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The Role of School Attachment and Academic Grit in Prediction of Computer Game Addiction

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Abstract

The study explored whether the role of school attachment and academic grit in predicting computer game addiction of elementary school 4th grade and middle school 5th grade students differs according to various variables (sex, grade level, having a computer at home and daily duration of playing computer games). The study sample was determined using the simple random sampling method. The sample consisted of 564 students attending two elementary schools and three middle schools in the Şahinbey District of the city of Gaziantep. The study data were collected in the fall semester of the 2020-2021 academic year. The "Computer Game Addiction Scale", the "Academic Grit Scale", and the "School Attachment Scale" were used to collect the study data. The study employed the relational research design, one of the descriptive research designs. In data analysis, independent samples t-test and one-way analysis of variance technique were used to examine dependent variables in terms of categorical variables. While examining the relationships between variables, Pearson correlation coefficient analysis and simple linear regression analysis techniques were used. The study results revealed that male students had higher computer game addiction. In addition, in terms of grade level, 4th grade students had higher computer game addiction. Also, there were differences according to the variables of whether there was a computer at home and whether they played computer games daily. The result of the regression analysis examining the prediction of the school attachment variable by computer game playing addiction put forth that the model was significant. This indicates that computer game playing addiction is a positively significant predictor of school attachment. Furthermore, the result of the regression analysis examining the prediction of the academic grit variable by computer game playing addiction determined that the model was also significant. According to this result, computer game playing addiction is a negatively significant predictor of academic grit.

Keywords: Computer game addiction, school attachment, academic grit.

Introduction

Games play an important role in the social, cognitive and sociocultural development of the child. Games have a great impact on the development of the child's communication and language skills, the satisfaction of curiosity, the development of self-expression skills, the acquisition of problem-solving skills, and the development of hand-eye coordination (Horzum et al., 2011). The games that children used to play with their friends in parks and on the streets have now become a virtual situation far from real life, played at home and on the Internet on computers (Horzum, 2011). The rapid development of technology has caused an increase in the time people spend on technology in their daily lives (Anderson et al., 2007). Computer games, which children and young people spend a lot of time on, are increasingly reaching addiction levels (Reiterer, 2010; Thalemann, 2010). The use of the Internet by large masses makes it difficult to realize its positive or negative effects, especially on children and adolescents (Joinson, 2003). While Internet and computer games are considered as technological miracles that support children and young people's access to information, and their personal development such as their research, problem solving, creativity, critical thinking skills, excessive, uncontrolled, unintentional, and unconscious use causes anxiety and fear, and negatively affects the development of personal skills (Colwell, 2003).

Game addiction is considered in the category of behavioral addiction (Gökçearslan & Durakoğlu, 2004). Computer game addiction refers to the condition that results in not being able to stop playing games for a long time, associating the game with real life, neglecting responsibilities due to playing the game, and preferring playing games on the computer to other activities (Horzum, 2011). Since addiction is not a process that a person can immediately notice, the person either does not realize that they are addicted or it takes time to realize it (Günüç, 2009). Addicts who spend a large part of their time with technological devices often neglect their sleep, nutrition, habits, and social life (Young, 2009). When they play games excessively, they may experience problems such as harming their school, family, and friendships, and losing control (Gökçearslan & Durakoğlu, 2004). While some studies mentioned the cognitive, social, affective, and psychomotor effects of computer games that improve learning (Rogge, 2000) and mentioned its entertaining aspect (Fritz, 1988), many studies also drew attention to their negative effects. Among these negative effects are that computer game addiction can lead to violence and aggressive behavior (Hartmann, 2007), that it can have negative physical, psychological, and social effects (Grüsser & Thalemann, 2006), and that it can cause delays in social skills and neglect in schoolwork (Schulte-Markwort, 2005). Since there is no end to playing games, it also makes the person addicted to that game by leveling up. The most important factor in the development of addiction is the activation of the “pleasure pathway” in our brain. The brain that learns this pleasure starts to look for ways to find pleasure again and focuses on doing this no matter what. Activities that provide pleasure in a short time make it easier for a person to become addicted. For this reason, with the “leveling up” features of computer games, the person stays in the game longer to reach pleasure. In addition, the visual color on the game screen causes the person become addicted (Ögel, 2017). Game addiction is considered as internet gaming disorder in the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-V), developed and published by the American Psychiatric Association (APA).

