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Analysis of the Relationships between School Children's Technology Addiction and School Achievement

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Abstract

In this study, the relationship between gaming, social media and internet addiction, which are within the scope of technology addiction, and school achievement and study behavior was examined. The sample of the study consisted of 240 students studying in grades 5-8 of 4 schools in Almaty, Kazakhstan. The study was designed in the comparative relational survey model and is descriptive in nature. In the study, a questionnaire was used as a data collection method. In this context, "Internet Addiction Scale", "Digital Game Addiction Scale", "Social Media Addiction Scale" and "Study Behavior Scale" were used in the research. T and F tests were used in the analyses made with SPSS 26.0 program. As a result of the study, it was determined that the technology addictions of the students participating in the research differed in terms of gender and grade level variables. In the study, social media addiction of female students was found to be high, while digital game addiction was found to be high in male students. It was also observed that technology addiction increased as the class level increased. Finally, students with low achievement and study behavior levels were found to have high technology addictions.

Introduction

Success is defined as achieving the desired result, reaching the targeted goal, reaching the desired level. When we think in terms of education, success is a set of behaviors consistent with the program objectives. In other words, a student can be considered successful if he/she exhibits the behaviors intended in the program. School achievement is defined as the student's progress in achieving the results determined according to the school, class and courses (Duckworth & Carlson, 2013; Sharif & Sargent, 2006). As understood from the definitions, a student can be considered successful if he/she demonstrates the attitudes towards the goal in his/her plan. However, the contemporary definition of success is not limited to academic achievement. Success includes cognitive behaviors as well as non-cognitive behaviors such as character qualities, interests and attitudes. It is an important mistake to see success only as school achievement. For this reason, it is possible to see success in many forms in life. Success is grouped as family life success, social success and academic achievement (Chung & Nam 2007; Marrero, 2016).

A student's academic achievement is influenced by many internal and external factors. The student's own characteristics (self-confidence, intelligence, personality, gender, interest, etc.), family (parents' education level, income level, value of education, participation in education, etc.), study habits and school factors (school environment, school climate, teacher behaviors, etc.) can increase or decrease academic achievement (Balci & Sünbül, 2015; Erickson, 1987; Garrett, Antrop-González & Vélez, 2007). It has also been found that general ability is the most important determinant of academic achievement and is directly or indirectly related to psychological processes such as academic self-efficacy, academic self-concept and student engagement (Dadandı, 2017). Studies have confirmed that there is a relationship between increased screen time and decreased reading and homework time and that it strongly affects poor school performance (Liu & Cavanaugh, 2011; Sharif & Sargent, 2006). As a matter of fact, internet and technology addiction has led to serious changes in students' study habits and academic performance (Wright, 2011).

In addition to being an important information and communication tool in our lives, the Internet also includes many activities that can be done at work and at home. This effective tool has negative as well as positive aspects. Some of the negative aspects are hosting insecure information, information overload and information discrimination. Internet addiction and cybercrimes are among the serious problems caused by the internet (Kayri & Günüç, 2010; Koc & Tanrikulu, 2021; Tarafdar et al., 2020; Tukul, 2020). In addition, there is no definition of pathological internet use or internet addiction in the recently published Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013).

Today, technology has become a part of every person's life with the introduction of smart phones, as well as the presence of computers and the internet in almost every home and office (Aslan, 2011). Computer, internet and video game addictions have an important place among these phenomena. These new types of addictions, which have been the subject of numerous studies in recent years, are considered as 'technology addictions that develop depending on behavior' (Jamir et al., 2019). The fact that the use of technology has become an indispensable activity for people brings along the problem of behavior addiction (Agarwal & Kar, 2015; Wang, Sigerson & Cheng, 2019). Griffiths (1996) describes technology addiction as a behavioral addiction involving the interaction of machines and people. In technology addiction, stimuli such as television keep the person passive, while stimuli such as computer games provide active participation, and all technological devices contain reinforcing and triggering features such as sound effects, interesting colors, and rewards that increase addictive tendencies.

