Relationship of Digital Game Addiction with Gender and Gamification User Types amongst Freshman

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Abstract

The study focuses on exploring the effects of three variables — gender, age, and gamification user types — on digital game addiction. The study enrolled a total of 422 first-year students – freshman- of a Turkish university in the Fall semester of the 2018–2019. The study employed two scales: The Turkish version of the "Gamification User Types Hexad Scale" (GUTHS) and the "Computer Game Addiction Scale" (CGAS). Data were analyzed by means of hierarchical regression analysis. In the first model, gender was found to be a significant predictor of digital game addiction. In the second model it was found that gender and being a "philanthropist" or a "player" according to the GUTHS were the significant predictors of digital game addiction. Being a male and being a "player" positively predicted digital game addition whereas being a "philanthropist" negatively predicted digital game addiction. In brief, males and "players" are more prone to digital game addiction than females and "philanthropists.". Further research is needed to investigate the persistence or variation of these profiles in people, the sub-variables associated or not associated with game addiction, the relationship of these variables with gaming addiction and positive psychological factors such as socialization, and the impact of career or other environmental variables on these relationships.

Keywords: Digital games, game addiction, gaming motivation, gamification, gamification user types.

Introduction

Across the world, 30.90% of all computer or mobile device users play digital games (Wijman, 2018). A recent survey shows that the average age of players is 33, and 46% of computer players are women (ESA, 2019). Today, the increase in time spent at home due to the coronavirus (COVID-19) pandemic has led to an increase in the use of digital entertainment tools and online games in particular (Perez, 2020). According to reports, sales of digital games in 50 countries began to increase when the coronavirus pandemic started, and just between March 16 and 20, 2020, sales increased by 63% compared to the previous year (Dring, 2020).

Video, computer or digital games — which are independent of the outside (real) world, have their own rules, and can be described as digital environments with elements of entertainment — are used by a large audience as a means of entertainment (Wood et al., 2007). People also play digital games for purposes

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such as decreasing stress levels (Young, 2009), getting away from real-life problems (Griffiths et al., 2012), and having fun (Kuss & Griffiths, 2012). Nevertheless, digital games have serious adverse effects like digital game addiction (Kuss & Griffiths, 2012). Digital game addiction may lead to negative social and psychosocial consequences like decreased academic performance, increased stress, decreased sleep quality, impaired social life (Batthyany et al., 2009). In addition, digital game addiction may lead to behavioral salience and tolerance and mood change, which are some of the traditional symptoms of drug addiction (Hsu et al., 2009; Lemola et al., 2011), and game addicts may experience similar neural processes observed in drug addicts and pathological gambling addicts (Han et al., 2011; Ko et al., 2009). Moreover, compulsive Internet use makes game addiction even worse (Van Rooij et al., 2011), game addiction reduces academic grade point average and self-esteem (Toker & Baturay, 2016), and game addicts may experience time distortion (Chou & Ting, 2003; Rau et al., 2006). It has also been indicated in the literature that game addiction can lead to low emotional intelligence (Kuss & Griffiths, 2012) and low psychological well-being (Barnett & Coulson, 2003). Apart from these, digital game addiction has been reported to positively correlate with offensive and narcissistic personality traits (Kim et al., 2008), depressive disorders, and dysthymia (Kim et al., 2017).

Gender is one of the most important variables that stand out among the demographic variables related to game addiction. In a study on online gamers with an average age of 22, female gamers were found to have shorter weekly online gaming hours than female gamers (Wei et al., 2012). There are many studies exploring whether game addiction differs by gender among university students. Some of these studies show that boys are more prone to digital game addiction than girls (King et al., 2012; Rehbein et al., 2016; Vollmer et al., 2014). On the other hand, some studies show that there is no difference between genders in terms of game addiction or game preferences (Pala & Erdem, 2011). These conflicting findings have made the gender variable important for research. Another important variable in terms of game addiction is age. People from all age groups play digital games. King et al. (2012) claim that game addicts are usually in the 25–30 age range. Kubey et al. (2001) found that first-year university students were more addicted to the Internet. In another study, there was no significant difference in game addiction among grade levels (Çakır et al., 2011). Greenberg et al. (2010) and Rehbein et al. (2016) found that game addiction differs depending on age.