Internet gaming disorder is graded as mild, moderate and severe. Those with mild levels have less disruption or fewer symptoms in their daily lives. Those with severe levels experience a decrease in communication and relationships with people, and a decrease in work and academic achievement (DSM-V, 2013).

The increasing time spent on computer games can, over time, cause the child's social relationships with family and friends to deteriorate, communication problems to occur and their commitment to school to be negatively affected. The negative impact on school life can negatively affect children's attachment to school and also negatively affect their responsibilities related to school (Grüsser & Thalemann, 2006). School is a central place in children's lives where they spend a significant amount of time in their daily lives (Kızmaz, 2006). Schools aim to protect children from risk factors and help them attain healthy behaviors. Students who do not like their school are more likely to exhibit unhealthy behaviors, have a lower quality of life, and have low academic achievement (Nutbeam et al., 1993).

Attachment to school is a basic psychological need including the belief that they are a member of the school and that they are respected (Osterman, 2000). School attachment includes student motivation, which is a dynamic relationship between teachers and classmates and reflects the belief in value and competence in school activities, as well as extracurricular activities at school (Fairclotch & Hamm, 2005). There are three sub-dimensions of school attachment, namely cognitive, affective, and behavioral (Jimerson et al, 2003). The behavioral dimension refers to students' participation in academic and social activities at school; the affective dimension refers to positive and negative reactions to teachers, classmates, and school; and the cognitive dimension refers to having a flexible approach to problem solving, having a sense of desire, and being able to use coping strategies in the face of negative situations (Fredricks et al., 2004). Students with a high sense of school attachment have high self-esteem, establish more positive relationships with their teachers and friends, and have higher life satisfaction (Cemalcılar, 2010). School satisfaction is related to peer support, peer relationships, positive classroom climate, and life satisfaction (Verkuyten & Thijs, 2002). With positive peer relationships, the student's attachment to school is positively affected, their attendance to school increases, they become motivated to fulfill their responsibilities at school, and their academic achievement increases (Nelson & DeBacker, 2008; Sidelinger & BoothButterfield, 2010). Recent studies argued that academic grit is among the characteristics that must be possessed to achieve success (Duckworth et al., 2007; Duckworth & Quinn, 2009; Sturman & Zappala-Piemme, 2017). Among two individuals with the same level of intelligence, the one with more grit is closer to success, and there is a significant relationship between grit and academic achievement (Duckworth et al., 2007).

Grit is defined as the determination to overcome obstacles in a task (TDK, 2016). According to Sherman et al. (2013), the concept of grit is used in the sense of endurance, perseverance, and patience that enable the student to overcome all kinds of difficulties in order to be successful and achieve their goals, and to correct psychological problems that arise as a result of long-term studies. Grit is also defined as not losing interest despite all the difficulties encountered while trying to reach relatively more

difficult and long-term goals (as cited in. Sarıçam et al., 2016). A person with grit is someone who can continue to work intensively against difficulties and maintain interest in the goal for a long time despite the tension that occurs as a result of failures. The most important advantage of a person with grit is that the interest is permanent and long-term. While people who lose their motivation to study and are disappointed give up on achieving their goals, people with grit continue to follow the steps they need to follow to achieve their goals (Duckwort & Peterson, 2007). While some people can easily recover and continue on their way when exposed to negative experiences, some people make this situation even bigger and become desperate. People who easily recover and continue on their way believe that the negative events that happen to them are temporary and the positive events are permanent. On the other hand, people who can never recover and drown in their helplessness believe that the negative events that happen to them are permanent and the positive events are temporary (Seligman, 1998). If an individual generalizes the failure after experiencing it and has the thought "I am already an unsuccessful student", he/she will completely stop studying and as a result, they will truly fail. If an individual think, "Failing in this task does not mean I will fail in all other tasks, I can succeed by working harder" after experiencing a failure, he/she will have more grit and show that the situation is specific only to that failure (Seligman, 1998). While individuals with no grit tend to give up more easily in the face of disappointments or failures, individuals with grit are more likely to succeed by continuing to move towards the goal without changing their direction (Duckworth et al., 2007). In schools, students are given importance to being successful in exams and courses. However, individuals need to learn different skills to be successful in their daily lives and careers. Examples of these are grit, perseverance, and not giving up (Hoerr, 2013).

