

A Research on Students' Information Security Awareness

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ABSTRACT

In this study, elementary and high school students' information and computer security awareness levels were investigated. Information and Computer Security Awareness Scale was developed by the researcher and it was applied to 2449 students in the schools in center of Kahramanmaraş City, towns, small towns and villages of Kahramanmaraş province. For data analysis the statistical analysis program was used. Consequently it was found that students have sufficient awareness level in terms of ethical issues. However, they have low awareness levels in terms of issues that require knowledge about rules. It can be deduced that information and computer security awareness education and related activities are insufficient. If these courses' hours can be increased, students' information and computer security awareness can be enhanced and negative effects of internet can be controlled.
Keywords: Information security, computer security, awareness level, elementary students, high school students

Öğrencilerin Bilgi Güvenliği Farkındalığı Üzerine Bir Araştırma

ÖZET

Bu araştırmada ilköğretim ve lise öğrencilerinin bilgi ve bilgisayar güvenliği farkındalık düzeyleri ortaya çıkarılmaya çalışılmıştır. Araştırma kapsamında Kahramanmaraş ili, il merkezi, ilçe, kasaba ve köylerinde öğrenim gören 2449 öğrenciye, geliştirilen bilgi ve bilgisayar güvenliği farkındalık ölçeği uygulanmış ve elde edilen veriler istatistik analiz programı kullanılarak değerlendirilmiştir. Sonuç olarak öğrencilerin etik konulardaki bilgi güvenliği farkındalık düzeylerinin yeterli seviyede olduğu bulunmuştur. Ancak öğrencilerin kurallar ve bilgi gerektiren konularda farkındalık düzeylerinin düşük olduğu gözlenmiştir. Bu da bilgi ve bilgisayar güvenliği farkındalık eğitim ve etkinliklerinin yetersiz kaldığı düşüncesini ortaya çıkarmaktadır. Eğer bu konudaki ilgili derslerin sayısı arttırılırsa öğrencilerin bilgi ve bilgisayar güvenliği farkındalıkları arttırılabilir ve bunun sonucunda internetin zararlı etkileri kontrol edilebilir.

Anahtar Kelimeler: Bilgi güvenliği, bilgisayar güvenliği, farkındalık düzeyi, ilköğretim öğrencileri, lise öğrencileri

GENİŞLETİLMİŞ ÖZET

Bu araştırma, ilköğretim ve lise düzeyinde öğrenim gören öğrencilerin bilgisayar ve internet güvenliği farkındalık seviyelerini ortaya koymayı amaçlamaktadır. Çalışmanın örneklemini, Kahramanmaraş'ta öğrenim gören ilköğretim ve ortaöğretim öğrencilerinden oluşan 2449 kişi oluşturmaktadır.

Öğrencilerinin bilgisayar kullanma alışkanlıkları ve bilgi güvenliği farkındalığı seviyelerini ölçmek amacıyla araştırmacı tarafından geliştirilen "Bilgi Güvenliği Farkındalığı Ölçeği" kullanılmıştır. Ölçeğin Cronbach's alfa güvenilirlik katsayısı 0,72 olarak hesaplanmıştır.

Araştırmaya katılanların demografik özelliklerine ait verilerin analizinde frekans değeri, cinsiyet değişkeni ile öğrencilerin bilgi güvenliği farkındalığı arasında ve bilgi güvenliği farkındalıklarının kullanım kuralı olup olmamasına göre anlamlı bir farklılık bulunup bulunmadığını belirlemek için bağımsız örneklem t testi, ve öğrencilerin yaşadıkları yerleşim yeri değişkenine ve öğrenim seviyesi değişkenine göre bilgi güvenliği farkındalığına ilişkin görüşleri bakımından anlamlı bir farklılık olup olmadığını belirlemek için tek yönlü ANOVA analizi uygulanmıştır.

Araştırmada öğrencilerin evde interneti kullanma amaçları sorulmuş önemli bir kısmı (%60,9) internete ders çalışmak amacıyla girdiklerini ifade etmişlerdir. Bu oranın yüksek bulunması veli kontrolünden kaynaklanmış olabileceğini düşündürmüştür. Öğrencilerin internet kafede interneti kullanma amaçları sorulmuş önemli bir kısmı (%45,1) internete ders çalışmak amacıyla girdiklerini ifade etmişler bunun yanında internet kafeyi oyun oynamak amacıyla kullanan (%32,7) öğrencilerin oranı da dikkat çekicidir.