Taking into account the teaching processes of students, Griffiths (2005) categorized technology addiction as "social network addiction", "instant messaging addiction", "online game addiction" and "websites addiction". In our study, "social network addiction, online game addiction, instant messaging addiction" types were used. Social network addiction can be limited as the use of platforms such as Facebook, Instagram, Twitter, LinkedIn, Youtube, where users create their individual profiles, communicate with their friends, and make friends in common interests (Kuss and Griffiths 2011). Online game addiction is based on the use of web-based and entertainment-oriented applications of multi-user virtual environments, which are carried out on electronic networks and have a wide network ranging from simple text-based games to games with complex graphic designs (Gao, 2005). Instant messaging addiction, on the other hand, involves the use of one-to-one communication tools based on the chat

model of multiple components such as e-mail, chat rooms, telephone, and voice messages (Chung and Nam 2007).

The development of technology has made it possible to play digital games with tools such as tablets, consoles, cell phones, and televisions as well as computers, and has enabled people of all ages to access these tools very easily (Bati & Workneh, 2021). According to Hazar, Mamak and Cinar (2015), the fact that the negative effects that such a situation may cause are not sufficiently understood by the society and that children can easily access the game tools and play uncontrollably causes children to become addicted to digital games day by day. With these developing situations, it is seen that children who spend most of their time with technological devices prefer games in a virtual world where life skills are not gained in a scenario where the person is not active in a digital environment instead of games where the individual is active in real life. The child, who is not physically involved in the game during the time spent, remains inactive for hours, and it is thought that human beings, who are created completely movement-oriented, are naturally negatively affected by this inactivity (Gómez-García et al., 2020). For this reason, in this study, in order to determine some of the negativities that digital game addiction may cause academically and physically in middle school students and to inform families about this issue, the question "Is there a relationship between digital game addiction and some physical parameters and academic achievement in middle school students?" was sought and the results were evaluated (Gómez-García et al., 2020; Navarro-Martinez & Peña-Acuña, 2022).

Technology addiction leads to experiences that negatively affect the physical and mental health of the person and subsequently cause problems in family, school, work and social life. It can be said that the behavior that causes addiction in technology addiction has mostly stimulating and reinforcing features. Technology addiction is a disease that starts with individuals losing control over the frequency of using these devices and the internet, which causes pathological disorders in time and should be treated with a specialist. Technology serves the purpose of facilitating human life only when it is used consciously. Today, with the developing technology and the active use of this technology, many changes, developments and conveniences have been provided in our lives (Cerniglia et al., 2019; Chine, 2022; Haand & Shuwang, 2020; Lumbre, Beltran-Joaquin, & Monterola, 2023; Oskembay et al., 2015).

Research shows that males play digital games more intensively than females. Ko et al. (2005) stated that the practice of playing online games is more common among male adolescents than among females, and that game addiction is also higher in males than females. The fact that games are generally produced by men and for men and therefore mostly contain a masculine image, the fact that women stay away from games that contain violence and aggression, the fact that men get higher scores in games and the desire to continue playing are seen as reasons that push men to play games more than women (Griffiths & Davies, 2005).

In a study, the academic performances of the clusters that emerged in terms of technology addiction and digital game playing behavior were examined with three variables. In the first one, the groups were compared in terms of study time and it was statistically revealed that addicts and candidates studied for less time compared to the conscious ones. A similar situation was found for the general academic average and a statistically significant difference was found between the groups. In terms of game playing behavior, all groups differed statistically from

each other and the grade point average decreased as the level of addiction increased. These findings are not surprising and add to similar findings in the literature (Anderson & Dill, 2000; Anand, 2007; Wright, 2011). As the third academic performance variable, the participants were asked to compare their achievement with their classmates. Although the subjective evaluations of the participants in the study were below the general average in addicts and above the general average in conscious participants, no statistical difference was found between the groups. For the practitioners, these findings clearly show that game addiction reduces study time and academic achievement, while the addicts do not want to accept this situation or are not aware of this situation. In a study (Elmas et al., 2015) examining the possible effects of the usage habits of technological devices on school achievement, it was stated that long-term gaming negatively affects school achievement and that the duration of gaming should be shortened to increase school achievement.

