The Relationship between Internet Addiction and Academic Success of Secondary School Students

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ABSTRACT This study aims to determine the relationship between the Internet addiction level of secondary school students and their academic performance. A qualitative and correlational research model was used to analyze the data. Participants in the study were 10th, 11th and 12th graders from nine secondary schools in Istanbul, Turkey, totaling 1,302 students. A personal information form and an Internet Addiction Scale were used as data collection tools. In addition, students' academic grades were provided by school managements and added to the personal information forms. Based on the results, it was found that Internet addiction had an effect on the academic achievements of students. It was found that as the academic success of the students deemed academically successful (45 and up in terms of grades) increases, their Internet addiction averages decreases. In addition, the average Internet addiction levels of male students, vocational school students and verbal field students were determined to be higher than more academically successful students.

INTRODUCTION

With widespread access to the Internet, needs in communication, banking, education and others areas can now be satisfied independent of time and location. While making our life easier, the Internet has also caused various kinds of problems when used without awareness (Muslu and Bolisik 2009). In other words, when the Internet becomes the center of life, it affects the lives of humans negatively and causes the problem of addiction (Karaman and Kurtoglu 2009). Internet addiction is one problem related to the use of information and communication technologies (Ahmadi et al. 2014). Studies have used a variety of terms to describe unhealthy interactions with the Internet such as" Internet Addiction" (Young 1996), "Pathologic Internet Usage" (Davis 2001) and "Internet Behavior Addiction" (Wang 2001). Although researchers use the term differently to some extent, "Internet addiction" appears to bethe most common.

Internet addiction includes not resisting the impulse to spend time on the Internet and not feeling the importance of time without Internet. The Internet addict tends to be very nervous and aggressive, thereby damaging relationships at work, and in family and social life (Young 1996).

According to Arisoy (2009), children and young adults are most at risk for Internet addiction in Turkey. According to Information Community Statistics (DPT 2013), the age range for the highest Internet usage is from 16 to 24. In 2012, Turkey established the Information and Internet Research Commission to analyze the effects of Internet usage on children, young adults and Turkey's family structure (TBMM 2012).

Social networking—which is used for spending time, keeping up with the latest news, and playing games—is becoming an indispensable part of our daily life. According to research conducted by Ofcom (2008), social networks were used by young people between ages of 16 and 24 and these networks were used for checking messages. However, they used the networks for other purposes at first. Cengizhan (2005) stated that excessive use of the Internet by school-age young people may negatively influence them psychologically, physically and socially and this may affect their academic success negatively. Internet addiction researchers particularly focus on time spent on the Internet (Kubey et al. 2001; Niemz et al. 2005; Young 1997, 1999). The studies show that Internet addicts cannot control the time they spend on the Internet, they spend more time on the Internet than those people who are not Internet addicts, and there is a clear relation-

ship between the time spent on the Internet and Internet addiction (Cengizhan 2003; Günüç 2009). One of the reasons people are spending more time on the Internet is due to social networks such as Twitter and Facebook. Moreover, the number of social networks has increased. These are websites where young people spend more time and cannot keep the time spent under control (Kaya 2011). It can be concluded that uncontrolled use of social networks may directly or indirectly increase Internet addiction. Moreover, it appears that uncontrolled use of social networks and the Internet can result in problems for children and teenagers in terms of their academic success and time management. There are various scales and approaches to measure whether individuals are Internet addicts. For instance, Young (1996) created a special form to measure Internet addiction; Cengizhan (2005) created a testinvolving statements that can measure the degree of Internet addiction. In his Internet addiction test, Young (1996) takes into consideration the following criteria:

- Internet-related excessive preoccupations (for example continuously thinking about the Internet, dreaming about the activities that can be done through the Internet, thinking about the next activity on the Internet, etc.)
- Feeling the need to use the Internet more for satisfaction; unsuccessful attempts to get Internet usage under control, to reduce usageor to completely quit using the Internet.
- Feeling anxiety, depression or anger when there is a reduction or permanent discontinuation of Internet access.
- Spending more time on the Internet than originally planned.
- Experiencing problems with family members and friends, at school and at work because of excessive use of the Internet; jeopardizing or losing an educational or a career related opportunity.
- Lying to others (family, friends, therapist, etc.) about the time spent on the Internet.
- Using the Internet to escape problems or negative emotions (for example, helplessness, guilt, depression and anxiety).

