The Relationship Between Digital Game Addictions and Academic Achievements of High School Students

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ABSTRACT

Over the last decades, research into digital game addiction has grown increasingly. The present research aimed to examine the relationship between digital game addiction, and academic achievement of high school students. In addition, digital game addiction was examined in terms of some demographic variables of high school students. The research was designed according to the correlational research design, one of the quantitative research method. The participants of the research consisted of 994 students studying in the central district of Elazig. For data collection, two different questionnaires were administered to the participants. The first of these was to determine some demographic characteristics (gender, socio-economic level, grade point average, etc.) of the participants. The other was the digital game addiction scale. The results of the study show that there is a negative significant correlation between digital game addiction and academic achievement. Moreover, it was determined that digital game addictions of high school students significantly negatively predicted their academic achievement. In addition, it was determined that digital game addiction differed significantly according to gender, class level, perceived income level and school type. Although the results of the study cannot demonstrate a causal relationship between digital game addiction and academic achievement, playing more digital games suggests that less time is spent on academic work. Some limitations and recommendations for future research are discussed.

Keywords: Digital game addiction, academic achievement, high school students

INTRODUCTION

The use of smartphones, which has become widespread with the development of technology, has left behind some habits such as playing outside, causing individuals to turn to mobile games and online games (Kuyucu, 2017; Kaysi, Aydemir & Yavuz, 2021). According to the research conducted by Gaming in Turkey in 2020, action-adventure games are the most popular game genres in Turkey with a rate of 49.2%, followed by puzzles with 46.2% and puzzle with 45.7%. racing games follow (Gaming in Turkey, 2020). With the spread of mobile and online games, the concept of "digital game addiction" has entered the literature (Griffiths & Hunt, 1998). This concept refers to excessive and uncontrolled playing of digital games, being indifferent to other activities, and being restless when not playing (Yalçın Irmak & Erdoğan, 2016).

There is a common understanding that excessive use of digital games causes some behavioral problems (Griffiths, 2005). Studies (Lemmens, Valkenburg & Peter, 2009) show that individuals with digital game addiction experience some social and emotional problems. However, as a result of spending too much time with digital games, it brings some negativities such as self-isolation from the real world, feeling of loneliness, psychological problems and behavioral problems. Moreover, digital game addiction also creates some behaviors that negatively affect academic achievement, such as indifference to lessons, not studying, not doing homework (Bülbül, Tunç & Aydil, 2018). In order to determine these effects, it is seen that there is an increasing trend in the number of studies (Sahin, Gümüş & Dincel, 2016; Haghbin, Shaterian, Hosseinzadeh & Griffiths, 2013; Brunborg, Mentzoni & Frøyland, 2014) examining the relationship between digital game addiction and academic achievement in the literature. When the studies in the literature (Zamani & Abedini, 2013; Göldağ, 2018; Baysan, 2019) are examined, it is seen that the studies examining the relationship between digital game addiction and academic achievement are conducted on students or adolescents studying at different school levels. When the studies conducted in Turkey were examined, no study was found that

examined the relationship between high school students' digital game addiction and academic achievement. In this context, the present study aimed to examine the relationship between high school students' digital game addiction and academic achievement. In this direction, the literature on the reasons for playing digital games and the positive and negative features of digital games has been reviewed, along with the definition and history of digital games in the following sections. Then, information about digital game addiction, the causes and consequences of digital game addiction was presented in the conceptual framework, and then information about the research was shared.

Digital Game Definition and History

With the development of globalization and technology, the games played in the garden have left their throne to the games played with technological devices (Yayman, 2019). Due to the disappearance of playgrounds with the increase in urbanization, the tendency of individuals to games played on the internet has accelerated (Karabulut, 2019). As a result of this situation, the places where children play games, the game tools and the types of games have begun to change. It can be said that children have started to prefer games that cause inactivity instead of games that require physical activity, that are played indoors instead of playing in gardens, and that are played individually instead of collective games (Şahin & Tuğrul, 2012). Digital games; It is also called computer, console and video game because it is played on many different platforms. These games are mostly played on a computer or with a console connected to the screen (Binark & Sütçü, 2008).