In this period, which we can call the age of technology, computer and internet use have become indispensable tools of life. Although the main purpose of the internet was to increase communication and facilitate the sharing of information, the rapid spread of the internet has begun to lead to pathological overuse and internet addiction, which can be described as a new type of addiction (Haand & Shuwang, 2020). Our country constitutes a suitable ground for this newly defined disorder, especially due to its high youth population, being a newly developing country, widespread internet use, unemployment and uncontrolled proliferation of internet cafes. In Kazakhstan, the problem of internet addiction is more common in young people and children who are more familiar with this technology, and families are now looking for centers that can treat this disorder due to the problems caused by their children's internet use (Berdibayeva et al., 2016; Oskembay et al., 2015; Zhatkanbaeva et al., 2021).

According to Young (1999), who first introduced the definition of technology addiction and created the first diagnostic criteria, the internet is addictive just like gambling and internet addicts show various symptoms of impulse control disorder. Young adapted the diagnostic criteria for pathological gambling to pathological internet use and created and published the first serious diagnostic criteria for "internet addiction" based on the fact that those with pathological internet use have a behavioral impulse control disorder and that this impulse control disorder does not involve the intake of a chemical substance (Greenfield, 1999; Hawi & Samaha, 2019; Young, 2007).

Block (2008), in his article on internet addiction in DSM-V, stated that internet addiction is a compulsive-impulsive spectrum disorder consisting of at least three subtypes including excessive gaming, sexual preoccupation and e-mail messaging with online or offline computer use; and that there are four follow-up components in all forms. Young (1999) states that Internet addiction has negative consequences that cause family, economic and occupational problems. Young (1999) suggested that internet addiction is a broad term that covers a wide range of behaviors and impulses by categorizing it with five specific subtypes.

- Cyber-sex addiction: Impulsive use of adult cybersex and porn sites,
- Cyber relationship addiction: Excessive involvement in online relationships,
- Network impulses: Obsessive online gambling, shopping or day trading,
- Over-information: Excessive web surfing or database searching,
- Computer addiction: Obsessive computer game playing.

Especially with the developments in computer and internet technology, individuals in many parts of the world have started to communicate with each other more intensively and have the opportunity to access the information they want very quickly (Chayko 2008, Horzum, Ayas & Cakir-Balta, 2008). However, these advances have led to the emergence of new problem areas (Nazir & Piskin 2016). While this problem first appeared as computer and game addiction (Grusser et al. 2006, Wehmeyer, 2007), social media addiction has recently been added to other types of addiction with the development of various social networking tools (Facebook, twitter, Instagram, etc.) (Andreassen et al. 2012; He et al. 2017; Malita 2011; Oberst et al. 2017; Zhao, 2021). In this context, social media addiction, digital game addiction and internet addiction come to the fore within technology addiction.

Social media addiction is characterized by symptoms such as being constantly preoccupied with it, using it to get rid of negative emotions, using it in increasing amounts, having withdrawal symptoms when social media use is prevented, disruption of responsibilities due to social media use or disruption of functionality in other important areas of life due to social media use, and loss of control in social media use (Andreassen, Pallesen, & Griffiths, 2017). Considering all these symptoms, it can be said that social media addiction can have very serious repercussions for a student. School failure, school absenteeism, deterioration of social relations, and problems with the family are some of these problems. Although digital game addiction has not yet been recognized as a disease by current diagnostic systems, this concept has been in the scientific literature for more than thirty years (Soper and Miller 1983). Especially in recent years, the increase in applications to psychiatric clinics due to the problems it causes, families' search for support and solutions, the evidence put forward by researchers and prevalence rates have increased concerns (Griffiths and Meredith 2009, Ko 2014, Wood 2008). According to the April 2020 Digital Report published jointly by UK-based global social media agency We Are Social and social media storage tool Hootsuite, students and young people spend 35% more time playing computer or video games (Marsden et al., 2020).

