

Gamification user types and game playing preferences of university students

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Abstract

Students' widespread use of games has attracted scientists' attention, and it has been a matter of curiosity whether games can be used in education. The primary purpose of this descriptive study is to examine gamification user types of university students. In addition, the digital game playing characteristics and preferences of students were identified. The participants comprised one hundred and eighty-one (181) university students enrolled at a state university in Turkey. An online questionnaire prepared by researchers and the Gamification User Types Hexad Scale were used as data collection tools. Descriptive statistics (mean, percentage, frequency), Kruskal Wallis H, and chi-square analysis were utilized for data analysis. The results revealed that the highest ratio of students stemmed from achievers, philanthropists, and players. Furthermore, participants mostly preferred to play online games, and most of the students played digital games daily.

Keywords: Digital games, game preferences, game genre, gamification user types.

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1. Introduction

Today, games have become an important leisure activity in the life of university students due to the entertainment and socialization opportunities it provides. Homer et al. (2012) assert that there has been a significant increase in digital game playing time of children and adolescents over the past ten years. Variables such as gender, game genre preferences, and time devoted to game playing are investigated in previous research (Hamlen, 2010; Olson, 2010). Students' widespread use of games has attracted scientists' attention, and it has been a matter of curiosity whether games can be used in education. Studies conducted in this field displayed those digital games can enhance learning environments and motivate learners (Rieber, 1996; Colella, 2000). Aydogan and Aydogan (2020) claim that instructors frequently employ game-like environments to capture learner attention. Regarding the benefits of game-based learning, gamification is increasingly used for teaching purposes to take advantage of the features provided by games, such as enjoyment, motivation, competition, and engagement in formal education and corporate training. In addition to the benefits games and gamification provide to students, research suggests that students' game playing habits and preferences are a vital issue to benefit most effectively (Denner, 2005 ; Karakus, Inal & Cagiltay, 2008).

1.1. Gamification & Gamification User Types

Regarding the educational perspective, Aydogan and Aydogan (2020) describe gamification as an educational approach in which game design principles are implemented in an educational context to enhance the interest and motivation of students. In other words, gamification refers to using game elements (i.e., points, leader boards, badges, teammates, etc.) in a non-game environment (Deterding, Dixon, Khaled & Nacke, 2011). Research shows that gamification is extensively used in marketing, industry, healthcare, financial services, and education (Huotari & Hamari, 2012; Hunter & Werbach, 2012; Kapp, 2012). Scholars concur that the primary function of gamification is to change a person's motivation and behavior towards a direction (Hamari & Koivisto, 2013). Studies on the use of gamification in educational contexts report positive results such as increasing students' motivation and participation in the lesson, making the courses more exciting, and increasing the quality of the products produced within the scope of the task (Barata, Gama, Jorge & Gonçalves, 2013; Jones, Caton & Greenhill, 2014 ; Hew, Huang, Chu & Chiu, 2016).

Besides the benefits of gamification, research indicates that user profiles must be considered to get the most out of the positive effects (Ferro, Walz & Greuter, 2013), because players have various opinions on what motivates them and what kind of reinforcements they find meaningful , (Hunter & Werbach, 2012; Cersowsky Weström, 2016). Studies show that the personalization of gamified settings is more effective and engaging than one-size-fits-all contexts (Dixon, 2011; Tondello, Mora, Marczewski & Nacke, 2019) . In the literature, different studies on player types have been conducted, and various classifications exist. Regarding the determination of player types, Marczewski (2015) has proposed a classification system (user type hexad) that involves six gamification user types explained below to tailor game mechanics to the users and classify individuals based on their characteristics.

Table 1

Hexad player types, user motivations, and characteristics (Tondello et al., 2016)

Player Type	Motivation	Characteristics
Philanthropists	purpose	“They are altruistic and willing to give without expecting a reward.”
Socializers	relatedness	“They want to interact with others and create social connections.”
Free Spirits	autonomy, freedom to express themselves and act without external control	“They like to create and explore within the system.”
Achievers	competence	“They seek to progress within a system by completing tasks or prove themselves by tackling difficult challenges.”
Players	extrinsic rewards	“They will do whatever to earn a reward within a system, independently of the type of the activity.”
Disruptors	triggering of change	“They tend to disrupt the system either directly or through others to force negative or positive changes. They like to test the system’s boundaries and try to push further.”