Although it is difficult to pinpoint the first digital game, it is stated that Nim, designed by John Makepeace Bennett in 1951 and made by engineer Raymond Stuart-Williams, is the first digital game (Digital Games Report, 2020). The period between 1960 and 1990 is called the new formation phase of video games. The digital game called 'Spacewar', which is considered to be the most effective computer game in this time period, has attracted the attention of users. Atari Inc., which will make an impact in this field in the early 90s, is seen as the first step towards the commercialization of the digital game industry. Shortly after, Atari started a new revolution in video games by releasing the widely accepted very popular video game 'Pong' (Digital Games Report, 2020). The years between 1990 and 2010 were called the golden years of the digital game market. Today, software such as Android, iOS and Windows have become a popular choice for digital gaming platforms along with smartphones (Digital Games Report, 2020; Kaysi, Yavuz & Aydemir, 2021). This has enabled digital games to be played without limits of time and place.

Reasons for Playing Digital Games

Since digital games have become an important communication tool for those who play constantly, even if they play to spend their free time at first, they have great effects on their lives in the future (İnal & Kiraz, 2008). When the literature is examined, it is seen that people turn to digital games for different reasons. It is seen that some of these are to spend their spare time, to meet their information needs, to communicate with the players in the game and to have fun (Tran & Strutton, 2013).

Sherry et al. (2006) argued that the urge to challenge and compete with other players is effective as the reason for playing digital games, while Yee (2006) argued that the attraction of social interaction and the sense of achievement are effective. Vahlo and Hamari (2019), according to the answers given by the participants in their research, are among the reasons why people play games; Enjoying interacting with others, playing because his friends are playing, the impulse of the challenge, the desire to get away from the outside world and immerse himself in the game in order to progress and reach the goals, to be affected by the story of the game, to feel good emotions while playing the game, to be a part of the game world, to feel relaxed while playing the game stated that they enjoy playing games, feeling good while playing games, experiencing a sense of independence while playing games, and being able to make their own decisions in games. Morever, in the researches (Sağlam &Topsumer, 2019), it has been determined that some requests such as the pleasure that individuals get while playing games, the feeling of struggling with difficulties, stress, getting rid of troubles, creating a world of their own, seeing digital games as a popular activity and a sense of curiosity cause them to play more games.

Positive and Negative Features of Digital Games

Games are used not only for entertainment, but also for the acquisition of various skills. For example, when a child with diabetes is played a game about his own disease, he can gain self-care skills related to his disease (Uslu & Özkan, 2018). In education, it is aimed to learn while having fun by using digital games. By contributing to the cognitive development of individuals playing games; it also contributes to problem solving, strategic thinking and critical thinking (Irmak & Erdoğan, 2016). In addition, digital games contribute to the development of motor skills, can be used as a motivation and leisure tool, contribute to hand-eye-mind

coordination, help increase technology-related information (Ministry of Family and Social Policies, 2017). Moreover, digital games can contribute to the development of empathy skills by increasing the desire of the players to solve problems (Aleksic, 2018). At the same time, it is stated that being able to communicate with the stakeholders of the game in digital games played positively affects social behaviors (Dilmen & Öğüt, 2010). It has been reported that the players do not feel discomfort even if they are addicted to digital games because they avoid making friends, avoiding stress, providing sociability, feeling a sense of accomplishment, and avoiding emotional problems from the games they play (Çelebi, 2020). In a study (Öncel & Tekin, 2015), it was determined that students who are game addicts felt the sense of loneliness at a low level. In addition, it is stated that digital games can facilitate the teaching of various foreign languages (Ceylaner & Yanpar Yelken, 2017).