Study Purpose and Importance

In the limited number of studies on game addiction in children, the negative effects of game addiction came to the fore, and change according to various factors was not given much space. Today, computer games, which are among the issues that parents and teachers mostly complain about, have started to take time from the students' daily responsibilities and the games played have begun to affect the students' behaviors and making them more aggressive. The academic achievement of students who have difficulty in fulfilling their responsibilities is negatively affected. This also affects their school attachment, causing it to decrease. For these reasons, the purpose of the study is to examine the role of school attachment and academic grit in predicting computer game addiction. In line with this purpose, the study will seek an answer to the question "Do school attachment and academic grit play a role in predicting computer game addiction?" In addition, the study also aims to reveal whether the aforementioned role of school attachment and academic grit shows differences in terms of demographic variables such as sex, grade level, having a computer at home and daily duration of playing computer games.

Study Questions

1. Do computer game addiction, school attachment, and academic grit differ according to sex?
2. Do computer game addiction, school attachment, and academic grit according to grade level?

3. Do computer game addiction, school attachment, and academic grit according to whether students have computer at home?
4. Do computer game addiction, school attachment, and academic grit according to daily duration of playing computer games?
5. Does computer game addiction significantly predict school attachment and academic grit?

Methodology

Study Design

The study examined the relationship between computer game addiction, school attachment, and academic grit by employing the correlational research design, one of the descriptive research designs.

Universe and Sample

The study sample consisted of 564 students attending two elementary schools and three middle schools in the Şahinbey District of the city of Gaziantep, determined by simple random sampling method. Data were collected in the fall semester of the 2020-2021 academic year.

Data Collection Tools

(1) Computer Game Addiction Scale: The Computer Game Addiction Scale for Children, developed by Horzum et al. (2008) was used as one of the data collection tools in the study. The scale has a four-factor structure consisting of 21 items. Titled "Inability to Stop Playing Computer Games", the first factor in the scale consists of a total of 10 items (items 3, 5, 6, 8, 9, 11, 14, 17, 18, and 23) and explains 27% of the total variance. The internal consistency coefficient of this factor is .83. The second factor of the scale named "Associating Computer Games with Real Life" consists of four items (items 4, 7, 13, and 22). The internal consistency coefficient of this factor, which explains 6.5% of the total variance, is .60. Named "Neglecting Tasks Due To Playing Computer Games", the third factor of the scale consists of three items (items 15, 16, and 20) and explains 6% of the total variance. The internal consistency coefficient of this factor is .50. Consisting of four items (items 1, 2, 10, and 19), the last factor of the scale is named "Preferring Playing Computer Games to Other Activities". The internal consistency coefficient of this factor, which explains 5.50% of the total variance, is .50. The entire 21-item scale explains 45% of the total variance and the internal consistency coefficient is .85. Respondents of the scale can get a minimum of 21 and a maximum of 105 points from the scale. All the items in the scale has positive items.

(2) Academic Grit Scale: In order to determine the academic grit levels of 4th grade elementary school students and middle school students, the 10 item-single dimension Academic Grit Scale, developed by Rojas et al. (2012), was also used in the study. Items 1 and 9 of the scale are reverse coded. In addition, item 1 is included in the scale as the control item of item 8. The scale uses a 5-point Likert-type rating of "strongly disagree", "disagree", "undecided", "agree" and "strongly agree". The lowest score that can be taken from the scale is 10 and the highest score is 50. A low score indicates that the student has a low academic grit level and a high score indicates that the student has a high academic grit level. While the Cronbach's alpha internal consistency coefficient calculated in the original form of the scale is .85, it was calculated as .84 for the Turkish form of the scale in the present study.