If people who deal with the Internet intensively cannot control their Internet use, their academic lives may be negatively affected. Students who use the Internet intensively prefer online activities to sleep (Anderson, 2001). Although there are many reasons for technology addiction, it is known that the developmental needs of adolescents are one of the most important reasons for addiction (Lin & Tsai, 2002). Out-of-school time activities vary across cultures. For example, a study on how adolescents use time found that students living in East Asia spent more time on school-related activities outside of school than their peers in the United States (Larson & Verma, 1999). To examine the differences between cultures, Won and Han (2010) compared the data of American and Korean 8th graders in their study by analyzing TIMSS 2003 data. In the study, it was found that the students of the two countries spent their time outside of school by spending time on different activities. In terms of these activities, the use of the Internet and technological devices ranked first. As in the rest of the world, there are a limited number of studies on the relationship between technology addiction and school achievement of students in Kazakhstan. In these studies, the relationship between technology addiction, television/video watching; computer game playing; internet use and academic achievement were examined.

In this study, the internet addiction of school-age 6-8. Grade children's internet addictions, digital addictions and social media usage addictions were examined in terms of gender, grade level and academic achievement variables.

In this context, the research questions are as follows:

- What is the level of 6th-8th grade students' internet addictions, digital game addictions and social media addictions?
- Do 6th-8th grade students' internet addictions, digital game addictions and social media addictions show differences according to gender variable?
- Do 6th-8th grade students' internet addictions, digital game addictions and social media addictions show differences according to the grade level variable?
- Do 6th-8th grade students' internet addictions, digital game addictions and social media addictions show differences according to school achievement and study behavior?

Method

In the study, in order to measure the relationship between school students' technology addiction and their academic achievement, the comparative relational survey model was used from the survey model, which is a quantitative research method. Watson (2015) states that the survey model is a research approach that aims to describe an event, phenomenon or variable that existed in the past or present in its current state, and the relational survey model aims to determine the presence or degree of co-variation between two or more variables. The comparative relational survey model aims to determine the presence or degree of co-variance between two or more variables. In this context, in this study, 5-8. The technology addictions of students studying in grades 5-8 were comparatively examined according to gender, grade level, school achievement and study behaviors.

The sample of the study consisted of 260 students studying in the 5th, 6th, 7th and 8th grades of 4 sampled schools in Almaty, Kazakhstan in the 2022-2023 academic year. While organizing the data, the data of 20 inappropriate students were removed from the research and the data of 240 students were used in the research. The students included in the study were selected by simple random sampling method. The sample group consisted of 120 (50%) girls and 120 (50%) boys, totaling 240 students.

Data Collection Tools

"Internet Addiction Scale", "Digital Game Addiction Scale", "Social Media Addiction Scale" and "Study Behavior Scale" were used as data collection tools in the study. Permissions were obtained from educational institutions for the scales used in the study. While applying the scales, school-age students were told about the study, it was stated that their data would only be used in this study, would not be shared with third parties and that they could leave the study at any stage they wanted. The scales were administered to participants who volunteered to participate in the study.

Internet Addiction Scale

In the study, the Internet addiction scale developed by Hahn and Jerusalem in 2001 and adapted into Kazakh by the researchers, consisting of 5 factors and 20 questions in total, was applied. According to Likert scale, answers

were received as Never (1), Rarely (2), Sometimes (3), Usually (4), Always (5). For the evaluation process of the answer averages, criteria were determined that participants with an average of 1.8 and lower were not addicted to the internet, while participants with an average of 3.4 and above were addicted and those with intermediate values were on the borderline of addiction.

Digital Game Addiction Scale

Validity and reliability analyses were conducted on the Digital Game Addiction Scale developed by Lemmens, Valkenburg, and Peter (2009) and adapted into Kazakh by the researchers. Since the aforementioned measurement tool was developed for undergraduate and secondary education sample, its suitability for the research sample was tested with a pilot study after expert opinion in order to be used in the research. In this context, the scale was first presented to the opinions of 3 faculty members who are experts in the Department of Psychology and Measurement and Evaluation. Adjustments were made in line with the feedback received. In the second stage, it was shared with 2 teachers teaching in the 2022-2023 academic year and adjustments were made in line with their opinions. The scale was finalized in line with the feedback given by a measurement and evaluation expert. Exploratory factor analysis was applied for the items in the Digital Game Addiction Scale. Exploratory factor analysis was performed with 7 items measuring frequency in 5-point Likert type (Never, Rarely, Sometimes, Frequently, Always). KMO value and Bartlett's test were used to check whether the scale items could be subjected to exploratory factor analysis. The KMO value, which is accepted as a measure of the factorability of the items, was found to be 0.82 and the χ^2 statistic obtained from Bartlett's test was significant at $\alpha = 0.001$ level ($\chi^2 = 132.80$, $p = .000$). This indicates the suitability of the sample for factor analysis. Exploratory factor analysis was performed without rotation technique and it was seen that the items were gathered under a single factor and reached a variance explanation rate of 41.88%. The loading values of the 7 items in the scale on the factors ranged between .787 and .472. For the reliability analysis of the "Digital Game Addiction" scale, the Cronbach alpha internal consistency coefficient was calculated as .805.