It is vital to tailor the system based on users’ gamification types because students’ engagement, motivation, and flow experience are directly affected by the implemented design approach in a gamified educational setting (dos Santos, Bittencourt & Vassileva, 2018). Hamari et al. (2016) reveal that a better gamification design leads to enhanced learning performance despite providing a tailored gamified educational system being challenging (Montserrat, Lavoué & George, 2014; dos Santos, Bittencourt & Vassileva, 2018). Through an examination of relevant literature on player types, it is found that studies are generally about suggested design elements for player types (Jia, Xu, Karanam & Voids, 2016) or scale development to classify players more effectively (Tondello et al., 2016). Consequently, scientific studies related to examining the relationship between player types and other variables are scarce.

1.2. Purpose of study

The primary purpose of this descriptive study is to examine gamification user types of university students. In addition, the digital game playing characteristics and preferences of students were identified.

The study aims to answer the following questions:

1. How is the distribution of the dominant gamification user types of the students?
2. What are the game-playing habits and preferences of university students?
3. What is the relationship between students’ gamification user types and preferred game genre regarding the number of players in a game?
4. Is there a significant relationship between students’ dominant gamification user types and the number of hours students spend daily playing digital games?

2. Method

This study was designed as descriptive research which aimed at exploring game playing habits, preferences, and gamification user types of participants.

2.1. Participants

Participants of this research were eighty-one (181) university students. The current paper evaluated answers of N= 126 females (69.6%) and N= 55 males (30.4%). The participants were determined using the convenience sampling method.

2.2. Data Collection Tool

The data were gathered through two data collection tools: (I) an online questionnaire containing questions related to student demographics and game playing preferences prepared by researchers and (II) the Gamification User Types Hexad Scale (Tondello et al., 2016). The Gamification User Types Hexad Scale (Tondello et al., 2016) aims to identify and classify user types in a gamified system based on six-player types (i.e., socializers, philanthropists, disruptors, player, free spirit, and achiever) and was adapted to Turkish by Taskin & Kiliç Çakmak (2020). The Turkish version comprises 24 items and six factors on a 7-point Likert-type scale.

The VRIOT Platform (Figure 1a), which was developed as a 3D learning environment within the scope of the Erasmus + KA203 project, was introduced to the participants before filling the relevant scale. This Erasmus + KA203 project was named "Designing a 3D Virtual Environment for Teaching IoT" (project number: 2017-1-TR01-KA203-046672). The platform was developed during 2017-2019 by a group of researchers under the coordination of Marmara University. The platform supports four different languages and contains comprehensive information about the Internet of Things and nine other projects that students can complete. In addition, the platform has elements such as an object collection laboratory (Figure 1b), a chat panel (Figure 1c), a discussion section (Figure 1d), and a web-based administrator panel where students' progress is followed. a. When filling the scale, students were given a scenario and filled the relevant scale, thinking they played an educational game with their classmates

during a lesson. The purpose of introducing The VRIOT Platform was to enable the participants to gain experience in game-based learning and gamification through the educational game.

Figure 1a.
The VRIOT platform

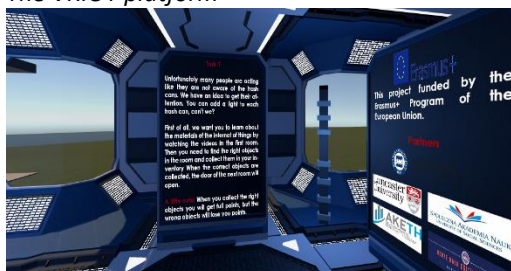


Figure 1b.
Object collection laboratory



Figure 1c.
Chat panel



Figure 1d.
Discussion section



2.3. Analysis

Regarding the data analysis, different statistical methods have been utilized. Descriptive statistics, percentage, and frequency calculations were used to analyse the distribution of variables such as dominant player types, digital game playing time, and game-playing preferences of participants. Furthermore, the internal consistency of the Gamification User Types Hexad Scale factors was evaluated using Cronbach's alpha values. Kolmogorov–Smirnov tests were used to analyse whether the sample data were distributed normally (Mishra et al., 2019). Kruskal Wallis H test was utilized to investigate the relationship between preferred game genre regarding the number of players in a game and gamification player types of participants based on the normality test results. Eta squared were calculated for effect size analysis (Levine & Hullett, 2002). Finally, a chi-square test of independence was used to analyse the relationship between dominant gamification user types and the number of hours students spend daily playing digital games. All statistical analyses were conducted using SPSS version 22.