(3) School Attachment Scale: The School Attachment Scale for Children and Adolescents was developed by Hill (2006) as a 5-point Likert type, and the Turkish adaptation of the scale was carried out by Savi (2011). The scale has a three-factor structure (school attachment, teacher attachment, friend attachment). The School Attachment sub-dimension includes the items 1, 2, 3, and, the Friend Attachment sub-dimension includes the items 5, 6, 7, 8, and 9), and the Teacher Attachment sub-dimension includes the items 10, 11, 12, and 13. This three-factor structure explains 58.69% of the total variance. The Cronbach's alpha internal consistency coefficient calculated to test the internal consistency of the scale is between .71 and .80 for the sub-factors and is .84 for the entire scale. The result of the test-retest analysis is .85. The split-half reliability of the scale is .78. The Turkish form of the scale can be administered to children between the ages of 9-14 and has 13 items and three sub-dimensions. A high score taken from each sub-dimension indicates that the person has that characteristic and the scale also gives a total score. The highest score that can be taken from the entire scale is 65, and the lowest score is 13. While the highest score that can be taken from the sub-dimensions of School Attachment and Teacher Attachment is 20 and the lowest score is 4, the highest score that can be taken from the sub-dimension of Friend Attachment is 25 and the lowest score is 5.

Data Analysis

Before data analysis, the data set was examined for missing values. The examination showed that there were no missing values in the data set. Z scores were examined and boxplots were checked to determine the outliers in each variable. No Z score exceeding |3.29| was found in the Z scores and there were no outliers as a result of the boxplot examination. In this context, the analyses were conducted on 564 observations. In terms of categorical variables, independent samples t-test and one-way analysis of variance technique were used in examining the dependent variables. While examining the relationships between variables, Pearson correlation analysis technique and simple linear regression analysis technique were used. The margin of error in the study was accepted as .05.

Results

Table 1. Standard Deviation Mean and T-Test Results of Computer Game Addiction, School Attachment and Academic Grit According to Sex.

	Sex	n	$\bar{x}$	ss	*t*	*p*
School Attachment	Female	299	22.18	6.18	-1.14	.26
	Male	265	22.83	7.26		
School Grit	Female	299	33.37	9.85	1.12	.26
	Male	265	32.45	9.48		
Computer Game A.	Female	299	37.81	12.93	-5.54	.00*
	Male	265	44.55	15.93		

*p<.05

In terms of the sex variable, there was a significant difference in students' computer game addiction levels (t(562)= -5.54, p< .05). According to this result, male students had higher computer game addiction levels. Furthermore, in terms of the sex variable, there was no significant difference in students' school attachment levels (t(562)= -1.14, p> .05) and academic grit levels (t(562)= 1.12, p> .05). According to these findings, the school attachment and academic determination levels of female and male students were similar to each other.

Table 2. Standard Deviation Mean and T-Test Results of Computer Game Addiction, School Attachment and Academic Grit According to Grade Level.

	Grade Level	n	$\bar{x}$	ss	*t*	*p*
School Attachment	4th grade	267	22.18	6.14	-1.03	.31
	5th grade	297	22.76	7.18		
Academic Grit	4th grade	267	33.00	10.08	.15	.88
	5th grade	297	32.88	9.32		
Computer Game A.	4th grade	267	43.88	14.49	4.49	.00*
	5th grade	297	38.37	14.59		

*p<.05

Table 3. Standard Deviation Mean and t-Test Results of Computer Game Addiction, School Attachment and Academic Grit According to Whether the Students Have a Computer at Home.