Despite the positive features of digital games, the negative features are too many to be underestimated. Spending too much time with games may cause them to isolate themselves from the real world, experience loneliness, decrease their achievement at school, decrease their social skills, decrease their sleep duration, gain weight, and experience back-neck pain (Mustafaoğlu & Yasacı, 2018). Studies (Berber, Karadibak & Uçurum, 2014) indicate that the risk of obesity is higher in individuals who play digital games for 5 hours or more a day. In addition, graphical transitions in digital games may cause epileptic seizures in children (Buluş, Benbir Şenel & Yeni, 2016). However, hyperactivity disorder may occur in individuals who are exposed to constantly changing scenes and violent images in the game (İşçibaşı, 2011). Another negative effect of digital games is that individuals avoid taking responsibility. Children and young people neglect their homework, avoid their responsibilities, and exhibit behaviors such as spending time in internet cafes in order to spend time in the game (Odabaşıoğlu et al., 2007).

Digital Gaming Addiction

The concept of addiction is defined as a disease that causes people to continue to use the substances they are addicted to despite experiencing negative situations, and to feel deficient when they try to quit (Uğurlu, Şengül & Şengül, 2012). Alper, Aytan, and Ünlü (2015) defined digital game addiction as a kind of addiction in which people create their social environment in a virtual environment and move away from their environment in the real world without wasting time. Büdık (2018) similarly defines the virtual world as an addiction that causes users to prefer the real world. Addiction resulting from the use of various substances is called substance addiction; Addiction that occurs as a result of repetition of various behaviors without the use of a substance is defined as behavioral addiction (Kesici & Tunç, 2018). In 2018, the Ministry of Health's Digital Game Addiction Workshop Report drew attention to the fact that there are various behavioral addictions that have emerged with the advancement of technology and that these addictions are especially seen in children and young people. The Ministry of Health (2018) reports that there are studies on diagnosis and treatment methods for behavioral addictions such as excessive internet use, excessive shopping, excessive digital gaming, and excessive attention to the phone. Although such addictions are not as well known as substance addiction, they affect a person's life and cause various problems (Arslan, 2021).

Causes and Consequences of Digital Gaming Addiction

Although the etiology of digital game addiction is not fully known, some cases come to the fore in various studies. In studies (Sonay Kurt et al., 2014), it is stated that the individual's enjoyment while playing digital games and being away from the real world while playing games reduces the level of stress and this situation triggers digital game addiction with the desire to play more games. In the study conducted by Horzum et al. (2008), it is stated that when individuals encounter a problem that they cannot cope with in real life, they see digital games as an escape from these problems. On the other hand, Çağıltay and İnal (2005) state that digital game addiction occurs because the individual feels relaxed while playing games. The stress caused by some families applying too much pressure to children leads children to digital games to get away from this pressure for a moment. Some families, on the other hand, cause children who want to find themselves to be deceived by the attractive side of digital games and turn to these games because they leave their children too free (Sherry & Lucas, 2001). This situation shows the importance of balance to be established on children.

Current research

The aim of the study is to examine the relationship between high school students' digital game addiction levels and their academic achievement. In addition, in order to determine the factors underlying digital game addiction, digital game addiction status will be examined in terms of some demographic variables (gender, perceived income level, school type and class level). In this context, answers to the following questions were sought in the study;

✓ Is there a relationship between high school students' digital game addiction levels and their academic achievement?

✓ Does digital game addiction levels of high school students significantly predict their general academic achievement?

✓ Does digital game addiction differ significantly according to the gender of high school students?

✓ Does digital game addiction differ significantly according to the grade levels of high school students?

✓ Does digital game addiction differ significantly according to the perceived income levels of high school students?

✓ Does digital game addiction differ significantly according to the school type of high school students?

METHOD

This research was carried out according to the correlational research design, which is one of the quantitative research methods. Relational screening model aims to determine the relationship between two or more variables (Karasar, 2005). In the correlational research design, the event or situation in the research is presented as it is and the variables causing this situation are determined (Kaya, Balay, & Göçen, 2012).

Participants

The universe of the study consists of high school students studying in the province of Elazig. In the process of determining the sample of the research, stratified sampling method was used. This sampling method is preferred if the research population is heterogeneous in terms of some characteristics (gender, socio-economic status, school type, etc.) and the size of each of these characteristics is different from each other in terms of groups (Balcı, 2006). Research data were obtained from each school, namely Anatolian High School, Science High School, Vocational and Technical Anatolian High School, Imam Hatip High School and Private High School, through stratified sampling from this universe. Descriptive statistics about the students participating in the research are presented in Table 1.

