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Original Research

Unethical computer using behaviors of Turkish high school students

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ABSTRACT

Introduction: As in developed countries all over the world, the internet is also utilized in developing countries in all educational activities to increase the students' interest and motivation at class, achieve permanence of knowledge, and keep pace with technologic developments. The purpose of this study was to determine the unethical behaviors of high school students in terms of internet use in the field of information technology as well as the factors that influence these behaviors. **Materials and Methods:** This study was population-based cross-sectional study. Research data were collected between February 13th and June 30th of 2012. The universe of research consisted of 900 students studying at five different high schools located in Zonguldak, Turkey, whereas 643 students (86 girls, 557 boys) constituted the actual sampling. The data collection forms, which we utilized for the purposes of this research, consisted of two separate sections, namely the "Personal Data Form" made-up of questions about the students' personal data and the "Unethical Use of Information Technologies Scale". In the data collection process, face-to-face interviews were conducted with the students in their school. **Results:** The average total score of the scale was determined as 103.70±43.71. We found that the students scored highest in the field of intellectual property (29.16±13.89), whereas the lowest scores could be observed in the sub-aspect of security and quality (21.91±10.10). A significant difference could be ascertained between the information accuracy factor and the students' age. We discovered that the students' behaviors in terms of information technologies usage differed significantly according to the students' age, the class and branch they study, their weekly internet usage time, and the place they lived in. **Conclusion:** The students' age is influential on their unethical use of information technologies. Along with basic computer training, teachers are supposed to raise the students' awareness with regard to ethical issues that arise from computer technologies and are of particular concern to the society, and teach them how they should act in terms of ethical problems.

KEY WORDS: Computers, ethics, students, Turkey

INTRODUCTION

As in developed countries all over the world, the internet is also utilized in developing countries in all educational activities to increase the students' interest and motivation in class, achieve permanence of knowledge, and keep pace with technologic developments [1]. However, the wide spread utilization of the internet for educational purposes is closely associated with the emergence of several problems with regard to the intended use and utilization time [2].

As a result of the internet becoming wide spread, a phenomenon that creates influence on all possible disciplines, various unethical behaviors have emerged such as resorting to fraudulent means to obtain confidential data from a system, annoying people by sending them meaningless emails, and slowing down a system by making unauthorized use of the system's resources, etc. [3-5].

"Computer ethics definition on the computer in parallel with developments how expansive the definition, working on the field with different theorists, according to the common point; computer technology on human values appropriate 'if you develop human values' Instead of damaging preserving them, I'll move". Generally, four ethical problems regarding computer ethics may be mentioned [6]. The four ethical issues of the information age, intellectual property, accuracy, confidentiality and access were collected under these concepts. Intellectual property has different definitions in the literature. According to the many researchers, intellectual property produced from the combination of different ideas [7,8]. As a result, a human generated picture, videos, books, articles, speeches or similar product, a hardware design for computer science, software, documents, instructional materials and all intellectual property is considered. The biggest threat to intellectual property, parallel to the sophistication of computers and the Internet through this medium is that ideas can be easily copied and distributed. The second ethical issue, accuracy, is related to correctness of the information. Incorrect information cannot be predicted and may cause irreversible consequences. Examination systems in daily life, weather, banking is done online, and many other vital processes are of great importance for the protection of its

accuracy. The third ethical issue, confidentiality, which includes people's thoughts, feelings, beliefs, fears, and fantasies, is the ability to hide from people.

People of this information will be shared with others can decide for themselves when and how. Otherwise, it is an ethical problem arises. The last ethical issue, access to information, includes the ability to access a person's information such as bank accounts, word documents, databases, and websites [9]. Finding ever increasing use in particular among teenagers, the internet is not only utilized to exchange information, but also as a personal means of communication. During the process of this communication, teenagers especially may display unethical behavior, either on purpose or not.

The purpose of this study was to determine the unethical behaviors of high school students in terms of internet use in the field of information technology as well as the factors that influence these behaviors.