	Having a Computer	n	$\bar{x}$	ss	*t*	*p*
School Attachment	Yes	383	22.82	6.67	1.74	.08
	No	181	21.77	6.75		
Academic Grit	Yes	383	32.52	9.65	-1.49	.14
	No	181	33.82	9.72		
Computer Game A.	Yes	383	44.89	14.39	9.89	.00*
	No	181	32.70	11.96		

*p<.05

The examination of whether the students' computer game addiction levels in terms of whether they had a computer at home, there was a significant difference (t(562)= 9.89, p< .05). According to this finding, the computer game addiction levels of students who had a computer at home were higher. However, there was no significant difference in students' school attachment levels (t(562)= 1.74, p> .05) and academic grit levels (t(562)= -1.49, p> .05) in terms of the variable of whether they had a computer at home. According to these results, the levels of school attachment and academic grit of the students who had a computer at home and those who did not have a computer at home were similar to each other.

Table 4. Standard Deviation Mean and ANOVA Results of Computer Game Addiction, School Attachment and Academic Grit According to Average Daily Computer Game Playing Duration.

Dimension	Game Playing Duration	N	$\bar{x}$	Source of Variation	Sum of Squares	sd	Mean Squares	F	df
School Attachment	0-2 hours	311	21.49	Between groups	833.99	2	416.99	9.53*	3-1 2-1
	3-4 hours	177	23.21	Within groups	24536.94	561	43.74		
	5 hours and over	76	24.88	Total	25370.94	563			
Academe	0-2 hours	311	34.47	Between groups	1754.31	2	877.16	9.64*	1-2

	3-4 hours	177	31.55	Within groups	51063.87	561	91.02		1-3
	5 hours and over	76	29.93	Total	52818.18	563			
Computer Game A.	0-2 hours	311	32.23	Between groups	61711.18	2	30855.59		
	3-4 hours	177	47.89	Within groups	61503.60	561	109.63	281.45*	3-1 3-2
	5 hours and over	76	60.67	Total	123214.78	563			2-1

*p<.05

In terms of the game playing duration variable, there was a significant difference in students' school attachment levels (F(2, 561)= 9.53, p< .05). The Scheffe test was conducted to determine the source of this difference. According to the test result, students who played computer games for 5 hours and more had a higher level of school attachment than students who played computer games for 0-2 hours. Similarly, students who played computer games for 3-4 hours had a higher level of school attachment than students who played computer games for 0-2 hours.

Furthermore, there was a significant difference in students' academic grit levels in terms of the computer game playing duration variable (F(2, 561)= 9.64, p< .05). The Scheffe test was conducted to determine the source of this difference. The test result revealed that the academic grit levels of students who played computer games for 0-2 hours were higher than those who played computer games for 3-4 hours and five hours and more.

In addition, in terms of the computer game playing duration variable, there was a significant difference in students' computer game addiction levels (F(2, 561)= 281.45, p< .05). The Scheffe test was conducted to determine the source of this difference. According to the findings of the test, those who played computer games for 5 hours and more had higher computer game addiction levels compared to those who played computer games for 0-2 hours and 3-4 hours. Also, the computer game addiction was higher in students who played games for 3-4 hours compared to students who played games for 0-2 hours.

Table 5. Means, Standard Deviations and Correlation Coefficients of Variables

Variables	$\bar{x}$	sd	1	2	3
School Attachment	22.49	6.71	-		
Academic Grit	32.94	9.69	-.10*	-	
Computer Game A.	40.98	14.79	.14**	-.21**	-

*p<.05, **p<.01

The above table shows the relationships between the variables. There were low-level significant relationships between the variables. This result is also an indication that there was no multicollinearity problem.

Table 6. Results Regarding the Prediction of School Attachment

Predictor Variable	*B*	SH *B*	*β*	*t*
Constant	19.83	.83		24.03*
Computer Game A.	.07	.02	.14	3.43*
R^2		.02		
adjusted R^2		.02		

*p<.05

The result of the regression analysis examining the prediction of the school attachment variable by computer game addiction revealed that the model was significant (F(1,562) = 11.78, p<.001). Computer game addiction explained 2% of the variance of school attachment. The examination of the unstandardized regression coefficients determined that computer game addiction (B = .07, t = 3.43) was a positively significant predictor of school attachment. According to this result, a one-unit increase in computer game addiction predicted a .07-point increase in school attachment scores.