Table 1. Descriptive Statistics of Participants

Variables	Statistics
Age	Age range: 15- 18; M = 16.04, sd = 1.69
Gender	Male= 477 (48%), Female= 517 (52%)
Sınıf Grade level	9th grade = 284 (28.6%) 10th grade = 244 (24.5%) 11th grade = 274 (27.6%) 12th grade = 192 (19.3%)
School type	Anatolian High School= 507 (54.6%) Science High School = 168 (18.1%) Vocational High School= 121 (13%) Imam Hatip High School= 132 (14.2)

As seen in Table 1, the ages of the students participating in the research range from 15 to 18, with 477 males and 517 females. In addition, students from all grade levels participated in the research. In addition, 507 students from Anatolian High School, 168 students from Science High School, 121 students from Vocational High School and 132 students from Imam Hatip High School participated in the research.

Instruments

In the research, a form containing demographic information and a digital game addiction scale were used as data collection tools. The students' gender, class level, perceived income level and previous year's grade point average were collected through the demographic information form.

In addition to the information form containing the general academic achievement and demographic information of the students, the digital game addiction scale developed by Lemmens et al. (2009) to determine the problematic digital game playing behaviors of adolescents between the ages of 12-18 was used. It is a seven-item short form of DOBÖ-21, which consists of 21 items and seven sub-dimensions, prepared by Yalçın Irmak and Erdoğan (2015). The validity and reliability values of the original DOCS-7 were found to be 0.92 for Cronbach's alpha, CFI=0.904, RMSEA=0.053 (90% CI=0.049 and 0.056), and it has been shown that it can be used in adolescents. The scale has a five-point Likert type, one-factor structure and scores between 1-5 (1=never, 5=always) (range: 7-35). In this study, the Cronbach's alpha value of the scale was determined as .89.

Data Analysis

The data obtained in the research were analyzed with the SPSS 22 package program. In the study, firstly, the normality of the data was tested. According to Tabachnick and Fidell (2007), skewness and kurtosis values

should be between -1.5 and +1.5 in order for the data to be accepted as normally distributed. In this context, skewness (.080) and kurtosis (.160) values revealed that the normality assumption was met. Therefore, independent groups t-test was used to compare two-group variables, and one-way ANOVA analysis was used to compare variables with more than two groups. Pearson product-moment correlation analysis was performed to examine the correlations between the variables. Correlation values were interpreted as .00 - .19 very weak relationship, 0.20 - 0.39 weak relationship, 0.40 - 0.69 moderate relationship, 0.70 - 0.89 high level relationship, and 0.90-1.00 very high level relationship (Kalaycı, 2006). In addition, for regression analysis, it was examined whether there was a multicollinearity in the data set. Accordingly, the variance inflation factor (VIF) was determined to be < 5.0 (Hair, Black, Babin & Anderson, 2010). In this context, it can be said that there is no multicollinearity problem. Finally, the linearity between the variables was examined in the Scatter Plot graph and it was determined that the data set was suitable for regression analysis. The findings were evaluated at the 95% confidence level at the 5% significance level.

RESULTS

In line with the purpose of the research, firstly, the relationship between high school students' digital game addiction levels and their academic achievement was examined. The obtained results are presented in Table 2.

Table 2. The Relationship Between Digital Game Addiction Levels and Academic Achievements

Variables	M.	sd	1
1: Digital Gaming Addiction (DGA)	2.17	.997	-
2: Academic Achievements (AA)	4.60	.82	-347**

**<.001

As seen in Table 2, a moderately significant negative correlation was found between students' digital game addiction levels and their academic achievements (p<.05). This shows that as digital game addiction increases, academic achievement decreases. However, it was determined that the digital game addiction (DOB) of the students participating in the research was at the level of (2.17 ± .997). Based on these results, it can be said that the digital game addiction of the students is at a low level.