MATERIALS AND METHODS

Setting and Sample

This study was conducted as population-based cross-sectional study. All the primary school students [n=12.939] who were part of the study's population were found in central Zonguldak province, in Turkey. Population a=0.05 and p=q=0.5 were taken thus sampling size was found as 374. The schools were randomly selected for the study. The sample group lasted from February 13th to June 30th, 2012, involving 900 students who attended five different high schools located in Zonguldak, Turkey. Total number of students at the school where the study was conducted is 900. Sampling universes equation method was used.

However 96 students were absent from school during the time of this study, 100 students refused to take part in the study, and 61 students failed to answer the questionnaire completely. Thus, we excluded them from assessment, and the study was carried out with 643 students (557 boys, 86 girls). In the data collection process, face-to-face interviews were conducted with the students in their school. During the data collection process, the purpose of the study was explained to the students either in writing or verbally.

Measurement and Instruments

We collected data by means of a "personal data form" made-up of questions about the students' personal data and an "unethical use of information technologies scale". We gave the students 15-20 min to fill out the data collection forms.

Personal Data Form

The questionnaire included 14 questions about the students' gender, age, the place where their parents live, socio-economic status of the family, the students' class, branch, and division, availability of a personal computer and internet connection. Pre-applications were conducted with 10 boys and this form was re-arranged with respect to their opinions in order to test the formats intelligibility and utility. Then, the format was finalized. These boys were excluded from the target population of the study.

Unethical Use of Information Technologies Scale

The scale we used was developed by Namlu and Odabasi in 2007 [10], and called it "unethical use of information technologies scale" for the purposes of this study. The scale is a 5-point Likert scale consisting of 80 items. We assessed each item according to following scores: "Absolutely true" [5], "True" [4], "I am not sure" [3], "Not true" [2], and "Absolutely not true" [1].

The scale has five sub-aspects, namely intellectual property, social impact, security and quality, network accuracy, and information accuracy. Items # 31, 33, 36, 38, 51, 52, 53, 60, 61, 68, 69, 70, 71, 72, and 73 refer to the factor of intellectual property; items # 40, 41, 42, 43, 44, 45, 46, 47, 50, 54, 55, 57, 64, 67, 76, 77, 79, and 80 to the factor of social impact; items # 2, 3, 4, 5, 11, 12, 13, 14, 15, 17, 18, 20, 62, and 63 to the factor security and quality; items # 6, 7, 8, 10, 22, 25, 27, and 65 to the factor network accuracy; and items # 28, 29, 30, and 34 to the factor information accuracy. The scores of the scale range between 80 and 400 points. The higher the score, the higher the unethical use of information technologies. In the study of Namlu and Odabaşı [10], the reliability coefficient was identified as 0.962, whereas Erdem [11] identified it as 0.929.

Statistical Analysis

We assessed the data by means of the SPSS 18.00 program for windows. To assess the data, we employed percentages, averages, median, frequency distributions, Chi-Square tests, Kruskall Wallis-tests and one-way analysis of variance (ANOVA) tests. After ANOVA test, we used *Post-hoc* test techniques to determine the difference between groups. Test results of $P<0.005$ have been considered as statistically significant. As a result of Kolmogorov Smirnov test the class, the division, and the branches of the distribution is not normal was observed ($P<0.05$). Therefore, in the statistical analysis of these variables Kruskall Wallis-tests test was applied.

Ethical Approval

Permission for research was obtained from the Ethics Committee of Medical Faculty of Bülent Ecevit University prior to the study (Reg. No: 2011/08-10). Application permit was obtained from the Directorate of National Education for the schools subject to the study. Subsequently, we informed the school directors and teachers about the purpose and method of research to achieve proper collaboration. In addition, we informed the students and their parents about the purpose and schedule of the research and asked them to sign an information form. The study was put into practice after having obtained the written consent of students and parents, who agreed to be part of the research.

RESULTS

The majority of the students were boys (86.6%), 49.8% of the students were girls, between 17 and 18 years old, 55.9% of the students were living in city center, 65.8% of the students had an average economic status, 31.6% of the students were in the 11th class, and 45.4% of the students were studying in the branch electronics. In addition, 70.9% of the students had own computer, and 70.6% of the students had the internet connection. The rate of students stating that they have good command of the computer, or the internet was 45.9% and 42%, respectively. The weekly internet usage time of 38.6% of the students ranges between 1 and 5 hrs, and 89.3% are capable to download files from the internet (Table 1).