Kız öğrencilerin ($X=2,67$) bilgi güvenliği farkındalığı konusunda erkek öğrencilere ($X=2,50$) göre anlamlı şekilde daha olumlu görüşe sahip oldukları belirlenmiştir.

Öğrencilerin öğrenim seviyesi değişkenine göre bilgi güvenliği farkındalığına ilişkin görüşleri incelendiğinde lisede öğrenim gören öğrencilerin bilgi güvenliği farkındalığının diğerlerine göre anlamlı şekilde daha yüksek olduğu anlaşılmaktadır.

Öğrencilerin yaşadıkları yerleşim yeri değişkenine göre bilgi güvenliği farkındalığına ilişkin görüşleri incelendiğinde ilçe merkezinde yaşayan öğrencilerin bilgi güvenliği farkındalığının diğerlerine göre daha yüksek olduğu anlaşılmaktadır.

Ayrıca evden internete bağlanan çocuklar için; internete bağlanma konusunda kural uygulanmayan öğrencilerin ($X=2,71$) bilgi güvenliği farkındalığının kural uygulanan öğrencilerin ($X=2,70$) görüşlerinin aritmetik ortalamaları arasında çok az bir fark olduğu belirlenmiştir.

Amerika Birleşik Devletlerinin ulusal bilgi güvenliği raporunda, öğrencilerin %94 ünün interneti araştırma yapmak amacıyla kullandığı ifade edilmiştir. Bu çalışmada da evden ve internet kafeden internete bağlanan öğrencilerin internete ders çalışmak amacıyla girdikleri sonucuna ulaşılmıştır. Dolayısıyla bu sonuç Amerika Birleşik Devletlerinin ulusal bilgi güvenliği raporundaki durumla benzer görülmüştür. Bu çalışmanın diğer bir sonucu da internet kafeden internete bağlanan öğrencilerin internet kafeyi oyun oynamak amacıyla kullanma oranının yüksek olmasıdır. İnternet kafelerde veli kontrolünün bulunmamasının bu duruma yol açabileceği düşünülmüştür.

Araştırmaya katılan öğrencilerin bilgi ve bilgisayar güvenliği konusundaki farkındalık düzeyleri konusunda aşağıdaki sonuçlara ulaşılmıştır. Öğrenciler, güvenli şifre kullanımı, çevrimiçi güvenli iletişim, kötücül yazılım denetlemesi yapma, belge koruma, kişisel bilgisayar güvenliği, güvenlik duvarı ve filtreleme yazılımları kullanımı, çevrimiçi arkadaş edinme ve internetin güvenli bir alan olup olmadığı konularında farkındalık düzeylerinin çok düşüktür. Yine Amerika Birleşik Devletlerinin ulusal bilgi güvenliği raporunda, çok az öğretmenin temel internet kullanım becerilerini öğrettikleri görülmüştür. Örneğin öğretmenlerin % 23 ü güçlü şifre oluşturma, %34 ü kişisel bilgileri internette kullanma ve %33 ü özel hayata saygı gösterme ile ilgili konularda öğrencileri bilgilendirdiğini belirtilmiştir. Öğretmenlerin çok azının bilgi güvenliği konusunun öğretimine önem verdiği göz önüne alındığında, bu çalışmada öğrencilerin güvenli şifre kullanımı, çevrimiçi güvenli iletişim, kötücül yazılım denetlemesi yapma, belge koruma, kişisel bilgisayar güvenliği gibi konularda farkındalık düzeylerinin düşük bulunmaması doğal görülmüştür.

