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Students' Perceptions about Gamification of Education: A Q-Method Analysis *

İbrahim Yıldırım [1]

Abstract

The present study aimed to determine how the gamification of the educational process is perceived by the students, whether the students' views are unified around a common ground for the concept of gamification, and to highlight the prominent elements of gamification. In this study, the Q methodology, which contains a combination of quantitative and qualitative methods, was used. The Q methodology aims to put forward people's perspectives, ideas, beliefs, and attitudes subjectively and systematically in the scientific research process. The participants of the study consisted of 34 sophomores in Faculty of Education who voluntarily participated in the Instructional Principles and Methods course in a gamified design in the Fall 2014 semester. The results of the study indicated that students do adopt common thoughts about the process of gamification in education, and it is in positive manner. In addition, prominent elements of gamification were logic of the process, emotions, advancement structure, achievement points, and badges. Furthermore, the sum of Z scores of dynamics and mechanics were doubles that of the components.

Keywords

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Introduction

Games bring to mind fun and having a good time. Even the thought of the word *game* puts smiles on people's faces. Several definitions have been made regarding the concept of *game* as "an adaptation process," "a bridge between the real and imagined," or "a social enterprise." It is a significant element of human life, especially at early ages. In fact, the findings of developmental psychology, educational psychology, and psychology of learning reveal that the games are the most important occupation of a child during this period of life (Koçyiğit, Tuğluk, & Kök, 2007). Although there is a prevailing belief that games are specific to children, games are in fact played by people of all ages at all periods of life. Examples include javelin played by the ancestors of Turks, chess played for centuries, and football, the most popular game of the contemporary world. Johan Huizinga draws attention with *Homo Ludens* to humans who play, not the ones who think. In his book, Huizinga (1949) highlights the cultural aspect of games and their position in the evolution of culture. As technology rapidly develops, games play an active role in the change and renewal processes of social structures

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[1] Harran University, Faculty of Education, Department of Educational Sciences, Turkey, iyildirim84@gmail.com

and culture. The previous games in real life are now moved to the virtual worlds. People spend money and time on games in the digital world. An estimated 101.1 billion USD was spent on digital games in 2016 worldwide (McDonald, 2017). In a similar vein, there is a trend in Turkey. According to a research conducted by Newzoo (2013), a global research company, Turkey ranks third in the world game market by a total of 38 million hours of e-gaming consumption per day. According to Newzoo (2017), approximately 30.8 million internet users in Turkey play games on the internet, and average consumption is 770 million USD for games on the internet annually.

Digital games, such as *FarmVille*, *Angry Birds*, or *Candy Crush Saga*, have become industries which are played by millions of people for a very long period of time, even to the degree of dependency and on which people spend money. It is an emergent idea to transfer this process to the other settings. Although the concepts associated with the gamification have been used in different ways since 2008, such as surveillance entertainment by Grace and Hall (2008); productivity games by McDonald, Musson, and Smith (2008); and applied gaming by the natronbaxter.com website, Jesse Schell is the one who use the term *gamification* for the first time in his presentation titled "Future of Games" at the 2010 DICE Summit (Deterding, Dixon, Khaled, & Nacke, 2011; Xu, 2011). Zicherman and Cunningham (2011) define gamification as "the use of game thinking and game mechanics in non-game contexts to engage users and solve problems." Deterding et al. (2011) also describes the term as "the use of game design in non-game contents."

The digital games mentioned above, like *FarmVille*, *Angry Birds*, or *Candy Crush Saga*, use the exact structure of games; thus, they have become so popular. At the first stage, the game design should be set out clearly for the transference of these digital games' design in non-game settings. The fundamental elements of game design are dynamics, mechanics, and components. The dynamics include emotions, the advancement structure narrating technique, and constraints in design, while the mechanics contain chance factor, competition, cooperation, exchange, and challenge. The components of game design can be listed as points, badges, level, experience points (xp), and leaderboards (Bunchball, 2010; Werbach, 2014). Gamification can be defined as the process of transferring these elements to non-game contexts in harmony.

Indeed, the components of a game design are the visible part. While they make people focus on the process by attracting their attention, the dynamics and mechanics keep people connected to the game by triggering impulses such as motivation, ambition, and curiosity. It would be logical to proceed on the *FarmVille* case for a better understanding in explaining the elements of gamification. *FarmVille* is a game developed by Zynga Company and played by nearly 65 million people (Farmville, 2015). In terms of dynamics, there is a story built on farming. The player is a farmer and has to go through several steps in order to open new fields and grow new products. These limitations constitute an advancement structure for the game. In the game process, there are unexpected situations, which are about mechanics. In other words, there are additional prizes, depending on the chance factor, in addition to a certain prize that the player can earn when planting a product or doing a specific job. The player's earning these additional awards based on luck keeps desire alive by means of the idea of "Do I earn again?" Furthermore, it can be explained by exchange and cooperation that sharing a product with a friend, supplying something that he/she is in need of, and asking for something someone needs from others. Additionally, visiting a field of a friend creates a competitive environment. The mechanics are seen more clearly in games. The points are earned in games, the levels are passed, the badges are received, and a ranking between friends is presented.