Social Media Addiction Scale

The Social Media Addiction Scale (SMAS) was developed by Van den Eijnden, Lemmens, and Valkenburgs (2016). The scale was developed as a one-dimensional scale by taking into account the diagnostic criteria for internet game addiction in the section of unspecified diagnoses to be investigated in DSM 5. The scale was first developed as 27 items and then a 9-item short form was created. The scale is scored as "Yes", "No" and the cut-off score is 5. Scoring of the scale is 0-9 points. Confirmatory factor analysis fit indexes of the scale showed good results. ($X=27$, $n=601$) 54.129, $p=0.002$, CFI:.989, RMSEA=0.041 (90% CI:.025-.057). The 9-item scale had a strong correlation with the 27-item social media addiction scale ($R=.94$, $p<0.05$).

Study Behavior Scale and School Achievement

The 10-item scale was developed by the researchers. Expert opinion was obtained to determine the validity of the instrument. The Kuder-Richardson 21 equation was used to determine the reliability of the inventory, which was

found valid by the experts, and the reliability coefficient obtained was calculated as .87. Evaluation of student achievement: In order to determine the school achievement of the students, the grade average of the first half of the 2022-2023 academic year was taken. In this first half, the average of the students' grades for all courses was taken.

Data Analysis

The scales applied to the students and the averages of the students' course grades were transferred to the computer by the researchers. SPSS 26.0 statistical program was used to analyze the data. In order to check the linearity and normality assumptions of the data, Q-Q plot and box-whisker (box plot) graphs were checked. When the graphs were analyzed, outliers were detected and these outliers were removed from the data set. After it was decided that the variables were normally distributed, the analyses were started in order to achieve the above-mentioned objectives of the study. In this context, Independent Sample t Test and One-Way Analysis of Variance techniques were used.

Findings

When Table 1, in which descriptive statistics values for each variable are given, it is seen that the average score obtained from the internet addiction scale in the study is 3.75; the minimum score that can be obtained from the scale is 1.00 and the maximum score is 5.00. According to the interval calculations obtained according to these results, it was seen that school children had a high level of internet addiction. The average score obtained from the digital game addiction scale was 3.54; the minimum score that can be obtained from the scale is 1.00 and the maximum score is 5.00.

Table 1. Descriptive Analysis of Students' Technology Addiction

	N	Minimum	Maximum	Mean	Std. Deviation
Internet Addiction	240	1.00	5.00	3.75	1.02
Digital Game Engagement	240	1.00	5.00	3.54	1.03
Social Media	240	2.00	10.00	6.55	2.11

According to the interval calculations obtained according to these results, it was seen that school children had a high level of digital game addiction. The average score obtained from the social media addiction scale is 6.55; the minimum score that can be obtained from the scale is 1.00 and the maximum score is 10.00. According to the interval calculations obtained according to these results, it was seen that school children's social media addiction was at a medium level.

When the comparison of internet addiction according to gender was evaluated by independent sample t-test, no significant difference was found between the mean scores of the groups. Internet addiction in male and female students is at a similar level (see Table 2).

Table 2. Comparison of Students' Internet Addiction according to their Gender

	Gender	N	Mean	Std. Deviation	t	P
Internet Addiction	Female	120	3.68	0.93	-1.08	0.28
	Male	120	3.83	1.11		

When the comparison of digital game addiction according to gender was evaluated by independent sample t test, a significant difference was observed between the groups ($t=-2.04$; $p<0.05$). According to the mean scores of the groups, male students' digital game addiction was found to be higher than their female peers (see Table 3).