The average total score was 103.70±43.71. The students scored highest in the field of intellectual property (29.16±13.89), whereas the lowest scores could be observed in the sub-aspect of security and quality (21.91±10.10) (Table 2).

There was a significant difference between the scale's social impact and class (KW: 41.16 $P<0.0001$), branch (KW: 11.78 $P=0.008$) ($P<0.01$). There was a significant difference between the scale's network accuracy and class (KW: 23.18 $P=0.006$) ($P<0.010$), branch (KW: 10.90 $P=0.012$) ($P<0.05$). There was a significant difference between the scale's security and quality and class (KW: 44.47 $P<0.0001$), branch (KW: 8.42 $P=0.038$) ($P<0.05$). There was a significant difference between the scale's information accuracy and class (KW: 28.55 $P<0.0001$) (Table 3).

There was no significant difference between the scale's social impact factor and the student's age, place of residence ($P>0.05$). However, a significant difference was discovered in terms of weekly internet usage time (F: 1.708 $P=0.001$) ($P\leq0.001$) (Table 4).

The difference between network accuracy and the student's age and place of residence was insignificant ($P>0.05$). However, a significant difference was discovered weekly internet usage time (F: 1.682, $P=0.022$) ($P<0.05$).

The difference between information accuracy and the student's place of residence and weekly internet usage time was insignificant ($P>0.05$). However, a significant difference was found in terms of the student's age (F: 1.915, P: 0.012) ($P<0.05$).

The difference between intellectual property and the student's age was insignificant ($p>0.05$). However, a significant difference was found in terms of place of residence (F: 1.429 p: 0.025) ($p<0.05$) and weekly internet usage time (F: 1.792 p: 0.001) ($p\leq0.001$).

The difference between security and quality and the student's age, the student's place of residence and weekly internet usage time was insignificant ($P>0.05$).

Tukey honestly significant difference post-hoc analysis performed in the age group 17-18, the social impact and

Table 1: Socio-demographical distribution of the students

	n	%
Gender		
Boy	557	86.6
Girl	86	13.4
Age (years)		
13-14	6	0.9
15-16	317	49.3
17-18	320	49.8
Place of residence		
Village	73	11.4
Town	211	32.8
City	359	55.9
Socio-economic status		
Bad	35	5.4
Average	423	65.8
Good	124	19.3
Very good	61	9.5
Class		
9	147	22.9
10	198	30.8
11	203	31.6
12	95	14.8
Branch		
n/a	92	14.3
Computer	211	32.8
Electronics	292	45.4
Math and Sciences	28	4.4
Medical devices	4	0.6
Electro-mechanics	16	2.5
Division		
n/a	327	50.9
Industrial repair and maintenance	75	11.7
Industrial control analysis	10	1.6
Web design	90	14.0
Installation and switchboard monitoring	40	
Audiovisual systems	8	1.2
Security systems	24	3.7
Network operation	23	3.6
Biomedical device technologies	30	4.7
Motor	16	2.5
Availability of personal computer		
Yes	456	70.9
No	187	29.1
Command of computer		
Zero	16	2.5
Low	15	2.3
Average	168	26.1
Good	295	45.9
Very good	149	23.2
Availability of internet		
Yes	454	70.6
No	189	21.4
Command of the internet		
Zero	15	2.3
Low	20	3.1
Average	138	21.5
Good	270	42.0
Very good	200	31.1
Weekly internet usage hours		
0	85	13.2
1-5	248	38.6
6-10	142	22.1
11-15	75	11.7
16 and above	93	14.5
Transfer files		
Yes	495	77.0
No	148	23.0
Download files from the internet		
Yes	574	89.3
No	69	10.7

intellectual property has been found more effective than the 15-16 age group. Again, those living in cities than those living in the village of intellectual property and social impact factors are more effective. Over 15 times in a week using the internet compered to never-users, using 0-5 hrs and 5-10 hrs using the intellectual property, social efficacy, safety, quality, integrity and accuracy of information in the network is more effective factors.