Öğrencilerin, interneti sadece bir eğlence aracı olarak görmedikleri, izinsiz müzik ve program edinmenin yanlış olduğu, başkalarına ait alanlarda izinsiz işlem yapmanın sakıncalı olduğu, orijinal olmayan yazılım kullanımının sakıncalı olduğu, dosya paylaşım sitelerinin kullanımının etik olmadığı, sohbet odaları ve tanımadığı kişilerle iletişim kurmanın güvenli olmadığı, çevrim içi uygunsuz ortamlara girmenin sakıncalı olduğu konularında orta düzeyde bir farkındalık düzeyine sahip oldukları saptanmıştır. Ayrıca öğrenciler, bilgi güvenliğine ilişkin yeterli bilgiye sahip olmadıklarını

belirtmişlerdir. İnternette alışveriş yapma konusunda aileleri de dahil olmak üzere öğrencilerin internette alışverişini tercih etmedikleri görülmüştür. Aynı zamanda internet üzerinden bilerek yasadışı etkinlikler yapılmaması gerektiği konusunda öğrencilerin yüksek bir farkındalığa sahip olduğu belirlenmiştir.

Dunkels'in Children's Strategies on the Internet (2008) isimli çalışmasında da K8 düzeyindeki çocukların internet kaynaklı zararlara maruz kaldığı ve önlemlerin yetersiz olduğu vurgulanmıştır. Cyber Security Awareness da günümüz çocuklarının ailelerinden daha çok bilgisayar ve internet kullanımı bilgisine sahip olduğu ve dolayısıyla ailelerin internet kullanımıyla ilgili çocuklarına danışmanlık yapmadığını belirtmektedir. Canbek ve Sağıroğlu'nun "Çocukların ve Gençlerin Bilgisayar ve İnternet Güvenliği" isimli çalışmasında ise, ebeveynlerin yeterli güvenlik önlemlerini almadıklarından dolayı çocuklarını internetteki tehlikelerden koruyamadıkları görülmüştür. Hâlbuki Tekerek ve Mart (2010), ailelerin bu tehlikelerin çoğundan habersiz olduklarını ve buna bağlı olarak süre sınırlaması koymak gibi basit önlemler kullandıklarını belirtmişlerdir. Bu çalışmada ise öğrencilerin internete bağlanmaları konusunda ailelerin kural uygulamalarının öğrencilerin bilgi güvenliği farkındalık düzeyleri üzerinde herhangi bir farklılık oluşturmadığı sonucuna varılmıştır.

Araştırma sonucunda temel olarak öğrencilerin etik konularında yeterli bilinç düzeyine sahip oldukları gözlenirken, kurallar ve bilgi gerektiren konularda farkındalık düzeylerinin düşük olduğu belirlenmiştir. Bu da bilgi ve bilgisayar güvenliği farkındalık eğitim ve etkinliklerinin yetersiz kaldığı düşüncesini doğurmaktadır. FATİH projesi ile internetle daha çok hemhâl olacak öğrencilerin bilgi güvenliği farkındalık düzeylerinin beklenen seviyede olmaması dikkat çekicidir. Öğrencilere, öğretmenlere ve hatta velilere yönelik eğitim faaliyetleri düzenlenerek bilgi güvenliği farkındalık seviyeleri artırılabilir.

INTRODUCTION

Internet is a communication net that is valid all over the world. Its development is fast and it connects many computer systems. Additionally, internet is a technology which is related to people's demand for reaching, keeping, and sharing information. By means of this technology, people can reach information in many fields easily, cheaply, and safely (Tekerek and Mart, 2010).

With the development of computer and communication technologies and internet's catalyst effect, there is a transformation in people's working, communicating, and supplying daily needs (Fallows, 2004). Nowadays people encounter technology in early ages and they use computers frequently either for their homework or their leisure time (Shield and Behrman, 2000). Research conducted in recent years supported this situation with their findings. According to Research of Households on using Information Technology, which was conducted by State Planning Organization in April 2011, 42.9 % of households have access to internet throughout Turkey (DPT, 2011).

According to İşman and Dabaj (2006), most of the students consider internet, the fastest way for obtaining information, as an universal digital library. Radio-Television Authority of Turkey (RTÜK) conducted a research including 1719 elementary level students in 17 cities in 2006. The results have shown that many students do not have personal computers. There are only a few students who have a PC with internet connection. The findings clearly indicated that students mainly use computer and internet to play games and have fun. In addition they get support for their lessons (RTÜK, 2006). While computer and internet provide fast and effective access to information for children's schoolwork (Subrahmanyam, Kraut, Greenfield, and Gross, 2000), it carries some risks for them. In order to avoid these risks, information security awareness as a phenomenon has occurred. It means that one should be aware of the risks of internet. Some of these risks can be listed as easy access to illegal sites and sites with violence and sex contents, communication with unreliable people, child abuse and overdependence on games are some of these risks. Moreover people who seek support to illegal things such as drugs or terrorism, use internet as a means of propaganda. Another risk that was determined by Watson (2005) is psychological effects of internet on children. Thus, children who overuse computers isolate themselves from the society, lack self confidence, and have depression and social problems (Watson, 2005). In contrast, İşman and Dabaj (2004) stated that most of the students do not agree with the fact that internet prevent them to be sociable. Additionally, they consider to have friends and chatting can be easier in social network.