3. Results

3.1. Research question 1: How is the distribution of the dominant gamification user types of the students?

Initially, the current study's internal scale reliability (Cronbach's alpha) was calculated and compared with the works of Poecze, Roncevic & Zlatic, (2019), Tondello, Mora, Marczewski & Nacke, (2019) and (Tondello et al., 2016) (Table 2). Fundamental discrepancies between studies were observed in terms of Cronbach's alpha values of factors. The reasons for reliability differences can be accounted for distinct

characteristics of participants such as age, language, etc. (Poecze, Roncevic & Zlatic, 2019). For gamification user type determination, participants were classified regarding the scores they obtained from the Gamification User Types Hexad Scale. Tondello et al. Tondello, Mora, Marczewski & Nacke, (2019) assert that the highest score that a participant receives from a factor determines their player type. The player type of each participant was determined by calculating the highest scores of the participants in a –factor.

Table 2

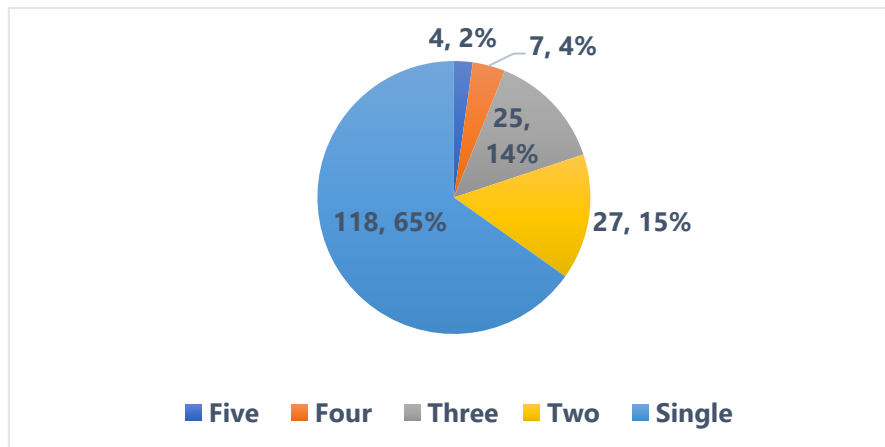
Internal scale reliability of the current study in comparison with other studies

Construct	α	Poecze et al. (2019)	Tondello et al.(2016)	Tondello et al. (2016) 1 st study (en)	Tondello et al. (2016) 1 st study (sp)	Tondello et al. (2016) 2 nd study (en)	Tondello et al(2016). 1 st study (sp)
Philanthropists	.736	.826	.893	.748	.814	.774	.774
Socializers	.742	.867	.838	.825	.826	.828	.820
Free Spirits	.598	.735	.723	.629	.727	.660	.543
Achievers	.676	.746	.759	.730	.808	.616	.594
Players	.712	.775	.738	.843	.874	.716	.758
Disruptors	.646	.691	.698	.788	.746	.699	.640

The distribution of the participants on the number of dominant gamification user types that they possessed is presented in Figure-2. As seen in Figure 2, while 118 participants had a single dominant gamification user type, 63 students had multiple user types (i.e., having maximum points in various factors).

Figure 2.

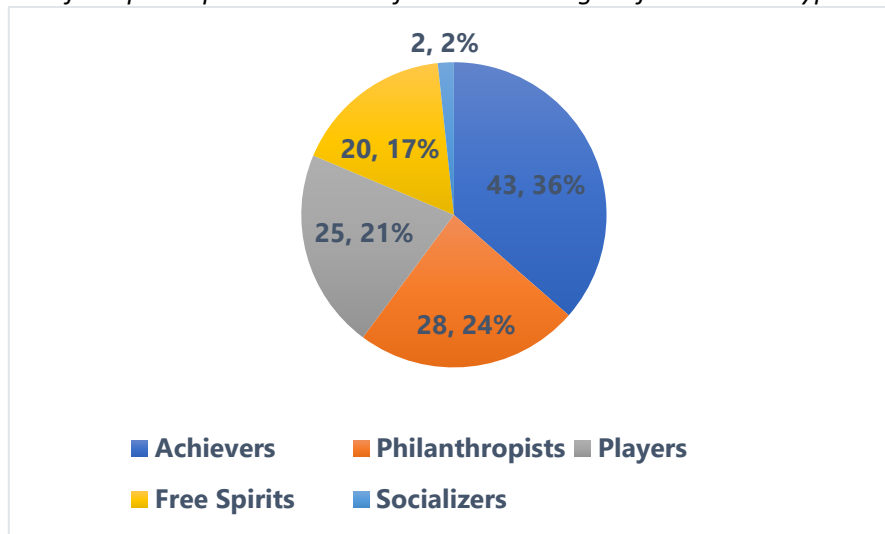
The distribution of the participants in terms of the number of dominant gamification user types