DISCUSSION

Considering the findings of the research, the average total score was found to be 103.70 ± 43.71. The students scored highest in the field of intellectual property (29.16 ± 13.89), whereas the lowest scores could be observed in the sub-aspect of security and quality (21.91 ± 10.10). The unethical behavior rate among students with regard to the use of internet is low. This might arise from the fact that most of the students have less computer knowledge since they are of low age and study at lower classes. On the other hand, it is not surprising that the students scored highest in the field of intellectual property and lowest in the field of security and quality, taking into consideration that unethical usage behaviors originate from an individual's own thoughts, intentions, and decisions; and that in society misbehaviors and false choices originate from lack of knowledge in most cases.

The study of Haines and Leonard [12] revealed that gender is the strongest factor in ethical decision-making. Erdem [11] and Genç *et al.* [13] confirmed that girl students adopted a more ethical attitude when making use of information technologies, than boy students. Cyber-bullying is considered as one of the most important problems brought along by the misuse of information and communication technologies. Cyber-bullying can be defined as the repeated, malicious use of information and communication technologies by an individual or a group to harm or harass other people [14-16]. Taking into account previous studies, it can be seen that cyber-bullying and unjust treatment are a wide spread problem. A study, which was carried out with a group who made use of the internet regularly and whose age ranged between 10 and 17, revealed that 15% of the participants were cyber-bullies, and that 14% thereof made rude comments when online [17]. Another study carried out with students at the age of 11-15 revealed that at least 7% thereof had received threat e-mails at least once [18]. Baker and Kavşut [19] and Arıcak *et al.* [20] found in their studies that cyber-bullying is more common in boy students than in a girl. Similarly, a study by Yılmaz [21] showed that the boy commit more cyber-bullying and revealed a negative relation between classical bullying and cyber-bullying. Peker *et al.* [22] asserted that increased internet addiction also led to increased cyber-bullying. In this study, no difference could be discovered between the unethical behaviors of boy and girl students with regard to the use of information technologies. It is considered that this originates from the difference between the number of students that constitute the universe and sampling of this research as well as from the fact that boy and girl students have attended the same amount of computer classes with identical content.

Table 2: Distribution of scores obtained from the unethical computer usage behaviors scale

	$\bar{\chi}$±SD	$\bar{\chi}$/number of items	Maximum	Minimum
Intellectual property	29.16±13.89	1.94±0.92	75,00	15.00
Social impact	30.86±14.36	1.71±0.79	90.00	18.00
Security and quality	21.91±10,10	1.56±0.72	70.00	14.00
Network accuracy	14.77±6,37	1.84±0.79	40.00	8.00
Information accuracy	6.98±3.63	1.74±0.90	20.00	4.00
UEBS total	103.70±43.71		295.00	59.00

UCBS: unethical computer usage behaviors scale

Studies up to the present day have shown that there is no interaction between age and ethical computer usage [11,19,23]. It can be seen that information accuracy scores differ according to the students' age and that the unethical use of information technologies is influenced by their age. It is considered that a possible reason why the results of this study differ from the results of other studies originates from the fact that the other studies focused on different age groups and that therefore the computer classes they attended were not limited to high school education.

A study by Erdem [11] revealed that students, whose families lived in a metropolitan municipality or in a city, acted more ethical when making use of information technologies, when compared to students, whose families lived in a town or village. Our study confirmed that the residence place of the students'

Table 3: Assessment of the scale's sub-aspects according to certain student characteristics

	$\bar{\chi}$±SD				
	Intellectual property	Social impact	Network accuracy	Security and Quality	Information accuracy
Branch	26.13±11.4	29.41±9.92	12.77±8.13	18.88±1.54	6.32±2.51
Chi-Square (Kruskall Wallis-H)	70.14	41.16	23.18	44.47	28.55
P	0.97	*P*<0.0001	0.006	*P*<0.0001	*P*<0.0001
Division	30.36±11.2	27.75±16.38	14.33±4.32	22.61±9.42	6.84±3.23
Chi-Square (Kruskall Wallis-H)	4.830	3.70	7.15	3.61	4.84
P	0.437	0.593	0.210	0.607	0.435
Class	28.88±15.6	28.82±13.21	16.77±6.13	19.99±11.34	5.32±4.01
Chi-Square (Kruskall Wallis-H)	5.32	11.78	10.90	8.42	5.83
P	0.149	0.008	0.012	0.038	0.120
Median	26	27	13	18	6
IQR	20	19	10	12	4