The criteria Young (1996) recommended to diagnose Internet addiction are useful since they are based on behavioral addiction and can be tested with experiments. In research studies on Internet addiction, Young's criteria have been used or benefited for creating question lists (Mikowski 2005). In the literature, it is claimed that negative cognitions similar to depression can play a role in Internet addiction and this addiction emerges as a behavior pattern for the purpose of compensating for an individual's the failure in a number of areas of life. Young (1999) suggested that banning the use of the Internet for the cognitive-behavioral treatment of Internet addiction is not an appropriate solution to the problem since the Internet is an indispensable in many areas today; the solution to the problem is to bring Internet use under control. In other words, uncontrolled use of the Internet causes Internet addiction rather than controlled use of it over a long period of time. Arisoy (2009) summarized the cognitive-behavioral techniques that are used for the treatment of Internet addiction as follows:

- Using the Internet at different times rather than usual times.
- Using external stoppers.
- Setting targets about Internet use.
- Trying to avoid the use of the Internet-specific activities.
- Using reminders.
- Keeping a notebook to write other things that one wishes to do instead of using the Internet.
- Joining a support group.
- Family therapy.

More strict precautions should be taken when the first three items related with basic time management techniques listed above do not help to stop Internet addiction. In such cases, the aim of the treatment is to reinforce the individuals and to help them develop a variety of coping strategies for overcoming the problem of Internet addiction.

Parents initially thought of the Internet as an educational tool that could create opportunities for their children. Therefore, they felt they needed an Internet connection at home. However, parents have soon realized that their children were using the Internet for purposes other than educational ones. Çelen et al. (2011) found that children were using the internet for entertainment such as watching video clips (59%), playing games (49%), posting or reading on the social networks (40%), and downloading music and/or movies (40%). Individuals spent long hours on the Internet for a variety of purposes (Durak et al. 2011). Because no strict precautions were taken to manage the use of the Internet, the Internet

gradually became a problem for children and teenagers, who do not have sufficient awareness of the harmful aspects of the Internet. Researchers believe that the best supervision starts within the family, so parents' knowledge and awareness level about the use of computers becomes important.

The Turkish Ministry of National Education (MoNE) decided to give every school Internet with the Internet Access Project between 2004 and 2007. Starting in 2010, the ministry started to give tablets and PCs to students through a project called Increase Opportunities and Improve Technology Project, or FATIH (Alkan et al. 2011). The project enabled students to connect to the Internet with free Wi-Fi.

Purpose of the Study

Since the Internet is available to most of the students, it's important to analyze the relationship between Internet usage and academic success. Thus, the researchers aim to determine the Internet addiction levels of secondary school students and examine the relationship between students' Internet addiction levels and the following:

- gender,
- school type,
- school field type,
- grades,
- internet usage,
- academic achievement levels.

METHODOLOGY

Research Model

A descriptive and correlational data analysis model was used in this study. A descriptive data analysis method aims to make distinctions based on the nature of data and to summarize the data obtained from different sources. On the other hand, a correlational model aims to investigate the relationships and connections between data obtained from different sources (Buyukozturk et al. 2011). The current study, which aims to investigate the relationship between academic success and the Internet addiction levels of secondary school students, represents descriptive features in essence. As in all descriptive studies (Karasar 2011: 77), this study aims to describe events, participants and objects as peculiar to their own conditions.

Study Group

The study group consisted of 1,302 randomly selected students in the 10th, 11th, and 12th grades of secondary schools located in the European side of Istanbul, Turkey. These secondary schools consist of five Anatolian high schools, two vocational schools and two general high schools in terms of types. Note that the difference between Anatolian high schools and other high schools is that in Anatolian high schools the formal language is English. The participants were divided into three groups in terms of their major fields of study: verbal (taking mainly social studies courses), numerical (taking mainly mathematics and sciences courses), mixed (taking social studies and mathematics courses, and very limited science courses). Their percentages were 21.4, 41.0, and 37.6, respectively. The reason for the exclusion of the 9th grade students from the study was that those students' fields of study (for example, verbal, numerical) were not known.

Table 1: Demographic characteristics

Parameter		Options	F %
Sex	Female	664	51.0
	Male	638	49.0
	Sum	1302	100.0
School	Anatolian High School	794	61.0
Type	Vocational High School	265	20.4
	General High School	243	18.7
	Sum	1302	100.0
School	Verbal	278	21.4
Field	Numeric	534	41.0
Type	Mixed	490	37.6
	Sum	1302	100.0
Class	10th Grade	477	36.6
	11th Grade	545	41.9
	12th Grade	280	21.5
	Sum	1302	100.0

As seen in Table 1, there was a balance in the distribution in terms of gender of students. Although the number of participants from vocational school and general school was seemingly low, the balance of the distribution was not affected negatively since the overall sample size of the study was large. In terms of the grades of the participants, the percentages were 36.6 percent for 10th, 41.9 percent for 11th, and 2.5 percent for 12th grades, respectively.