One of the most important components of digital game-playing behavior is the motivation to play and actions resulting from this motivation (Ghuman & Griffiths, 2012). The motivation to play games is a domain that will give researchers insight into online gaming intentions (Hussain et al., 2015). There are studies in the literature examining how variables such as gaming motivations and gamification user types correlate with gaming durations and game addiction. Ng and Wiemer-Hastings (2005) pointed out that social interaction was a crucial element in motivating users in the cyber world to stay online for long periods of time. Ducheneaut et al. (2006) found in their study on Massive Multiplayer Online Role Playing Game (MMORPG) players that players who joined an online gaming community spent more time in the game than those who did not join, and that socializing in virtual environments could affect the time spent playing online games. In their study, Hsu et al. (2009) examined the relationship between MMORPG game addiction and 11 different gaming motivations. They pointed out that certain gaming motivations — namely curiosity (the motivation to make a discovery), role-playing (the motivation to progress), belonging-obligation (a long-term cybersocial relationship), and reward (player reward) — were significant variables in predicting MMORPG game addiction. Dindar and Akbulut (2014) noted that

motivational elements such as game mechanics, mastering or advancing in the game (advancement), and socializing were the leading motivators for players and that team games were of less importance. In their study on 690 World of Warcraft (one of the most well-known MMORPG games) players, Billieux et al. (2013) observed players' in-game behaviors for eight months. They found relationships between certain gaming motivations and in-game behaviors. They found that progression regarding the competitive aspects of the game positively correlated with the motivation to compete and challenge other players. They also stated that progression related to cooperative achievements positively correlated with the motivation of teamwork and of discovery, affiliation with a guild, and weekly playing duration. Finally, there was no significant correlation between problematic game playing and other variables based on the results of the longitudinal study. Hussain et al. (2015) carried out a study on 1167 MMORPG players. They pointed out that those who had highly-social and competitive motivations had high risks of game addiction. Kuss et al. (2012) conducted a study on 375 gamers. They stated that the players' motivation to avoid real-life problems and to analyze the rules and the system to optimize character performance in the digital game increased the time they spent playing the game. Lehenbauer-Baum et al. (2015) stated that game addiction correlated with achievement and immersion game motivations in their study on 682 MMORPG players.

Current Study

Studies in the literature measure gaming motivation by making specific measurements to the player population playing certain types of games (mostly MMORPGs). In this study, it was aimed to compare gaming motivation with related variables by making a more general measurement that is not specific to a particular game genre, a gamification user type scale (GUTHS) (Tondello et al., 2016). In addition, in these studies, researchers generally compare game addiction with player motivation and with players' in-game and game-related behaviors. The aim of this study is to examine whether gaming motivations are significant predictors of digital game addiction using a more general scale of game motivation that does not belong to a specific digital game genre. During the conduct of this study, age and gender, the two variables that have been reported in the literature to affect digital game addiction, were treated as control variables when examining the relationships between addiction and gamification user types.

Method

Research Design

The study was conducted as a correlational survey to examine the relationship of digital game addiction with gamification user types, age, and gender.

Participants

The study enrolled 422 first-year students who accepted to participate in the study from among 520 students studying at different departments of the Faculty of Education in a Turkish university in the Fall semester of the 2020–2021 academic year. The participants were determined using the convenience sampling method. The reason why the study focused on this sample is that the GUTHS was developed (Tondello et al., 2016) by collecting data from first-year university students - freshman. In other words, it is more suitable for this target sample. Of the participants, 290 (68.7%) were female, and 132 (31.3%) were male. The age range was between 17 and 22, and the average age was 19.38. The distribution of the

participants by department was as follows: Computer and Instructional Technologies (n = 52, 12.32%), Science Education (n = 40, 9.48%), Mathematics Education (n = 45, 10.66%), Early Childhood Education (n = 39, 9.24%), Special Education (n = 47, 11.14%), Social Studies Education (n = 29, 6.87%), Psychological Services in Education (n = 50, 11% , 85), Elementary Education (n = 49, 11.61%), Turkish Language Education (n = 43, 10.19%), and English Language Education (n = 28, 6.64%).