When literature related to information and computer security awareness is examined, it can be said that children and young are not sufficiently aware of risks of computer and internet, and they have no precautions for these risks.

In Dunkel's (2008) study named Children's Strategies on the Internet, the researcher concluded that children and young develop some strategies to these threats unconsciously. However, these precautions are not sufficient to avoid harm of the threats.

Some researchers have suggested some precautions for teenagers when they encounter the threats in internet. One of these precautions is forming rules for both children and their parents in order to not to be exposed to harmful effects of internet (Canbek and Sağıroğlu, 2008). Another precaution strategy is putting filter and control vehicle by parents who want to protect their children from these harms (Yiğit, Sıgla, Aksungur, Erbağ, and Palaz, 2007). Besides Yalçın, (2006) stated that children's and young's experiences about internet is not enough to not to affect from the risks. In order to not expose them to physical and psychological harm such as; negative behaviors including sex, violence, alcohol, cigarette, gamble and unhealthy nutrition, they can be taught about internet usage during their growing. Nowadays education systems tend to use information communication technologies widely. Thus, if using internet and computer is evaluated in general, investigation of information and computer awareness may be considered as an important tool.

The purpose of this study was determined as to reveal elementary and high school students' information and computer security awareness levels. Main research question of the study is;

"What students' information and computer security awareness levels are?"

In this context, following sub questions were examined.

Does students' information and computer security awareness level differ in terms of gender?

Does students' information and computer security awareness level differ in terms of whether there is a rule of using or not?

Does students' information and computer security awareness level differ in terms of their living place?

Does students' information and computer security awareness level differ in terms of their grade level?

METHOD

For the purpose of determining elementary and high school students' computer using habits and information security awareness levels, the survey design was used.

Survey model aims to describe the situations that are valid in the past as well as in the present and to observe and determine important things (Karasar, 2005).

The data obtained from the study were analyzed by means of statistical analysis packet program. Frequency analysis was used for the sample's demographical properties analysis. Independent samples t-test was conducted to determine whether there is a significant difference between students' information security awareness in terms of gender, and between information security awareness and whether there is a rule for children's internet usage. Additionally one way Analysis of Variance (ANOVA) was used for the analysis of whether there is a significant difference on students' views about information security awareness and students' place and education levels. The significance level was stated as 0.05.

Sample

The sample of the study was 2449 students from elementary and high school in the center of Kahramanmaraş City, towns, small towns and villages of Kahramanmaraş province. Random sampling was used as a sampling strategy. The questionnaire was applied to students under the control of their teachers. Students' demographical properties such as gender, education levels and place are given in Table 1.

Table 1. Students' Demographical Properties

	<i>Property</i>	<i>N</i>	<i>%</i>
Gender	Girl	1351	55,2
	Boy	1098	44,8
School Type	Elementary (1. Level)	694	28,3
	Elementary (2. Level)	1506	61,5
	High School	249	10,2
Place	Village	317	12,9
	Small Town	208	8,5
	Town	368	15,0
	City Center	1556	63,5

Data Collection Tool

In the study "Information and Computer Security Awareness Scale" was developed by the researcher. The questionnaire was used by the purpose of determining elementary and high school students' computer usage habits and information security awareness levels.

For mean scores of answers intervals were determined by the following formula: *Interval Width = Series Width (Range)/Number of Groups*, thus, $4/5=0,80$ (Tekin, 1996). These intervals are given in Table 2.