In order to better explain the significant relationship, found in the study, the predictive power of digital game addiction on academic achievement was examined by regression analysis. Accordingly, the findings obtained after determining that the assumptions of the regression analysis (normality, auto-correlation and linearity) were appropriate are presented in Table 3.

Table 3. Regression Analysis Results

Predictive	Predicted	R	R^2	B	SH	β	t	p	F	p
DGA →	AA	.35	.12	-.285	.025	-.347	-11.255	.000	126.67	.000

As can be seen in Table 3, digital game addiction predicts academic achievement negatively (p< .05). Findings show that digital game addiction predicts 12% of the variance in academic achievement. In this respect, it can be said that digital game addiction reduces academic achievement.

In line with the sub-purpose of the research, the level of digital game addiction was examined in terms of gender variable. The obtained results are presented in Table 4.

Table 4. Examination of Digital Game Addiction by Gender Variable

	Gender	N	M	sd	$Sh_{\bar{x}}$	t test t	t test Sd	t test p
DGA	Female	487	1.94	.961	.436	-7.74	926	.00
	Male	441	2.43	.972	.046			

As can be seen in Table 4, a significant difference was determined in favor of women in terms of digital game addiction levels according to the gender of the students (t(926)=-7.74, p<.05). This situation can be accepted as an indication that male students have more digital game addiction.

Another independent variable considered in the study is grade level. In Table 5, digital game addictions of students according to their grade levels are compared.

Table 5. Examination of Digital Game Addiction by Grade Level Variable

	Grade level	N	$\bar{X}$	SS	F	p	Difference
DGA	9th grade	273	2.16	.899	4.600	.003	2>4, 3>4
	10th grade	235	2.23	1.003			
	11th grade	251	2.29	1.144			
	12th grade	169	1.94	.862			

1: 9th grade, 2: 10th grade, 3: 11th grade, 4: 12th grade

When Table 5 was examined, it was determined that there was a significant difference between digital game addiction and grade levels (p<.05). According to the Scheffe analysis performed to determine between which grade levels the significant difference was, it was determined that there was a significant difference between the 10th and 12th grades, and the digital game addiction levels of the 10th grades were higher than those of the 12th grades. However, it was determined that there was a significant difference between the 11th and 12th grades, and it was determined that the significant difference was in favor of the 12th grades. It is thought that this situation restricts the level of playing the game because the 12th grade students are preparing for the Transition to Higher Education (YKS) exam.

Another independent variable examined in the study is perceived income level. In this variable, students' perceived income levels were classified as low, medium and high. In Table 6, digital game addictions of high school students in terms of perceived income levels are compared.

Table 6. Examination of Digital Game Addiction by Perceived Income Level

	Income	N	M	sd	F	p	Difference
DGA	Low	62	2.40	1.312	3.284	.038	1>2
	Middle	754	2.13	.968			
	High school	112	2.31	.964			

Perceived Income Level 1: Low, 2: Medium, 3 High

As seen in Table 6, it was determined that the level of digital game addiction differed significantly in terms of perceived income level (p<.05). As a result of the Sheffee analysis conducted to determine between which groups the significant difference was, it was seen that the students with low perceived income level had a higher level of digital game addiction than students with a medium level of perceived income. In this context, it can be said that the income level is related to the digital game addiction level.

Another situation examined within the scope of the research is the comparison of digital game addiction levels of high school students according to the type of school they study. The findings obtained in this direction are presented in Table 7.

Table 7. Examination of Digital Game Addictions According to School Type

	School Type	N	M	sd	F	p	Difference
DGA	Anatolian High School	507	2.13	.877	11.654	.000	3>1, 3>2, 3>4
	Science High School	168	1.98	.854			
	Vocational high School	121	2.64	1.339			
	Imam Hatip Lis	132	2.16	1.110			

1: Anatolian High School, 2: Science High School, 3: Vocational High School, 4: Imam Hatip High School

When Table 7 is examined, the digital game addiction levels of the students differ significantly according to the type of school they attend (p<.05). In the Scheffe analysis conducted to determine between which groups the significant differences were, it was seen that the students studying at Vocational High School had higher digital game addiction levels than the students studying at other school types. This shows that the type of school where one is educated is an effective variable in terms of digital game addiction level.