Data Collection Tools

Two types of data collection tools were used in this study: A personal information form and

the Internet Addiction Scale. In addition, individual's average academic performance was obtained from schools' administrations and added to the personal information forms.

Personal Information Form: This form is created specifically to determine the general characteristics of the students and to gauge the effects on the other variables in the study.

Internet Addiction Scale: The five-dimensional scale used in this study was developed by Young (1996) and includes 20 items in Likertype. The translation of this scale was done by Bayraktar (2001) and its Cronbach's alpha was 0.91 (Bayraktar 2001, cited in Esen and Siyez 2011). The scale was used after two experts from the field of Computer and Instructional Technologies and one professor from the department of Turkish Education analyzed the scale in terms of its scope and validity and language. Three items in the scale was re-written based on the sample population of the current study. The Cronbach's alpha value was found to be 0.89 for the current study. In the analysis process of the results of the Internet Addiction Scale, the criteria shown in Table 2 were used.

Table 2: Internet addiction scale value interval

Point interval	Addiction level
20-49	Average user
50-79	More than average
80-100	Internet addict, needs treatment

Data Analysis

After administering the questionnaire, the information obtained was transferred to a computer and students' academic performance were obtained from the administrations of the schools and added to the personal information forms. The data was analyzed by statistical data solution programs. Frequency, percentage, mean and standard deviation were used in a descriptive analysis of the data. Among the variance and post-hoc analysis, for correlational analysis, the two groups were compared by independent samples t-tests. Tukey test in the case of equality and Tamhane test in the case of difference for comparing more than two groups were used. The significance level was taken as .05 from the analysis of data.

FINDINGS

This section of the study investigated the relationship between Internet addiction and variables such as students' academic performance, gender, time spent on Internet use, and school types.

Analysis of Comparisons Gender and Internet Addiction Levels in Secondary School Students

t-test was used to determine the Internet addiction level of the students in terms of their gender.

Table 3: t-test according to gender of the students

Gender	N	x	ss	t	sd	p
Female	664	37.57	12.81	-5.8981277		.000
Male	638	41.98	14.10			

As depicted in Table 3, a significant difference was found in the Internet addiction level of students in terms of gender (t=5.898; sd=1277; p<0.05). The total average Internet addiction levels of male students were X=41.98 and females X=37.57. This shows that the averages for male students were higher than for the female ones. However, both groups displayed an average Internet addiction level. Based on these results, it can be concluded that Internet usage of male students in particular should be kept under control.

Analysis of Comparisons between School Types and Internet Addiction Levels in Secondary School Students

Based on the homogeneity test, the p value was determined as .191, which is higher from 0.5. Variance analysis was conducted to determine the difference in the Internet addiction scale in terms of three school types: Vocational high school, general high school, and Anatolian high school.

Significant differences were found in the Internet addiction levels of students in terms of school types, $F(2, 1299)=6.658, p< .05$. Since homogeneity was seen in the variance analysis, the Tukey test was used for comparison. As seen in the Table 4, significant differences were found in the Internet addiction levels of students in vocational high schools ($\overline{X}=41.84$) and general high schools ($\overline{X}=37.44$). Based on these results, it can be concluded thatInternet use by students of vocational high schools should be kept under control.

Table 4: Variance analysis of internet addiction level of students in terms of school types

School type	N	x	ss	F	p	Difference
Anatolian High School	794	39.72	13.55	6.658	0.001	General High School and
Vocational High School	265	41.84	14.18			Vocational High School
General High School	243	37.44	13.00			
Sum ($\bar{x}$)	1302	39.73	13.64			

Analysis of Comparisons between Field Types and Internet Addiction Level of Students in Secondary School

Based on the homogeneity test,the p value was found to be 0.015, which is lower than 0.05. Because of this, the Tamhane test, which is used when variance analysis is not homogeneous, was used. Variance analysis was conducted to determine differences in the Internet addiction levels of students in terms of field variance.

As seen in Table 5, a significant difference was found between the Internet addiction level of students in terms of numerical and verbal fields in the variance analysis, $F(2, 1299)=4.140, p< .05$. The difference can be clearly seen when the arithmetic averages are considered. Based on these results, it can be stated that the Internet use of students inthe field such as social studies and history should be kept under control.

Analysis of Comparisons between Grades and Internet Addiction Level of Students in Secondary Schools

The variances were homogeneous since the p value was found as 0.097, which is higher than 0.05. The researchers conducted a variance analysis to determine the Internet addiction level of students in terms of grades.