Table2. Scale score intervals

<i>Views</i>	<i>Score</i>
(4) Totally Agree	4,20- 5,00
(3) Agree	3,40- 4,19
(3) No comment	2,60- 3,39
(2) Disagree	1,80- 2,59
(1) Totally Disagree	1,00- 1,79

For development of the data collection tool, firstly, "Information Security Awareness Outline Scale Form" was prepared by using related literature. The outline includes 35 items. The outline was sent to 5 experts for validity analysis. Final version of the scale has 27 items. 15 items of the scale are coded as reverse items. The data collection tool has two parts, namely, students' demographical properties

and information security awareness part. At the end of the pilot study Cronbach's alpha reliability value was calculated as 0.72 which is an acceptable value.

3. RESULTS

In the study, students were asked why they use internet at home. Table 3 shows students' purposes of using internet at home.

Table 3. Using internet purposes of the students that connect to internet from their home

<i>Purpose</i>	<i>N</i>	<i>%</i>
Play	91	14,5
Listen to music	47	7,5
Chat	107	17,1
Study	382	60,9
Total	627	100,0

According to Table 3, more than half of the students (%60.9; N=382) connect to internet in order to study their lessons. This situation may be mainly due to their parents' control. 39.1% of them use internet to play, listen to music, and chat.

Additionally students were asked why they use internet at internet cafe. Table 4 shows percentages of the students for the question.

Table 4. Using internet purposes of the students that connect to internet from internet cafe

<i>Purpose</i>	<i>N</i>	<i>%</i>
Playing game	223	32,7
Listen to music	57	8,3
Chat	95	13,9
Study	308	45,1
Total	683	100,0

According to Table 4, nearly half of the students (%45.1; N=308) use internet in order to study their lessons. Additionally, 32.7 % of the students (N=223) stated that they go to internet cafes to play. These ratios may because of the lack of parents control in internet cafes. Besides 22.2 % of these students use internet cafes by the purposes of listening to music and chatting.

Table 5, Table 6, Table 7 and Table 8 shows items and awareness levels of students about information and computer security.

Table 5. Information and computer security items students undecided

<i>Item</i>	<i>X; SD</i>
I use the same password in all process that password is necessary.	(X=3,19; SD =1,40)
I know that my internet chats can be observed by other people.	(X=3,55; SD =1,34)
I do virus control when I will download folder or e-mail attachments.	(X=3,16; SD =1,55)
If there is an important document for school I save it more than one.	(X=3,06; SD =1,52)
I or my parents control whether information in my computer are safe or not.	(X=3,36; SD =1,50)
I use Firewall or Filter Software.	(X=3,06; SD =1,50)
My friends use internet for only playing and chatting.	(X=3,17; SD =1,32)
I believe internet is a safe field and my computer and information do not harm from it.	(X=2,71; SD =1,40)

Table 6. Information and computer security items students agree

<i>Item</i>	<i>X; SD</i>
I know to interrupt to others information in internet is crime.	(X=4,30; SD =1,19)
My school use programs that keep off from non suitable web sites.	(X=4,03; SD =1,45)
I can understand whether a web site is trustfull and give true information.	(X=3,52; SD =1,31)
I have some concerns about someone can take my information when I am online.	(X=3,41; SD =1,30)

Table 7. Information and computer security items that students disagree

<i>Item</i>	<i>X; SD</i>
When I am online, I am disturbed by people that I do not know.	(X=1,89; SD =1,17)
Unsuitable materials are sent to me when I am online.	(X=1,85; SD =1,14)
I have sufficient information about information security.	(X=2,37; SD =1,23)
I use internet for downloading music, program etc. from folder sharing sites.	(X=2,47; SD =1,32)
I use chat rooms.	(X=2,02; SD =1,35)
I hesitate whether to believe or not to people that I chat and their sayings.	(X=2,40; SD =1,50)
I delete or buy a program when free using time has finished.	(X=2,13; SD =1,43)
When free using time has finished I do something and go on to use it.	(X=2,04; SD =1,40)
To download free music, video or programs that are not allowed is not bad.	(X=2,25; SD =1,30)
You do not get in to trouble because of making changes in someone's web sites, since it is not real.	(X=2,32; SD =1,20)
The important thing in internet is fun. It is not important that whether the web sites I surfed are safe or not.	(X=2,10; SD =1,23)

Table 8. Information and computer security items that students totally disagree

<i>Item</i>	<i>X; SD</i>
I buy something from internet.	(X=1,39; SD = 0,89)
I bought something from internet with no permission of my parents.	(X=1,32; SD = 0,95)
I chat with people that I do not meet.	(X=1,54; SD = 1,02)
I use internet to mock people because I know it is not clear who said.	(X=1,47; SD = 1,04)

In the study, whether there is a statistically significance difference between students' gender and information security awareness was examined. Because of sample size is large enough independent sample t-test, one of the parametric tests, was conducted.