In addition, prevalent gamification user types of participants were investigated (Figure 3). As shown in Figure 3, the highest ratio of students stemmed from *achievers* (N = 43, 36%), followed by *philanthropist* (N = 28, 24%), *players* (N=25; 21), *free spirits* (N=20; 17%) and *socializers* (N=2; 2%). On the other hand, students with *disruptor* user types were not detected.

Figure 3.

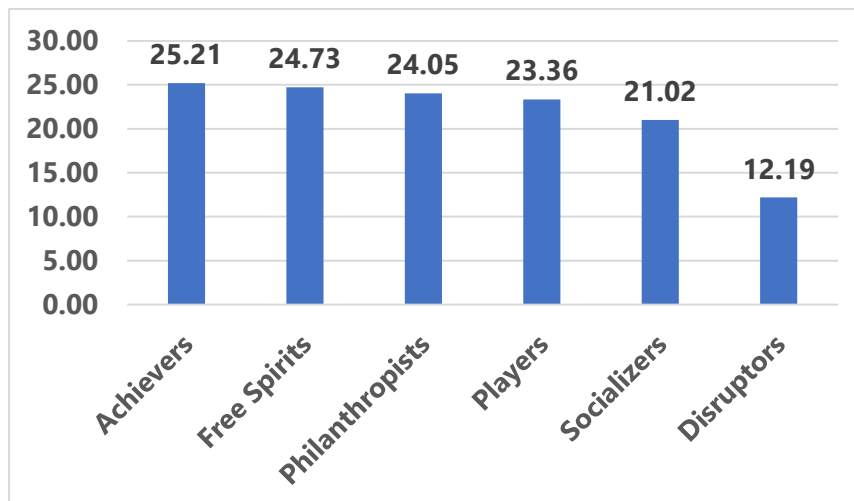
The distribution of the participants in terms of the dominant gamification user type



Finally, the average factor scores of the participants were calculated (Figure 4). According to Figure 4, while the mean scores of participants in the *achiever's* factor were calculated as the highest, *disruptor* factor was the lowest.

Figure 4.

The average factor scores of the participants



3.2. Research question 2: What are the game-playing habits and preferences of university students?

Primarily, the daily game playing time of the participants was investigated. The digital game playing distribution of participants is presented in Table 3. Participant answers to their daily game playing time resulted in a frequency of those who play games less than an hour (N = 54, 29.8%), followed by those

who play games 1-2 hours (N = 53, 29.3%), followed by those who never play games (N = 44, 24.3%), followed by those who play games 3-4 hours (N = 21, 11.6%), followed by those who play games 4-5 hours (N = 5, 2.8%), followed by those who play games 5-6 hours (N = 3, 1.6%), and followed by those who play games 7-8 hours (N = 1, 0.6%)

Table 3

Daily game playing time of students

	Distribution (N)	Distribution (%)
None	44	24.3
Less than one hour	54	29.8
1-2 hours	53	29.3
3-4 hours	21	11.6
4-5 hours	5	2.8
5-6 hours	3	1.6
7-8 hours	1	0.6
Total	181	100

Participants' preferences in terms of devices to play were presented in Table 4. As seen in this Table 4, most participants preferred to play games on their P.C./game console (N=108, 59.7%). In addition to preferred devices to play games, the participants were asked to express whether they preferred to play online or offline games. While 65.7% of participants liked online games, 34.3% of participants chose to play offline games. Finally, the participants were asked whether they preferred to play single-player, multiplayer games, or both. Results are presented in Table 5. As shown in the table, students' single-player and both single-player and multiplayer game playing preferences appeared to be similar.

Table 4

Preferred device to play games

	Distribution (N)	Distribution (%)
P.C./Game console	108	59.7
Mobile phone/tablet	44	24.3
Other students' P.C./Game console	5	2.8
Total	181	100

Table 5

Preferred game type according to the number of players

	Distribution (N)	Distribution (%)
Single player	74	40.9
Multiplayer	39	21.5
Both	68	37.6
Total	181	100

3.3. Research question 3: What is the relationship between students' gamification user types and preferred game genre regarding the number of players in a game?