Data Collection Tools

The "Gamification User Types Hexad Scale" (GUTHS) used in the study was based on a framework put forward by Marczewski (2015), and the validity and reliability studies were carried out by Tondello et al. (2016). The scale was adapted to Turkish by (Akgün & Topal, 2018), who also carried out translation, linguistic equivalence, validity, and reliability studies. It is different from other scales in the literature in that it was not developed specifically for a specific type of game, which is why the present study employed it. Nevertheless, the scale is about possible gaming motivations described as personality traits (Tondello et al., 2016). The scale consists of 22 items and six sub-dimensions, each of which represents a user type: "free spirits, socializers, achievers, philanthropists, players, and disruptors." The scale is a 7-point Likert-type scale. One can score a minimum of 4 points and a maximum of 28 points on the "free spirits," "socializers," "achievers," and "philanthropists" sub-dimensions, and a minimum of 3 points and a maximum of 21 points on the "players" and "disruptors" sub-dimensions. The range of scores — from low to high — shows the extent to which a person has those user types. Cronbach's alpha coefficients of the sub-dimensions were calculated in original study as follows: philanthropists = .76, socializers = .79, free spirits = .72, achievers = .80, disruptors = .71, and players = .78 (Akgün & Topal, 2018). Accordingly, all the sub-dimensions were found to be reliable.

The "Computer Game Addiction Scale" (CGAS) was adapted to Turkish by (Ayas, Çakır & Horzum, 2011). The scale consists of 26 items and a single sub-dimension. The scale is a 5-point Likert-type scale. One can score a minimum of 26 points and a maximum of 130 points on the scale. The range of scores — from low to high — indicates the severity of game addiction. Cronbach's alpha of the scale was calculated as .95, which indicates the scale is reliable (Ayas et al., 2011).

Data Analysis

Prior to the study, permission was obtained from the Faculty of Education, where the study would be conducted, and the data collection instruments were administered to the students who volunteered to participate in the study. Hierarchical linear regression analysis was used to analyze the relationship between gamification user types and addiction while controlling gender and age. The gender variable was coded and included in the analysis as a dummy variable ("0" = "Female" and "1" = "Male"). The analyses were carried out using the SPSS 21 package program.

Findings

The students were 17 to 22 years old (M = 19.18, SD = 2.49). The scores on the CGAS ranged from 26 to 130 (M = 31.01, SD = 13.64). The scores on the sub-dimensions of the GUTHS ranged as follows: the scores on the "philanthropist" type ranged from 4 to 28 (M = 23.22, SD = 4.29), those on the "socializer" type ranged from 4 to 28 (M = 21.50, SD = 4.79), those on the "free spirit" type ranged from 4 to 28 (M = 23.15, SD = 3.89), those on the "achiever" type ranged from 4 to 28 (M = 23.34, SD = 4.14), those on the "disruptor"

type ranged from 3 to 21 (M = 13.65, SD = 3.64), and those on the "player" type ranged from 3 to 21 (M = 16.07, SD = 4.13). It was observed that the highest average belonged to the "achievers," while the lowest average belonged to the "disruptors" (see Table 1).

Table 1

Descriptive Statistics of Measurements

	Average			Standard Deviation				
	Total	Female	Male	Total	Female	Male	Min.	Max.
Game Addiction	31.01	27.15	39.50	13.64	10.10	16.36	21	105
Philanthropist type	23.22	23.36	22.92	4.29	4.19	4.50	4	28
Socializer type	21.50	21.42	21.68	4.79	4.69	5.03	4	28
Free-spirit type	23.15	23.10	23.27	3.89	3.95	3.76	4	28
Achiever type	23.34	23.39	23.23	4.14	4.05	4.36	4	28
Disrupter type	13.65	13.59	13.77	3.64	3.65	3.62	3	21
Player Type	16.07	16.03	13.17	4.13	4.06	4.30	3	21

According to the results of the analysis, there was no statistically significant relationship between the CGAS scores and the ages of the participants (r = -.010, p < .001). Pearson product-moment correlation coefficient was used to examine the relationship between the CGAS (as the dependent variable) and age and the sub-dimensions of the GUTHS (as independent variables).

