11	0.367
Q24) Deliberately sending a virus by e-mail.	1.15	0.473
Q25) Using others' personal information without permission.	1.23	0.553
Q26) Sending one's personal information to a web page without permission.	1.19	0.459
Q27) Using the network of an individual or institution to access Internet without permission.	1.91	1.253
Q28) Hacking through Internet.	1.60	1.051

Table 2. Descriptive Statistics of the Items

	$H_{a(1)}$	$H_{a(2)}$	$H_{(3)}$
Privacy	p	p	p
Q1) Use a computer to harm other people.	0.993	0.002**	0.056
Q2) Interfere with other people's computer work.	0.015*	0.019*	0.019*
Q3) Snoop around in other people's computer files.	0.016*	0.032*	0.118
Property			
Q4) Use a computer to steal.	0.172	0.028*	0.426
Q5) Use a computer to bear false witness.	0.024	0.062	0.676
Q6) Copy or use proprietary software for which you have not paid.	0.236	0.000**	0.001**
Q7) Use other people's computer resources without authorization or proper compensation.	0.142	0.053	0.010**
Q8) Appropriate other people's intellectual output.	0.915	0.332	0.520
Q11) Using crack programmes.	0.111	0.000**	0.037*
Q12) Copying licensed CDs, DVDs.	0.387	0.017*	0.002**
Q13) Selling licensed CDs, DVDs which are reproduced against regulations.	0.340	0.001**	0.012*
Q14) Using materials like pictures, animations, etc. without the consent of the owner.	0.033*	0.170	0.022*
Social Impact			
Q9) Do not think about the social consequences of the program you are writing or the system you are designing.	0.043*	0.011*	0.106
Q10) Do not use a computer in ways that ensure consideration and respect for your fellow humans.	0.546	0.033*	0.605
Q15) Disturbing people by using the advantage of virtual environment.	0.147	0.000**	0.026*
Q16) Carrying a propaganda in Internet that threatens social peace.	0.051	0.478	0.022*
Q17) Allowing children to play computer games of violence.	0.424	0.002**	0.009**
Q18) Permitting children to enter inappropriate sites on Internet in Internet Cafes.	0.034*	0.182	0.004**
Q19) Web masters' delivering the personal information of members to other people.	0.076	0.224	0.088
Safety and Quality			
Q20) Deliberately damaging the hardware of computers designed for public use.	0.221	0.184	0.817
Q21) Copying the data in a computer without the consent of the owner.	0.138	0.015*	0.036*
Q22) Sending a private mail to others without the consent of the sender.	0.046*	0.194	0.155
Q23) Sending pornographic mail to people without request.	0.141	0.734	0.011*
Q24) Deliberately sending a virus by e-mail.	0.084	0.080	0.036*
Q25) Using others' personal information without permission.	0.078	0.520	0.090
Q26) Sending one's personal information to a web page without permission.	0.009**	0.494	0.097
Q27) Using the network of an individual or institution to access Internet without permission.	0.089	0.017*	0.086
Q28) Hacking through Internet.	0.493	0.001**	0.262

* indicates significant at the 0.05 level
** indicates significant at the 0.01 level

Table 3. The Results of t-test

	$H_{a(1)}$		$H_{a(2)}$		$H_{(3)}$	
	18-19 years old	20-24 years old	Male	Female	1-4 hours	>4 hours
N	57	53	49	61	52	58
Privacy						
Q1	1.26	1.26	1.47	1.10	1.15	1.36
Q2	1.70	1.34	1.73	1.36	1.35	1.69
Q3	1.58	1.23	1.59	1.26	1.29	1.52
Property						
Q4	1.18	1.08	1.22	1.05	1.10	1.16
Q5	1.26	1.08	1.27	1.10	1.15	1.19
Q6	2.30	2.00	2.71	1.70	1.73	2.53
Q7	1.61	1.38	1.67	1.36	1.29	1.69
Q8	1.49	1.51	1.59	1.43	1.44	1.55
Q11	2.23	1.85	2.63	1.57	1.79	2.28
Q12	2.54	2.32	2.78	2.16	2.02	2.81
Q13	1.70	1.53	1.96	1.34	1.38	1.83
Q14	2.26	1.77	2.20	1.89	1.75	2.28
Social Impact						
Q9	1.65	1.36	1.71	1.34	1.38	1.62
Q10	1.32	1.25	1.43	1.16	1.25	1.31
Q15	1.47	1.28	1.65	1.16	1.23	1.52
Q16	1.32	1.13	1.27	1.20	1.12	1.33
Q17	1.60	1.45	1.84	1.28	1.29	1.74
Q18	1.42	1.13	1.39	1.20	1.08	1.47
Q19	1.28	1.11	1.27	1.15	1.12	1.28
Safety and Quality						
Q20	1.21	1.11	1.22	1.11	1.15	1.17
Q21	1.35	1.19	1.43	1.15	1.15	1.38
Q22	1.65	1.32	1.61	1.39	1.37	1.60
Q23	1.16	1.06	1.12	1.10	1.02	1.19
Q24	1.23	1.08	1.24	1.08	1.06	1.24
Q25	1.32	1.13	1.27	1.20	1.13	1.31
Q26	1.30	1.08	1.22	1.16	1.12	1.26
Q27	2.11	1.70	2.22	1.66	1.69	2.10
Q28	1.67	1.53	2.00	1.28	1.48	1.71

Table 4. Group Means