The relationship between students' gamification user types and preferred game genre in terms of the number of players in a game was evaluated using the Kruskal-Wallis H test. The results were presented in Table 6. There were significant differences in participant scores of the *Socializers* user type (p = .045). On the other hand, no significant differences in participant scores of different player types were found.

Table 6

F-values, eta squared effect sizes (η^2), and the Kruskal-Wallis H test results of user types in terms of different gaming-related activities

User types	F	η^2	p (Kruskal-Wallis H)
Philanthropists	.266	.012	.749
Socializers	3.085	.007	.045
Free Spirits	1.299	.014	.474
Achievers	1.13	.003	.204
Players	.266	.012	.234
Disruptors	.66	.032	.545

3.4. Research question 4: Is there a significant relationship between students' dominant gamification user types and the number of hours students spend daily playing digital games?

Daily game playing time of students concerning dominant gamification user type is presented in Table 7. A Chi-square test of independence was utilized, and test results revealed no significant association between daily game playing time and students' dominant gamification user types, X^2 (24, N=108) =24.727, p>.0.05.

Table 7

Daily game playing time of students concerning gamification user type

Daily game playing time	Achievers		Free Spirits		Philanthropists		Players		Socializers	
	N	%	N	%	N	%	N	%	N	%
None	7	16.3	5	25.0	10	35.7	4	16.0	1	50.0
Less than one hour	11	25.6	5	25.0	9	32.1	10	40.0	-	-
1-2 hours	14	32.6	8	40.0	5	17.9	6	24.0	-	-
3-4 hours	8	18.6	1	5.0	3	10.7	4	16.0	1	50.0
4-5 hours	3	7.0	-	-	1	3.6	-	-	-	-
5-6 hours	-	-	-	-	-	-	1	4.0	-	-
7-8 hours	-	-	1	5.0	-	-	-	-	-	-
Total	43	100	20	100	28	100	25	100	2	100

4. Discussion

This study was carried out to determine gamification user types of university students. Moreover, game playing habits and preferences of students were analyzed. The study covered 181 students in total – 126 females and 55 males. In terms of participants' dominant gamification user types, it was detected that the vast majority of the students (81.3%) were "Achievers," "Philanthropists," and "Players," which

harmonizes with the findings of (Cersowsky Weström, 2016) . In the current paper, none of the students with the "disruptor" user type were detected. Moreover, the calculation of the mean factor scores of the participants revealed that the lowest mean score was estimated for the "disruptor" player type.

When students were asked to state their preferred device for playing games, it was found that 59.7% of participants play computer games using P.C./game console while 24.3% mobile phone/tablet and 2.8% P.C./Game console of others. In addition, it was found that 65.7% of participants preferred online games, and 34.3% of participants preferred to play offline games. When students were asked to state preferred game type regarding the number of players in a game, it was found that 40.9% of participants preferred single-player games while 21.5% multiplayer and 37.6% both single-player and multiplayer. When students' daily game playing time was analyzed, results showed that 75.7% of participants played digital games daily, consistent with the results of (Homer, Hayward, Frye & Plass, 2012).

Chi-square test results revealed no significant association between daily game playing time and students' dominant gamification user types, $\chi^2(24, N=108) = 24.727, p > .05$. On the other hand, the analysis of player types regarding referred game genre unveiled significant differences in socializer player type. This result is not extraordinary because the motivation of the socializer's player type is generated by relatedness and the desire to interact with others (Santos et al., 2021).

5. Conclusion

The current study focused on university students' digital game playing habits, preferences, and gamification user types. The findings of the study showed that most of the students played digital games daily. This study suggests that faculties can develop game-based learning environments to enhance their student motivation. In addition, most of the participants were found as "Achievers," "Philanthropists," and "Players" gamification user types. In the light of this result, researchers also suggest that gamification elements of these user types can be used more often in gamified learning environments. Furthermore, these results provide further evidence that learners constitute a diversified group, and this situation should be considered in motivational designs.

The findings of the current study have to be evaluated in consideration of some limitations. The primary limitation is related to sample size. This study was conducted with 181 participants. In future research, larger sample size may provide more generalizable results. The second limitation of this study is related to the Gamification User Types Hexad Scale. The correct presentation of students' gamification user types is limited by the ability of the conducted scale to determine those types. There is still room for the gamification field to grow and develop. In future studies, different scales regarding gamification user types can be utilized. In addition, future studies can examine the relationship between gamification user types and other variables such as age, gender, academic motivation, academic procrastination, learning styles, etc.

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