Table 2

Pearson Correlation Values Between Computer Game Addiction and Predictor Variables of Age, Philanthropist Type, Socializer Type, Free Spirit Type, Achiever Type, Player Type and Disrupter Type

	Age	Philanthropist	Free Spirit	Socializer	Achiever	Player	Disrupter
GUTHS	-.010	*-.182**	-.005	-.026	.086	*.121***	.048

*The scores marked with * show statistically significant relationships at the p < .10 level, and those marked with ** show statistically significant relationships at the p < .050 level. In terms of CGAS, an increase in scores on the Computer Game Addiction Scale shows that game addiction is increasing. In terms of GUTHS, an increase in player type scores on six dimensions of the Gamification User Types Hexad Scale shows the dominance of that type of player in the person.*

Considering the Pearson product-moment correlation coefficients, there were some significant relationships between the participants' CGAS scores and their GUTHS scores (see Table 2). The participants' CGAS scores had a significant, very weak, negative correlation with the "philanthropist" user type (r = -.182, p < .001) and a significant, very weak, positive correlation with the "player" (gamer)

user type (r = .121, p < .005). According to these findings, the CGAS score increases as scores from the sub-dimension of "players" (motivated by extrinsic rewards and likes to get rewards and points in exchange for his or her efforts) increase. This finding shows a correlation, albeit weak, between being a "player" and being an addict. On the other hand, the CGAS score decreases as scores from the sub-dimension of "philanthropist" (seeks meaning and purpose in what he/she does and likes to help people) increase. So, there is a weak, negative correlation between these two variables. In other words, the "philanthropist" user type negatively correlates with being a game addict. In addition to the correlation analyses carried out, a regression analysis was conducted to investigate the emerging correlations in terms of cause-and-effect and impact. In the regression analysis, a hierarchical regression analysis was carried out to determine the effect of age and gender as well as player types based on the models that were intended to be tested.

The effect of gender and age on CGAS scores was examined in the first block using the hierarchical regression model. It was observed that gender was a predictor of CGAS scores whereas age was not (see Table 3). The F value in the first block was significant [F (2,419) = 44.905 at p < .05 and R^2 = .177] (see Table 3). The six dimensions of the GUTHS representing the gamification user types were added to the second block of the hierarchical regression model. The F value in the second block was also significant [F_{change} (6,413) = 3.132 at p < .05 and R^2_{change} = .036]. Compared to the first block, the R^2_{change} value was observed to have decreased in the second block (see Table 3). Analysis results showed that males were more prone to game addiction than females.

Table 3

Hierarchical Regression Analysis Results for the Extent to Which Demographic Variables and Player Types Predict Game Addiction

Predictor Variable	B	Standard error	Beta	t	p
Block 1 (R = .420, R^2 = .177, ΔR^2 = .177, F(2, 419) = 44.905, p < .001)					
Gender	*12.388*	*1.312*	*.421*	*9.443*	*.000*
Age	-0.064	0.244	-.012	-.262	.793
Block 2 (R = .461, R^2 = .212, ΔR^2 = .036, F (8, 413) = 13.918, p < .001)					
Gender	*12.109*	*1.298*	*.412*	*9.327*	*.000*
Age	-.056	.241	-.010	-.234	.815
Philanthropist	*-.579*	*.206*	*-.182*	*-2.811*	*.005*
Socializer	-.075	.163	-.026	-.459	.647
Free Spirit	-.018	.221	-.005	-.082	.935
Achiever	.281	.201	.086	1.402	.162
Disrupter	.181	.179	.048	1.011	.313
Player	*.400*	*.171*	*.121*	*2.342*	*.020*