Table 3. Comparison of Students' Digital Game Addiction according to their Gender

		N	Mean	Std. Deviation	t	P
Digital Gaming Addiction	Female	120	3.41	0.96	-2.03	0.04
	Male	120	3.68	1.08		

When the comparison of social media addiction according to gender was evaluated by independent sample t test, a significant difference was observed between the groups ($t=2.22$; $p<0.05$). According to the mean scores of the groups, social media addiction of female students was found to be higher than their male peers (see Table 4).

Table 4. Comparison of Students' Social Media Addiction according to their Gender

		N	Mean	Std. Deviation	t	p
Social Media	Female	120	6.85	1.95	2.22	0.03
	Male	120	6.25	2.22		

In the study, internet addiction was compared according to grade levels with the F test. Internet addiction showed a significant difference according to grade level ($F: 9.02$; $p<0.05$). When the differences between the grade levels were evaluated with Tukey HSD multiple comparison test, it was seen that the students in the 7th and 8th grades were more addicted to the Internet than those in the 5th and 6th grades (see Table 5).

Table 5. Comparison of Students' Internet Addiction according to their Grade Levels

	Class Level	N	Mean	Std. Deviation	F	p
Internet Addiction	5	56	3.59	0.95	9.02	0.00
	6	65	3.43	0.92		
	7	49	4.35	1.03		
	8	70	3.77	1.00		
	Total	240	3.75	1.02		

In the study, digital game addiction was compared with the F test according to grade levels. Digital game addiction did not differ significantly according to grade level ($F: 0.91$; $p<0.05$). Students in all grades exhibited similar levels of digital game addiction (see Table 6).

Table 6. Comparison of Students' Digital Game Addiction according to their Grade Levels

	Class Level	N	Mean	Std. Deviation	F	P
Digital Game Addiction	1	56	3.46	0.97	0.91	0.44
	2	65	3.42	1.18		
	3	49	3.69	0.85		
	4	70	3.61	1.03		
	Total	240	3.54	1.03		

In the study, social media addiction was compared according to grade levels with the F test. Social media addiction showed a significant difference according to grade level (F: 6.46; $p < 0.05$). When the differences between the grade levels were evaluated with Tukey HSD multiple comparison test; students in the 7th and 8th grades had a higher level of social media addiction than those in the 5th and 6th grades (see Table 7).

Table 7. Comparison of Students' Social Media Addiction according to their Grade Levels

	Class Level	N	Mean	Std. Deviation	F	p
Social Media	1	56	6.14	1.74	6.46	0.00
	2	65	5.88	2.37		
	3	49	7.35	1.32		
	4	70	6.94	2.33		
	Total	240	6.55	2.11		

In the study, internet addiction was compared according to achievement levels with the F test. Internet addiction showed a significant difference according to achievement level (F: 24.38; $p < 0.05$). When the differences between achievement levels were evaluated with Tukey HSD multiple comparison test, it was seen that students with low achievement level were more addicted to the Internet. Again, students with average achievement level are more dependent on the Internet compared to their successful peers (see Table 8).

Table 8. Comparison of Students' Internet Addiction according to their Achievement Levels

	Achievement Level	N	Mean	Std. Deviation	F	P
Internet Addiction	High	96	3.24	0.97	24.38	0.00
	Middle	102	4.09	0.91		
	Low	42	4.12	0.89		
	Total	240	3.75	1.02		

In the study, digital game addiction was compared with the F test according to achievement levels. Digital game addiction showed a significant difference according to achievement level (F: 12.51; $p < 0.05$). When the differences between achievement levels were evaluated with Tukey HSD multiple comparison test, it was seen that students with low achievement level were more addicted to playing digital games. Again, students with average achievement level have a high level of digital game addiction compared to their successful peers (see Table 9).