DISCUSSION AND CONCLUSION

In the present study, the relationship between high school students' digital game addiction levels and academic achievement was examined. According to the results obtained from the research, a negative significant correlation was determined between the level of digital game addiction and academic achievement. Fox (2021) and Müller et al. (2014) concluded that digital game addiction negatively affects academic achievement. However, the results are similar to those of Durkin and Barber (2002) and Huge and Gentile (2003). The results may not be explained in terms of a causal relationship between digital game addiction and academic achievement. However, the results can be interpreted as high participation in playing digital games leaves less time to participate in academic studies and this reduces academic performance. In addition, the results of the research show that digital game addiction negatively predicts academic achievement. The results of the research show that digital game addiction dramatically reduces academic achievement.

Another result obtained from the study is that male students have higher digital game addiction levels than female students. When the literature is examined, it is seen that the gender variable is an important factor in studies on digital game addiction (Çiçek, 2021; Tilki, 2021; Barışık, 2021; Özdemir & Karaboğa, 2021; Dinçer and Kolan, 2020; Lermi & Afat, 2020; Wittek et al., 2016). Moreover, the fact that digital game addiction is higher in male students in the study conducted by Soyöz-Semerci and Balcı (2020) on high school students supports the findings of the current study. However, it was determined that the digital game addiction, which Erkılıç (2021) examined in terms of secondary school students, resulted in favor of female students. In

the literature, it can be said that it is the common finding of many studies (Kılıç, 2019; Lee & Kim, 2017; Müller et al., 2014; Li & Wang; 2013) that male students have higher digital game addiction than female students. Aktaş (2018) stated that this is due to the fact that men have the opportunity to play digital games outside the home environment (internet cafe, etc.) as they are more freed by their families. Although the research does not focus on the reasons why digital digital game addiction is higher in men, it is a finding in line with the literature that women's digital digital game addictions are significantly lower than men.

Another result obtained from the research is that digital game addiction differs significantly according to grade level. The results show that as the grade level increases, the digital game addiction decreases. Erkılıç (2021) found in his study that digital game addiction differed significantly according to the class variable. Similarly, in the study conducted by Dinçer and Kolan (2020), it was determined that the class variable made a significant difference on digital game addiction. Eyyüpoğlu (2017) commented that the decrease in digital game addiction as the grade level increases may be related to the university entrance exam. In this context, it is thought that the decrease in digital game addiction as the grade level increases may be related to the increase in academic responsibilities.

Within the scope of the research, it was determined that the digital game addiction differed significantly according to the income level. The results show that low-income students have more digital game addiction. When the results of digital game addiction are examined in terms of perceived income level, it is seen that different findings have been reached in the literature. In the study conducted by Göldağ (2018), it was determined that students with higher perceived income levels had higher digital game addiction levels. Dinçer and Kolan (2020), on the other hand, found that there is no significant relationship between perceived income level and digital game addiction. Nergiz and Nergiz (2021) state that in parallel with the increase in income level, parents have more time to take care of their children. In this context, it is thought that in cases where the income level is low, parents' spending more time for financial gain and spending enough time with their children may have caused them to spend more time with digital games.

Another result of the study is that the digital game addiction levels of Vocational High School students are higher than students from other school types. When the literature is examined, there are many studies that show that school type has a significant relationship with digital game addiction (Eyyüpoğlu, 2017; Yayman, 2019). On the other hand, Taş, Eker, and Anlı (2014) and Uslu (2019) concluded in their study that the school type variable did not have a significant effect on the level of digital game addiction. There seems to be a limited number of studies examining digital game addiction in terms of school type. It is thought that the significant differentiation of digital game addiction according to school type may be caused by many factors such as the intensity of the lessons at the school and the expectations of the school from the students in terms of performance.

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