The predictor variables were analysed in two steps. Age and gender were added to the analysis in the first step and GUTHS in the second step. Gender: 0 = Female, 1 = Male. In terms of CGAS, an increase in scores on the Computer Game Addiction Scale shows that game addiction is increasing. In terms of GUTHS, an increase in player type scores on six dimensions of the Gamification User Types Hexad Scale shows the dominance of that type of player in the person. Durbin–Watson = 1.964, Tolerance Values** are between .985 to .999 and VIF Values** are between 1.001 and 1.003.*

**Durbin–Watson value was near 2, and nonautocorrelation between variables is indicated.*

***All tolerance values are greater than .20 and VIF values smaller than 5, no multicollinearity problem is indicated.*

Significant differences are in italic.

Age did not have a significant effect on digital game addiction, but gender had a significant effect in favor of males (R^2 = .177, F (2, 419) = 44.905, p < .001). The findings of the regression analysis in the first block indicate that the model explained variance of .18. It is worthy to note that in this model, being a male was associated with a change of B = 12.388 points in CGAS scores.

In the second block, both the gender and age variables were incorporated into the model; thus, the effects of both demographic variables and user types on predicting digital game addiction were re-examined. In the second step of the analyses, the effects of age and gender on game addiction were found to decrease relatively, as expected, due to the incorporation of the effects of player types into the model. It was found that gender was the only significant predictor, and when the effect of these demographic variables was controlled, "philanthropist" and "player" user types emerged as other significant predictors [R^2 = .212, ΔR^2 = .036, F (8, 413) = 13.918, p < .001]. Among these variables, gender (being a male, B = 12.109) and being a "player" (B = .40) were the variables that positively affected digital game addiction; in other words, they significantly predicted the increase in CGAS scores. Being a "philanthropist" (B = -.579) was a negative predictor of digital game addiction. In other words, those who were "philanthropists" according to the GUTHS were less likely to become a digital game addict. A review of the standardized effects of these variables on CGAS scores showed that the strongest significant predictor with the most influence was gender (being a male, β = .412), followed by being a "philanthropist" (β = -.182) and being a "player" (β = .121). These findings show that when gender and age variables were controlled, there was a significant relationship between user types and digital game addiction. Those who were considered "players" according to the GUTHS were relatively more prone to digital game addiction than those considered "philanthropists." The "philanthropist" user type, which refers to a profile of players who look for meaning in what they do and who like to help people, appears to indicate a lower risk of digital game addiction. On the other hand, the "player" user type, which refers to people who are motivated by extrinsic rewards and who like to get paid for their work, appears to indicate a higher risk of digital game addiction. Other user types, namely, "socializers," "free spirits," "achievers," and "disruptors" did not significantly predict digital game addiction in this study.

Discussion

According to the results of the study, gender, being a "philanthropist," and being a "player" significantly predicted the possibility of game addiction amongst freshman. Among these factors, being a male and a "player" was associated with an increased risk of digital game addiction whereas being a "philanthropist" was associated with a lower risk of digital game addiction. Apart from these, age, being a "socializer,"

being a "free spirit," being an "achiever," and being a "disruptor" were not found to be significant predictors of game addiction among university students.

This study demonstrated that the gender variable could predict game addiction strongly and male participants were more prone to game addiction than female participants. These findings were also consistent with many similar studies (Çakır et al., 2011; Greenberg et al., 2010; King et al., 2013; Rehbein et al., 2016; Vollmer et al., 2014; Wood & Griffiths, 2007). These results can be attributed to the fact that playing digital games is usually considered a pastime for boys (Ayas et al., 2011). Indeed, some researchers have suggested that boys are more motivated to play digital games than girls (Chou & Tsai, 2007). On the other hand, the findings indicated that the age variable did not predict game addiction significantly. In this regard, the results of the study contradict the results of the study of King et al. (2013) and Rehbein (2016). Lemola et al. (2011) pointed out that adults spent more time on digital games than adolescents. The average ages of women and men playing digital games are 34 and 32, respectively, according to the 2019 Entertainment Software Association (ESA) report on digital games (2019). However, in this study, age was not a significant predictor of game addiction. Differences between these research results may be due to differences in samples, intercultural differences, and the idea that the hobbies of adolescents and adults vary depending on cultures. In this study, the variations in ages of the participants did not affect their game addictions, which means that their addiction remained at a similar level even though their ages differed.