Table 9. Independent sample t-test for gender and information security awareness

<i>Gender</i>	<i>N</i>	\bar{X}	<i>SD</i>	<i>Levene Test</i>		<i>Df</i>	<i>T</i>	<i>p</i>
				<i>F</i>	<i>P</i>			
Girl	1351	2,67	0,38	3,8	0,05	2447	11,84	0,000
Boy	1098	2,50	0,35					

According to Table 9, that female students ($\bar{X}=2,67$) have more positive views than male students ($\bar{X}=2,50$) about information security awareness. There is a statistically significant difference between students' gender in information security awareness levels ($t_{(2447)}=11,84$; $p=0,000$).

Additionally students' views about information security awareness were statistically analyzed in terms of their education levels. One Way ANOVA (Table 10) was conducted for this purpose.

Table 10. ANOVA results for information security awareness according to education levels.

<i>School Type</i>	<i>N</i>	\bar{X}	<i>SD</i>	<i>Sum of squares</i>	<i>Df</i>	<i>F</i>	<i>p</i>
Elementary 1. Level	694	2,53	0,37	Between groups	11,65	2	42,74
Elementary 2. Level	1506	2,6	0,38				
High school	249	2,8	0,33	Within groups	333,41	2446	

Table 10 indicates that high school students' information security awareness are higher than other students ($X=2,8$). There is a statistically significant difference between education levels and information security awareness ($F_{(2,2446)}=42,736$; $p=0,000$). To understand which groups are different from each other Bonferroni analysis in ANOVA was conducted. As a result, a statistical difference was observed for high school students.

Furthermore, students' views about information security awareness were analyzed (Table 11) in terms of their living place by using ANOVA test.

Table 11. ANOVA results for information security awareness according to place

Place	N	\bar{X}	SD	Sum of Squares	Df	F	P
Village	317	2,53	0,37	Between groups	3,87	3	9,24
Small Town	208	2,51	0,41				
Town	368	2,64	0,35	Within groups	341,19	2445	
City Center	1556	2,61	0,37				

According to ANOVA results in Table 11, students in towns ($\bar{X}=2,64$) have higher information security awareness compared to others. There is a statistically significant difference between information security awareness in terms of living place ($F_{(2,2445)}=9,24$; $p=0,000$). To understand which groups are different from each other Bonferroni analysis in ANOVA was conducted. As a result, students in city center and town centers have more positive views compared to students in small towns and villages.

Finally whether there is a significant difference between putting a rule for children's internet usage at home and information security awareness was examined. Independent samples t-test was conducted (Table 12) for this purpose.

Table 12. T test results for the rule and information security awareness

Rule	N	\bar{X}	SD	Levene Test F	P	Df	T	P
Yes	535	2,70	0,33	5,812	,016	906	0,452	0,651
No	373	2,71	0,38					

Table 12 shows that there is a small difference between students who have no rule for internet usage ($\bar{X}=2,71$) and students who have to follow rules ($\bar{X}=2,70$) in terms of their information security awareness. This small difference is not a significant difference ($t_{(906)}=0,452$; $p=0,651$).

4. DISCUSSION and CONCLUSION

Akkoyunlu (2004) investigated 319 4th-8th grades students' preferences between computer and bicycle. The researcher concluded that most of the students preferred computer instead of bicycle. In addition students stated that everything can be easily done by computer and internet, and they can research through the internet and learn more via internet. Moreover they evaluated internet as a communication tool. Students stated that they play both educative and entertaining games and internet supports them to do their homework. Additionally, most of the students used the term "computer" as a synonym of internet and game (Cited by Gürgün, 2007). Information Technology Resource Management Council, (ITRMC) reported that 90% of the 5th-12th class students use computers. National Data Security Report of United States of America determined that children and teenagers are spending 33% of a day time by using internet.