IQR: interquartile range

Table 4: Analysis of certain student characteristics

Factor	Source of variance	Age	Place of residence	Weekly internet usage time
Social impact	Between groups	15.606	33.870	144.535
	Within group	169.140	281.337	852.130
	Total	184.747	315.207	996.666
	f	0.929	1.212	1.708
	P	0.626	0.143	0.001
Network accuracy	Between groups	9.247	15.897	61.120
	Within group	175.499	299.310	935.546
	Total	184.747	315.207	996.666
	f	1.347	1.368	1.682
	P	0.120	0.114	0.022
Information accuracy	Between groups	8.922	8.682	39.894
	Within group	175.825	306.524	956.772
	Total	184.747	315.207	996.666
	f	1.985	1.108	1.631
	P	0.012	0.343	0.056
Intellectual property	Between groups	19.886	38.514	148.137
	Within group	164.861	276.693	848.529
	Total	184.747	315.207	996.666
	f	1.238	1.429	1.792
	P	0.121	0.025	0.001
Security and Quality	Between groups	12.337	29.878	84.827
	Within group	172.409	285.329	911.839
	Total	184.747	315.207	996.666
	f	0.949	1.389	0.146
	P	0.569	0.051	1.234

families has an impact on the degree they use information technologies ethically; thus delivering parallel results with the study of the previous sentence.

Certain studies have shown that online unethical behaviors increased as the number of years of computer usage and the degree of internet usage increased [13,24]; whereas other studies [25,26] reached the conclusion that the time of computer usage has no influence on an individual's moral decision-making process about ethical dilemmas associated with computer technologies. Again, a study by Loch and Conger [27] delivered significant results about women reading the e-mails of other people.

In our study, we discovered a significant difference in terms of social impact, network accuracy, information accuracy, and intellectual property according to the students' weekly internet connection time. It is considered that the commitment of unethical behaviors during the use of information technologies as the time of the students' weekly internet connection increases.

In a study on university students, Genç *et al.* [13] discovered that students with very good command of the computer displayed more unethical online behaviors. In this study, we reached the conclusion that students, who indicated to have "very good" command of the internet tended to use information technologies for more unethical purposes than those who indicated to have "zero", "low", "average", or "good" command. The findings of our study are similar to those of Genç *et al.* [13]. After all, it is obvious that unethical behaviors on the internet can only be conducted with advanced command of the internet.

Our study revealed no significant difference ($P>0.05$) between the students' intellectual property and information accuracy scores according to the class their studying at. In contrast, we discovered a significant difference between social impact, network accuracy, and security and quality scores according to classes. This might originate from the fact that the students' awareness of computer usage and the impacts thereof increases as they pass to upper classes.

CONCLUSION AND RECOMMENDATIONS

The students' unethical behavior rate in terms of internet usage is low. Along with basic computer training, teachers are supposed to raise the students' awareness with regard to ethical issues that arise from computer technologies and are of particular concern to the society, and teach them how they should act in terms of ethical problems in order to prevent the emergence of unethical behaviors among students when they make use of the internet.

This study obtained from the results, young people use the internet in unethical behavior in the emergence of prevention and identification of school health nurses in schools of education programs and student awareness of the increasing efforts made emphasizes the necessity.

The main strong point of this study was to determine the Turkish high school students used the internet for the right purpose. The most important limitation of this study was the usage of less number of girl students than boy students as test material.

In the data collection process, students were interviewed face-to-face in their school. During the data collection process, the purpose of the study was explained to the students either in writing or verbally.

Limitations of the Study

The findings of the study are limited to the province of Zonguldak in Turkey, i.e. its failure to reflect the situation in other countries/cultures constitutes the limitation of this study.

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