According to the results, being a "philanthropist" significantly and negatively predicted game addiction. This means that being a "philanthropist" is associated with a lower risk of digital game addiction. The "philanthropist" user type was defined by Marczewski (2015) as a type that seeks purpose and meaning in what they do. People of this sort are altruistic and want to add something to the lives of other people without expecting anything in return (Marczewski, 2015). This result brings to mind those acts of sacrifice and getting away from egocentricity can minimize the risk of game addiction. Indeed, Kim et al. (2008) claimed that narcissistic personality disorder, which refers to egocentrism and people who do not need to empathize with and think about other people, indicates a higher risk of game addiction.

By results of this study, being a "player" positively predicted digital game addiction. People who are "players" according to the GUTHS are motivated by extrinsic rewards and expect to be rewarded for their actions. The result of the study of Hsu et al. (2009) shows that "players" are more prone to game addiction. The fact that people who fit this profile are fond of extrinsic motivations and rewards (passing levels, getting points, rising in rankings, boasting of their positions in the game, and so forth) may be a significant factor in the propensity for gaming addiction. People with this profile can be in the high-risk group, compared to other profiles, of digital game addiction.

On the other hand, other user types — namely, "socializers," "free spirits," "achievers," and "disruptors" — did not significantly predict game addiction in this study. This result shows that those who are in these gaming motivation profiles are not in a high-risk group for gaming addiction. However, within these profiles, the "achiever" user type and the "disruptor" user type tended to stand out marginally in terms of the regression coefficients (B). It is stated in the literature that socialization (Dindar & Akbulut, 2014; Ducheneaut et al., 2006; Hussain et al., 2015; Ng & Wiemer-Hastings, 2005), making discoveries (Hsu et al., 2009), and motivation for achievement (Lehenbauer-Baum et al., 2015) are significant predictors of game addiction. In future studies, the effects of these profiles on addiction can be examined in different

and larger samples along with age and gender variables, as well as the effects of the above-mentioned variables.

Conclusions

This study was carried out to investigate digital game addiction in students only in terms of gamification user types and other variables. Digital games can be played on many platforms today. This study was, however, limited to digital game addiction. The results of the study indicated that male participants were at a higher risk of digital game addiction. It can be said that nowadays when more people are choosing to socialize online rather than face to face due to the COVID-19 pandemic, digital tools should be used to strengthen communication and relationships between people. Males, in this regard, are in a higher-risk group for digital game addiction, therefore, they should be more careful when using digital technologies. Further research is needed to explore the impact of digital environments on human psychology and on their use for contribution to socialization, as well as to identify applications to ensure their correct usage. These studies should also take into account gender differences. Taking into account the results of this study, an effort can be made to help students develop awareness, knowledge, and skills in the formal education process. The results of the study show that digital game addiction does not vary depending on age. This result can be interpreted as that game addiction does not increase or decrease depending on age. Thus, it can be said that it is important to raise awareness of game addiction in people as early as possible during formal education. Similar studies can also be carried out to measure digital game addiction on different platforms.

The risk of game addiction increases in "players" and declines in "philanthropists," which are two of the gamification user's types. This result shows that the characteristics and psychology of these profiles may be associated with the dynamics of digital game addiction. Therefore, it should be emphasized that "players" are more prone to digital game addiction. Being a "philanthropist," on the other hand, was found to be associated with a lower risk of digital game addiction. Nevertheless, these results do not imply that "players" will necessarily become addicted to digital games, or "philanthropists" will never become addicted to digital games. Therefore, further research is needed to investigate the persistence or variation of these profiles in people, the sub-variables associated or not associated with game addiction, the relationship of these variables with gaming addiction and positive psychological factors such as socialization, and the impact of career or other environmental variables on these relationships. In addition to these, similar studies can be carried out to explore gamification user types in games on different platforms and digital environments.

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