Based on the variance analysis results seen in Table 6, no significant difference was found in the Internet addiction levels of students in terms of grades. However, it was determined that as the grade level increased, the Internet addiction level of students decreased. Based on these results, it can be stated that grade level may not

Table 6: Variance analysis in terms of grades of students

Class level	N	x	ss	F	p	Difference
10th Grade	477	40.71	14.37	2.625	0.073	-
11th Grade	545	39.55	13.46			
12th Grade	280	38.40	12.58			
Sum ($\bar{x}$)	1302	39.73	13.64			

acceptable as an indicator of Internet addiction level.

Analysis of Comparisons between Internet Usage and Internet Addiction Level of Students in Secondary Schools

One way analysis of variance was used to determine how Internet addiction levels of students change according to daily Internet use. Based on the homogeneity test, the p value was determined to be .000 which is lower than 0.5, meaning that variances were not homogeneous. The researchers conducted the Tamhane test, which is used when variance analysis is not homogeneous.

Based on the analysis of variance tests, no significant difference was found between daily Internet use and Internet addiction level of the students, $F(4, 1297)=130.673, p<.05$. As seen in Table 7, as the daily Internet usage time increases, the addiction level of students increases proportionally. The striking finding related to the relationship between daily Internet use and the Internet addiction level of students is that Internet addiction is of average level (x=20-49) when the Internet is used for up to three hours daily but it is higher than average (x=50-79) when it

Table 5: Variance analysis in terms of school field types

School type	N	x	ss	F	p	Difference
Verbal	278	41.28	14.94	4.140	.016	Verbal and Numeric
Numeric	534	38.53	12.96			
Mixed	490	40.16	13.50			
Sum ($\bar{x}$)	1302	39.73	13.64			

Table 7: Varianceanalyze results of daily internet use

Daily Internet use	N		ss	F	p	Difference
Less than 1 hour (a)	532	33.47	10.02	130.673	.000	(a)-(b), (a)-(c), (a)-(d),
1 - 3 hours (b)	538	39.92	11.99			(a)-(e), (b)-(c), (b)-(d),
4 - 6 hours (c)	157	51.02	13.60			(b)-(e), (c)-(e)
7 - 9 hours (d)	32	56.31	12.32			
More than 9 hours (e)	43	61.20	14.16			
Sum ($\bar{x}$)	1302	39.73	13.64			

exceeds four hours. Based on this finding, it can be stated that the Internet use by students of more than three hours per day should be kept under control.

Analysis of Comparisons between Academic Success Grades and Internet Addiction Level of Students in Secondary Schools

Analysis of variance was used to determinethe relationship between the academic grades of students and Internet addiction levels. Based on the homogeneity test, variances were found to be homogeneous since the p value was 0.727, which is higher than 0.05.

As seen in Table 8, a significant difference was found between fail and pass academic averages in terms of the Internet addiction level of students, $F(4, 1297)=2.712$, $p< .05$. Because of the homogeneity of the variances, the Turkey test was administered. It was determined that as the academic grade averages of students regarded as successful (45 points and over) increased, their average Internet addiction levels decreased. Based on this finding, it can be stated that, forparticularly for students who have *failing* academic points, Internet use of more than three hours a day should be kept under control.

DISCUSSION

In this study, the relationship between the academic success of secondary school students and Internet addiction levels was investigated in terms of various variables including gender, grade, school type, and time spent using the Internet. There are three levels in the Internet Addiction Scale as developed by Young (1996): average (20-49 points), above average (50-79 points), and Internet addict (80-100). Based on the data obtained from 1,320 students in the study, the majority (78.6%) were found to score at the average level, while 20.2 percent was above average, and 1.2 percent scored at the Internet addict level. The finding that the majority of the participants were on the average was considered as positive. In a study (Durak-Batigün and Hasta 2010) conducted on teenagers between 17 and 27 years of age, it was found that 14 percent were Internet addicts; these finding are very similar to those of this current study. The researchers also found that the internet addiction level of male students was significantly higher when compared to that of females. Similarly, several studies (that is, Gökçearslan and Günbatar 2012; Zorbaz and Dost 2014) found that male high school students' average Internet addiction points were higher than those of females. In another study on Internet addiction among teenagers, Esen and Siyez (2011) found that males were addicted to the Internet more often than females, which once again is consistent with the results of this study. In addition, studies conducted of teacher candidates (Çakir et al. 2008; Kurtoglu and Kurtoglu 2009) have found that male teacher candidates' addiction levels, on average, were higher than that of female candidates.