Table 7. Results Regarding the Prediction of Academic Grit.

Predictor Variable	*B*	SH *B*	*β*	*t*
Constant	38.49	1.18		32.70*
Computer Game A.	-.14	.03	-.21	-5.01*
R^2		.04		
adjusted R^2		.04		

*p<.05

The result of the regression analysis examining the prediction of the academic grit variable by computer game addiction revealed that the model was significant (F(1,562) = 25.13, p <.000). Computer game addiction explained 4% of the variance of the academic grit variable. The examination of the unstandardized regression coefficients determined that computer game addiction (B = -.14, t = -5.01) was a negatively significant predictor of academic grit. According to this result, a one-unit increase in computer game addiction predicted a .14-point decrease in academic perseverance scores.

Discussion

In this study, findings regarding the role of school attachment and academic grit in predicting computer game addiction were determined. In addition, whether the students' school attachment, academic grit and computer game addiction levels differed according to sex, grade level, whether or not they had a computer at home and the duration of playing computer games were among the other study findings.

The study results put forth that there was no significant difference in students' school attachment and academic grit levels in terms of the sex variable, and that male and female students were similar. A significant difference was found in the students' computer game addiction levels. According to this result, male students had higher computer game addiction levels. Studies suggest that especially male adolescents between

the ages of 10-19 have a higher tendency to excessive game playing and problematic use than female adolescents and other age groups (Chou & Tsai 2007, Çakır et al., 2011). Many studies in the literature state that male students have higher addiction levels than female students (Hauge & Gentile, 2003; Griffiths & Davies, 2005; İnal & Çağıltay, 2005; Onay et al., 2005; Gentile, 2009; Yılmaz, 2010; Erboy, 2010; Horzum, 2011; Erboy & Vural, 2011; Şahin & Tuğrul, 2012). In their research on computer games, Çavuş et al. (2016) determined that one in every five students is at risk of game addiction, males are more intensely affected by games than females and have difficulty controlling the time they play. A study conducted at Stanford University School of Medicine in 2008 found that males are more addicted to games than females. The reason for this is that the pleasure region in men's brains is more active during the game compared to women (Wiki, 2008). In terms of gender roles assigned to women and men in society, women being more submissive and calm and men being more dominant and aggressive are accepted behaviors. Women are encouraged more than men to establish and maintain relationships with others (Güçray, 2009). Encouraging women to establish more social connections with others may cause them to spend time in real social environments instead of the time spent on the internet.

Another study finding was that there was a significant difference between students' computer game addiction levels and their school grade level. This difference is the result of the fact that the computer game addiction levels of 4th grade students were higher than 5th grade students. Contrary to this study result, some studies determined that computer game addiction scores are higher as the grade level increases (Horzum, 2011; Erboy, 2010; Şahin & Tuğrul, 2012; Öncel & Tekin, 2015). Horzum (2011) concluded in his study that 5th grade students' computer game addiction is higher than fourth grade students.

Moreover, there was no significant difference in students' school attachment and academic grit levels in terms of whether there was a computer at home. According to this result, students school attachment and academic grit levels were similar, no matter they had a computer at home or nor. On the other hand, there was a significant difference in students' computer game addiction levels, and that students with computers at home had higher computer game addiction levels. Durdu et al. (2005) concluded in their study that individuals who own a personal computer are more likely to be fond of computer games. There are studies that are consistent with this finding (Onay et al., 2005; Yılmaz, 2010; Erboy, 2010; Şahin & Tuğrul, 2012).