Table 9. Comparison of Students' Digital Game Addictions according to their Achievement Levels

	Achievement Level	N	Mean	Std. Deviation	F	P
Digital Game Addiction	High	96	3.17	0.96	12.51	0.00
	Middle	102	3.73	0.91		
	Low	42	3.95	1.17		
	Total	240	3.54	1.03		

In the study, social media addiction was compared with the F test according to achievement levels. Social media addiction showed a significant difference according to achievement level (F: 9.02; $p < 0.05$). When the differences between achievement levels were evaluated with the Tukey HSD multiple comparison test; it is seen that students with low achievement level have high social media addiction. Again, students with average achievement level show more addiction to social media compared to their successful peers (see Table 10).

Table 10. Comparison of Students' Internet Addiction according to their Achievement Levels

	Achievement Level	N	Mean	Std. Deviation	F	P
Social Media	High	96	5.81	1.86	19.01	0.00
	Middle	102	6.63	1.89		
	Low	42	8.05	2.36		
	Total	240	6.55	2.11		

In the study, internet addiction was compared with the F test according to the study habits and behaviors of the students. Internet addiction showed a significant difference according to study behavior (F: 39.26; $p < 0.05$). According to the results of Tukey HSD multiple comparison test; it is seen that students with low and medium study behavior are more dependent on the internet (see Table 11).

Table 11. Comparison of Students' Internet Addiction according to their Study Behaviors

	Study Behavior	N	Mean	Std. Deviation	F	p
Internet Addiction	Positive	44	2.75	1.04	39.26	0.00
	Middle	153	3.88	0.89		
	Low	43	4.35	0.69		
	Total	240	3.75	1.02		

In Table 12, digital game addiction was compared with the F test according to the study habits and behaviors of the students. Digital game addiction showed a significant difference according to study behavior (F: 24.80; $p < 0.05$). According to the results of Tukey HSD multiple comparison test; digital game addiction of students with low and medium study behavior is quite high.

In Table 13, social media addiction was compared with the F test according to the study habits and behaviors of the students. Social media addiction showed a significant difference according to study behavior (F: 42.53; $p < 0.05$). According to the results of Tukey HSD multiple comparison test; social media addiction of students with

low and medium study behavior is quite high. On the other hand, students with positive work behavior have low level of addiction to social media.

Table 12. Comparison of Students' Digital Game Addiction according to their Study Behaviors

	Study Behavior	N	Mean	Std. Deviation	F	p
Digital Game Addiction	Positive	44	2.84	1.22	24.80	0.00
	Middle	153	3.54	0.84		
	Low	43	4.26	0.93		
	Total	240	3.54	1.03		

Table 13. Comparison of Students' Social Media Addiction according to their Study Behaviors

	Study Behavior	N	Mean	Std. Deviation	F	p
Social Media	Positive	44	4.64	2.01	42.53	0.00
	Middle	153	6.55	1.72		
	Low	43	8.51	1.64		
	Total	240	6.55	2.11		

Discussion

In this study, the technology addiction and achievement of 5th-8th grade students studying in different schools in Kazakhstan were comparatively analyzed in terms of some variables. Grade students' technology addiction and achievement were examined comparatively in terms of some variables. According to the results of the study, it was observed that the participants had high levels of internet, digital game and social media addictions. This information is similar to the study conducted by Simkova and Cincera (2004). In recent years, technology addiction has become a worldwide problem among young people. Many young people can sit in front of their phones and computers for hours in order to play online games, watch online sites and social media activities, and chat with others on social media all day long without rest. Almost everywhere in the world, individuals have started to show similar attitudes, habits, thoughts and behaviors in their relationship with the internet. It is known that many educational institutions and families have difficulties due to the destructive effects of the Internet, especially on children and adolescents (Kaess et al., 2014; Poli & Agrimi, 2012; Van Rooij et al., 2011). Similarly, it is seen that studies on internet addiction are mostly related to adolescents or young people and addiction is rapidly increasing for children between the ages of 12-18. Although every period has a distinctive characteristic in human life, the period of rapid and important changes in terms of biological, psychological and social development undoubtedly occurs in the middle of the school age, during adolescence.

In terms of gender, some research shows that male students are generally more dependent on technology. Boys are reported to spend more time on video games, online games, social media and other digital activities. However, this may vary depending on individual differences and there may be some technology addicts among female students.