Table 8: Variance analyze results of academic success level

Average academic success	N		ss	F	p	Difference
1-44 point (fail)	9	39.22	10.21	2.712	.029	Between pass and average
45-54 point (pass)	171	42.64	14.03			
55-69 point (average)	671	39.68	13.66			
70-84 point (good)	405	38.88	13.58			
85-100 point (perfect)	46	37.33	11.70			
Sum ($\bar{x}$)	1302	39.73	13.64			

The averages of vocational high school students in terms of Internet addiction were significantly higher than those of the general high-school students. Ceyhan (2011) pointed out that students in vocational high schools had higher Internet addiction level than ones in general high schools and Anatolian high schools. In Turkey, students who continue on to general or Anatolian high schools must show a greater performance in the high school entrance exam while students who have lower scores on this exam attend vocational high schools. According to both Ceyhan's study and this current study, it is clear that the academic success rates of the schools and the Internet addiction scores of their students were negatively correlated.

The averages of verbal field students are significantly higher than the students in numerical field students in terms of internet addiction scores. The researchers can utter similar situation about the negative correlation between success of the schools (or students) and internet addiction scores as Ceyhan (2011) stressed since numerical field students are obviously more successful than verbal field students in Turkey.

In the current study, the connection between students' academic performance and their internet addiction level was also examined. According to the results, as students' academic achievement increased, the Internet addiction scale scores decreased for those students who had grade of 45 and over. More specifically, students with lower academic performance (grades between 45 and 54) were more addictive to the Internet comparing with other students who had higher grades (between 70 and 84). Similar results were found by Esen and Siyez (2011).

Based on the comparison of students' grade levels and Internet addiction scores, no significant differences were found. However, although non-significant, as the grade levels increased, the Internet addiction level of students got decreased. Similarly, Ceyhan (2011) found that first and second grade students had higher Internet addiction scores than third and fourth grade students. Yilmaz et al. (2014) also demonstrated that the students in higher grades of high schools had lower Internet addiction scores. A possible explanation for such results might be due to the university entrance exam that is administered at the end of the fourth year of high schools in Turkey. In general, through the end of the last years of high school, students start focusing on that exam so they may limit their social activities including their Internet use.

Finally, the researchers found significant differences in terms of Internet usage time. The increase in the Internet usage time caused a significant increase in the Internet addiction level of the students as expected. For instance, Young (2007) indicated in her study that people who use the Internet more than 40 hours in a week tend to become Internet addicted. This finding is also consistent with the studies in the literature (Cakir et al. 2008; Durak et al. 2011; Karaman and Kurtoglu 2009; Yilmaz et al. 2014).

CONCLUSION

For the purpose of determining the relationship between the Internet addiction level of high school students and several variables including students' academic performance, gender, school type, and the time of their internet use, the researchers collected data from 1302 students from nine schools through two data collection tools; personal information form and Internet Addiction Scale. The researchers found critical negative correlation between students' academic performance and their internet addiction scale scores. Although the researchers have not focused on how students use Internet in their daily lives, they can clearly claim that the excessive use of Internet, even if it is not at addictive level, are negatively correlated with the success of students. Decrease in internet addiction scores as grades got higher indicates that students seem systematic study habits throughout their high school education. Thus, the researchers can conclude that students may not give priority to academic success during their first years of schools and use internet as a part of their social activity instead of a supportive medium to their courses. It can also be inferred from results that female students have stronger self-control mechanisms than male students do based on their internet addiction scale scores. Thus, male students have more likely to be subject to the negative effects of Internet than females.

RECOMMENDATIONS

Today, the Internet use has become an indispensable part of all fields including education. It is clear that in a seemingly small world, uncontrolled use of the Internet causes problems for

people, teenagers particularly are at risk. Therefore, their use of the Internet should be kept under control and they should be guided to use it for specific purposes that are beneficial to their education and lives. To achieve this, all related institutions and people witha role indecision-making processes should take the responsibility to provide safe use of the Internet, particularly for the teenagers who are more vulnerable to the negative effects. This current study conducted on a large sample size of students should be replicated in different regions and with different educational levels such as elementary schools and universities. Moreover, studies could also be conducted at the same educational level to compare results.

Based on the results of the current study, if average Internet usage is not to evolve into Internet addiction, daily time spent on the Internet should be limited to three hours or less. In this regard, psychological counselors, guidance teachers and ICT Teachers in educational institutions should ensure students and their parents are informed of the risks of spending too much time on the Internet. Internet usage of male students, vocational school students, students whose major are in social studies, and students whose academic grade point average is between 45 and 54 should be monitored cautiously. At this point, the collaboration and co-operation of parents and teachers are of great importance.

NOTE

This study is based on a portion of a master's thesis written by the second author.

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