Furthermore, there was a significant difference in students' school attachment levels in terms of the computer game playing duration variable. The source of this difference was that students who played computer games for 5 hours and more had higher levels of school attachment than students who played games on the computer for 0-2 hours. Similarly, students who played computer games for 3-4 hours had higher levels of school attachment than students who played computer games for 0-2 hours. These findings showed that there was a positive relationship between the duration of game playing and school attachment. However, another study emphasized that children and adolescents who spent too much time playing computer games gradually became lonelier and had difficulty in establishing face-to-face relationships (Kraut et al., 2018). The

fact that the result of the present study revealed a positive effect can be due to the fact that the computer games played can increase conversations between friends, provide them with more opportunities to talk about games at school, and create an environment where they can play games similar to the games they play on the computer during breaks.

There was also a significant difference in students' academic grit levels in terms of the game playing duration variable. The source of this difference was that students who played computer games for 0-2 hours had higher academic grit levels than students who played computer games for 3-4 hours and more than 5 hours. The increase in time spent on computer games can negatively affect the child's school-related responsibilities and academic studies (Grüsser & Thalemann, 2006). The increase in time spent on computer games can reduce the time spent doing homework, reading or participating in other educational activities. Studies confirmed that there is a relationship between increased screen time and the reduction of reading and homework time and that it strongly affects poor school performance (Sharif & Sargent, 2006). Yavuz (2018) found significant differences in weekly computer use time according to academic achievement levels in his study. Those with high academic achievement levels have lower weekly computer use times than those with medium and low levels. Wright (2011) stated that those who play computer games have lower academic grade point averages compared to those who do not play, while Anand (2007) put forth that computer games have a detrimental effect on academic grade point averages. Elmas (2015) also argued that playing games for long periods of time negatively affects academic achievement and that the time spent playing games should be controlled in order to increase academic achievement.

Moreover, there was a significant difference in students' computer game addiction levels in terms of the game playing duration variable. According to the source of this difference, those who played computer games for 5 hours and more had higher computer game addiction levels compared to those who played games for 0-2 hours and 3-4 hours. Students who played games for 3-4 hours had higher computer game addiction levels compared to students who played games for 0-2 hours. In the study conducted by Gökçearslan and Durakoğlu (2014), game addiction levels differ in terms of computer game playing duration. Accordingly, those who play more than three hours a day have higher game addiction levels than others. Thus, there is a direct proportion between game addiction and playing duration. In the study conducted by Şahin and Tuğrul (2012), the opposite result was reached.

The examination of the relationship between the variables in the study showed that computer game addiction is a positively significant predictor of school attachment and negatively significant predictor of academic grit. Some studies in the literature concluded that users who spend excessive time playing computer games have low academic achievement (Anand 2007, Gentile 2009). In the literature, the prevalence of computer game addiction was found higher in those who spend more time on the Internet and use the Internet mostly for playing games. On the other hand, the prevalence of computer game addiction was found to be lower in those who use the Internet mostly for studying and getting information. This may be related to the meaning and function of playing games for the individual,

which is emphasized to have an important role in the development of computer game addiction (Bingöl-Karagöz, 2017).

Recommendations

The present study examining the computer game addiction levels of elementary school 4th graders and middle school 5th graders according to grade, sex, whether there is a computer at home and the duration of playing computer games revealed that computer game addition levels of male students were higher than female students, 4th graders' levels were higher than 5th graders' levels, and the levels of those with computers at home were higher than those without. The increase in the duration of playing games also increased computer game addiction and school attachment. However, the increase in the duration of playing games decreased academic grit. In light of these findings, recommendations are presented to researchers and practitioners:

- The family environment is decisive in children's socialization and attaining positive/conscious behaviors. School counselors should inform families and students about the negative situations that may arise from spending too much time on the computer, and trainings on "digital game addiction and accompanying problems" and "problem prevention and conflict approaches" for parents may be beneficial.

- Studies on games put forth that there is a need for research on the childhood period when games are played the most and self-control is low. In addition, the development of up-to-date measurement tools that will reveal the game addiction levels is gaining importance.

- The study findings are limited to the characteristics of the study group. For this reason, it may be recommended that this and similar studies be conducted with a wider age range.

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