National Data Security Report also indicated that 94% of the students use internet in order to research. In this study, it was concluded that the students who connect to the internet at home or internet cafe, use internet in order to study lesson. Therefore, these results were similar to the National Data Security Report. Another result of this study is that most of the students connect to internet at internet cafe in order to play game. It may be a result of the lack of the parental control at internet cafes.

Moreover the following conclusions were obtained about the students' information and computer security awareness levels:

Students' awareness levels are very low in terms of using secure passwords, online secure communication, making malware inspection, document protection, personal computer security, firewall and the use of filtering software, getting friends via internet and whether the internet is a safe space or not. These findings support the results of "very few teachers teach the basic skills of internet use" (NCSA, 2012) in the National Data Security Report of United States of America. For example, 23% of teachers stated that they inform students about creating a strong password. Additionally 34% of them stated that they advise students about using personal information on the internet. Besides, 33% of the teacher emphasized that they inform students related to respect for private life (NCSA, 2012). Very few teachers give importance to teaching of information security. Thus it is also an expected result that students' awareness levels are low about presence of low awareness levels of students in

using secure password, online secure communication, making malware inspection, document protection, and personal computer security.

It was concluded that the students are aware of some issues such as; accessing other's information without their permission is a crime, using internet in school is safe, the secure web sites can be distinguished while surfing on the web, and their information can be used by malicious people. However ITRMC (2011) emphasized that more than half of the 5th-12th grade students admitted that they found out online chat being safe. Further, 40% of them stated that they share their personal information on the internet.

It was determined that students do not think the internet is just an entertainment tool. However they also have a moderate level of awareness about downloading music and software without permission is wrong, making the process of others unauthorized areas is objectionable, the use of non-genuine software is inconvenient, the use of file-sharing sites is not ethical, communication in chat rooms or with strangers is not safe and entering online improper environments is inconvenient. In addition, students stated that they have insufficient knowledge about information security.

Another result showed that both students and their families do not make online shopping. Moreover, it was determined that students have high awareness level in terms of not to make illegal activities consciously on internet.

According to the results, it was concluded that female students have higher information security awareness level than male students. The regional effects of having different forms of cultivation for boys and girls can cause this situation. Additionally, students who live in city/town centers have higher level of information security awareness than students who live in small towns and villages. According to the education level of students, students who have higher level of education have higher level of information security awareness. In the study, it was also determined that high school students have higher level of information security awareness than others.

In Dunkels' study about Children's Strategies on the Internet (2008), the researcher emphasized that K-8 level children are exposed to damage from internet and precautions against these damages are insufficient. ITRMC also expressed that today's children have more knowledge about use of computer and internet than their parents. Therefore the parents cannot consult them on the use of the internet (ITRMC, 2011). Furthermore, ITRMC stated that 1/3 of the students are capable of removing internet filtering precautions. In another study namely "Children's and Teenagers' Computer and Internet Security", it was concluded that parents failed to prevent their children against internet threats due to their insufficient safety precautions (Canbek and Sağıroğlu, 2007). However Tekerek and Mart (2010) indicated that the parents were unaware of most of these damages and they use simple precautions such as time limits. In this study, it was concluded that there were no significant difference between students' internet security awareness levels in terms of there is a rule.

Moreover, it was observed that students have sufficient awareness of ethical issues. However they have low awareness levels about the rules and topics. This situation may be originated from the fact that there is insufficient education and activities related to information and computer security awareness.

In this information era, "accessing information" and "accessing internet" terms became almost synonyms. In this sense, educational institutions/schools should prepare students for necessary equipment/knowledge and skills. In this context, it is an undeniable fact that educational institutions have started to use information and communication technology with instructional technology applications. Thus they should teach students about information security awareness.

This study aimed to illuminate researchers in terms of informing students about information and computer security awareness. In Turkish Education System information technology courses are elective and only one hour in a week. If these courses' hours can be increased, students' information and computer security awareness can be enhanced and negative effects of internet can be controlled.