In another finding of the study, internet, digital game and social media addiction were compared according to the gender of the students. According to the findings of the study, male students had higher averages in digital game addiction and female students had higher averages in social media addiction. Internet and video games are traditionally perceived as a male domain, an activity created by men (Fox & Tang, 2014). According to the results obtained in our study, the mean game addiction scores of male students are higher than female students. The results obtained in the studies support the results we obtained (Anderson, Steen, & Stavropoulos, 2017; Gentile et al., 2011; Horzum, Ayas, & Çakir, 2011; Li et al., 2019; Xin et al., 2018). Although it is difficult to provide precise and comprehensive data on the distribution of technology addiction by gender, it is generally thought that male students and young students are more addicted to technology. However, it is important to note that such generalizations are not always accurate, as each individual's addiction risk and usage habits may be different.

According to another finding of the study, significant relationships were found between students' grade levels and their technology addiction. Students in grades 7 and 8 exhibited higher technology addiction compared to those in lower grades. According to grade and age groups, younger students are thought to be more prone to technology addiction. Especially during adolescence, social media, games, and other digital platforms are very popular among young people (Gholamian, Shahnazi, & Hassanzadeh, 2017; Sakuma et al., 2017). Therefore, students in adolescence may be at higher risk of technology addiction. However, individual differences and lifestyle factors may still influence this distribution. According to the researcher's observations, students in the upper grades have mobile cell phones. Students with mobile phones are known to have high social media, internet and gaming addictions (Kawabe et al., 2016).

The last finding of the research is about students' school achievement, study habits and behaviors and technology addictions. According to the results of the research, it was found that students with low achievement level and negative and irregular study habits and behaviors have high internet, digital game and social media addiction. It leads to low school achievement, increased absenteeism, and disruption of study habits (Rehbein, Psych, Kleimann, Mediasci, & Möble, 2010). According to Young (2009), social media and online gaming is a time-consuming activity. Users and gamers neglect their studies and homework to create more time for gaming. This negatively affects their academic achievement in general. Li et al. (2019) stated that the reason for the decline was that the participants did not find time to use the internet or used it minimally. There are various relationships between students' technology addiction and their academic achievement. These relationships may vary depending on individual differences and usage habits. Excessive use of technology can distract students and negatively affect their study processes. Students who are constantly engaged in social media, games or other digital activities may reduce the time they need to devote to homework and studying. This can negatively impact their academic performance. However, the relationship between each student's technology use and academic achievement may be different. Some students may use technology efficiently, while others may face problems of overuse or distraction. A balanced and purposeful use of technology by students can positively affect their academic achievement. It is also important that parents, teachers and schools play a role in managing and educating technology use.

As in the results of the study, technology and internet addiction in children has become a significant issue both in

the Kazakhstan sample and all over the world. With the rapid development of the internet and digital technologies, children's access to and use of technology has increased. This has brought with it the risk of technology and internet addiction in children. Here are some points to consider in this regard.

Teachers and parents play an important role in controlling and limiting children's use of technology. In order for children to use technology in a healthy way, it is important for parents to provide guidance, set time limits and raise awareness about safe internet use. It is essential to limit the time children spend with technology. Prolonged and uncontrolled use of technology can distract children from other important activities and weaken their social relationships. In order to maintain a balance, children should be allowed to use technology for certain periods of time and these periods should be monitored. It is crucial to control the content that students have access to when using technology. Teachers and parents should use filtering and moderation tools that provide access to appropriate content for children. In this way, children can be prevented from being influenced by harmful content. It is significant to explain to children the responsibilities and risks of using technology. They should be taught about safe use of the internet, being careful about sharing personal information, and cyberbullying. Children who learn to use technology consciously and responsibly can reduce the risk of addiction. Children should be encouraged to spend time on activities other than technology. Activities such as sports, art, music, reading books, etc. contribute to children's development and can reduce dependency on technology. In addition to all these explanations, it is recommended that future studies should include experimental and mixed-model studies that test the effects of guidance and instructional programs to reduce school children's technology addiction.

Notes

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