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REFERENCES

- Canbek, G., Sağıroğlu, Ş., (2008). Kişisel Gizlilik ve Yasal Düzenlemelere Kötücül Yazılımlar Açısından Bakış, *Kara Harb Okulu Savunma Bilimleri Dergisi*, 7(2), p. 119-139.
- Canbek, G., Sağıroğlu, Ş., (2007). Çocukların ve Gençlerin Bilgisayar ve İnternet Güvenliği, *Politeknik Dergisi*, 10(1), p. 33-39.
- D.P.T., (2011). *T.C. Başbakanlık Devlet Planlama Teşkilatı Müsteşarlığı Bilgi toplumu istatistikleri 2011*, p. 13. Retrieved from http://www.bilgitoplumu.gov.tr/Documents/1/Diger/Bilgi_Toplumu_Istatistikleri_2011.pdf
- Dunkels, E., (2008). Children's strategies on the Internet, *Critical Studies in Education*, 49(2), 171-184
- Fallows, D.(2004). *Pew Internet and American Life Project: The internet and daily life*, Retrieved from http://www.pewinternet.org/~media/Files/Reports/2004/PIP_Internet_and_Daily_Life.pdf.pdf
- İşman, A. & Dabaj, F. (2004). Attitudes of Students towards Internet, *Turkish Online Journal of Distance Education-TOJDE*, 5(4), Retrieved From: <https://tojde.anadolu.edu.tr/tojde16/articles/dabaj.htm>
- I.T.R.M.C., (2011). *Information Technology Resource Management Council Cyber Security Awareness Month Key Messages*, p. 3. Retrieved From: http://csrc.nist.gov/groups/SMA/ispab/documents/minutes/2011-10/oct26-2011_cybersecurity-awareness_BNewhouse.pdf
- Gürgün, S., (2007). *Özel okullarda öğrenim gören ilköğretim öğrencilerinin internete yönelik tutum ve düşünceleri*, (Unpublished Master Thesis), Sakarya Üniversitesi, Sosyal Bilimler Enstitüsü, Sakarya
- Karasar, N., (2005). *Bilimsel Araştırma Yöntemi*, (12. Edition), Nobel Yayınları, İstanbul.
- N.C.S.A., (2011). *National Cyber Security Alliance State of U.S. Cyber Education*, Retrieved from: http://staysafeonline.org/sites/default/files/resource_documents/Cyber%20Education%205.3.11%20PDF.pdf, 12.03.2012
- RTÜK., (2006). *T.C. Radyo Televizyon Üst Kurulu İlköğretim Öğrencilerinin Bilgisayar, İnternet, Televizyon Sahiplik ve Kullanım Durumları Araştırma Raporu*, p. 21-24. Retrieved from: http://www.medyakuryazarligi.org.tr/arastirmalar/ilkogretim_cagindaki_cocuklarin_tv_aliskanliklari.pdf
- Shields, M. K., Behrman, R. E (2000). Children and Computer Technology: Analysis and Recommendations, *The Feature of Children Journal*, 10(2), p. 3- 29
- Subrahmanyam, K., Kraut, R. E., Greenfield, P. M., Gross, E. F., (2000) The Impact of Home Computer Use on Children's Activities and Development, *Children and Computer Technology*, 10(2), pp. 123- 144.
- Tekerek, M., Mart İ., (2010). Behavioral Computer and Web Security Awareness for K8 Level, *4th Information Security and Cryptology Conference Proceeding Book*, pp: 254-258.
- Tekin, H., (1996). *Eğitimde Ölçme ve Değerlendirme*, (10. Edition). Yargı Yayınları, Ankara
- Watson, J. C. (2005). Internet addiction diagnosis and assessment: implications for counselors, *Journal of Professional Counseling Practice and Research*, 33(2), pp. 3- 29.
- Yalçın., N. (2006). *İnterneti Doğru Kullanıyor muyuz? İnternet Bağımlısı mıyız? Çocuklarımız ve Gençlerimiz Risk altında mı?* 9 - 11 Şubat Pamukkale Üniversitesi 4. Bilgi Teknolojileri Kongresi Akademik Bilişim Bildiriler Kitabı, p. 585-588, Denizli.
- Yiğit, T., Sıgla, M., Aksungur, N., Erbağ, S., & Palaz, Ü. (2007). *Çocuklar İçin İnternet Güvenliği: Bir Ebeveyn Kontrol Aracı*, 31 Ocak-2 Şubat Dumlupınar Üniversitesi 9. Akademik Bilişim Konferansı Bildiriler Kitabı, p. 45-49, Kütahya