The exploitation of the detailed gamification structure in education emerges as a process of gamification of education. Lee and Hammer (2011) claim that gamification and education will be in great harmony. Gamification of education can be seen as a process of affecting student achievement and their attitudes towards the courses positively and increasing their attention and motivation by the transference of a popular games' gamification structure, such as that of *FarmVille*, to the educational processes. In this process, the course itself becomes a game in which student achievement means completing the game. From this point of view, gamification has clearly become distinct from the

educational games. Educational games are under the classification of serious games and are played in the process of courses. In serious games, the primary objective of the game is not fun. There are additional serious purposes, such as education, commerce, health care, and social awareness (Serious Games, 2015). Hung, Young, and Lin (2015) found that serious games have a positive impact on student achievement and interaction between different levels of students. Although Deterding et al. (2011) claim that there is not a clear distinction between serious games and gamification, gamification is more original and has a more comprehensive structure compared to educational games. The game is a subsidiary component of serious games, while in gamification the entire process is converted into the game. When the tendency of people towards games is taken into account, it might be suggested that gamification would create a more effective educational process.

Gamification of the educational process positively affects student achievement (Ar, 2016; Buckley & Doyle, 2014; Domínguez, Saenz-de-Navarrete, and Pagés, 2013; Faghihi et al., 2014; Rouse, 2013; Sanmugam et al., 2016), attitudes (De-Marcos et al., 2014; Harrold, 2015; Polat, 2014), and motivation (Bell, 2014; Measles & Abu-Dawood, 2015; Rouse, 2013; Wongso, Rosmansyah, & Bandung, 2014) toward lessons. On a theoretical basis, gamification would positively affect the educational procedures, but the students will decide whether it works in practice. In this regard, the present study aimed to determine how the gamification of the educational process is perceived by the students, whether the students' views are unified around a common ground for the concept of gamification, and to highlight the prominent elements of gamification process. Within this scope, answers to the following research questions are sought:

1. Do students have a common idea about gamification?
2. What do the students think about gamification?
3. Which elements are prominent in the gamification process?

The significance and the originality of this study come from adapting a research method used in other disciplines into educational sciences and determining the prominent elements in the gamification process based on students' perceptions.

Method

In this study aiming to determine students' views about the gamification of educational processes, Q methodology, which contains a combination of quantitative and qualitative processes, was used. Q methodology aims to put forward people's perspectives, ideas, beliefs, and attitudes subjectively and systematically in the scientific research process (Brown, 1993). The Q methodology emerging within the discipline of psychology and introduced into the social sciences is a method in which the strengths of quantitative and qualitative methods are combined together and data analysis is performed via specific software (Brown, 1996; Demir & Kul, 2011). The most important advantages of this method are determining whether the research groups unify under a specific theme, putting forward in what direction their common thoughts are, if this is the case, and prioritizing common ideas. Additionally, as Watts and Stenner (2005) suggested, large numbers of participants are not required for Q methodological studies. In this study, Q methodology was used to determine whether the students' views unified around a common ground and to put forward a ranking between the subthemes.

It can be asserted that a structure revealed by means of Q methodology equals a scale development process to some extent. Although it resembles exploratory factor analysis (EFA) in terms of the principal component analysis procedure, it has important distinctions in principle. In a scale development process, a survey is administered to people, and the items in different dimensions are determined by means of principal component analysis in EFA. In Q methodology, items are administered to people, but people are grouped by means of principal component analysis instead of items. In other words, factors in Q methodology refer to groups who think similarly.

The participants of the study consisted of 34 sophomores in elementary mathematics education in Faculty of Education who volunteered to participate in the Q methodology implementation and had taken the Instructional Principles and Methods course in a gamified design in the Fall 2014 semester. "Teaching Principles and Methods" was a three-credit lesson for 150 minutes. In this process, 90 minutes are allocated to face-to-face learning, while distance learning comprises 60 minutes. In other words, a blended learning procedure was conducted as traditional education by 60% and as distance education by 40%. In distance education, Moodle was used as open source educational software. Every student logged into the system with his/her user name and password, so the students could monitor their instructional development through the website. The students were provided with course materials by means of the website to increase their readiness and engagement in accordance with the flipped classroom mentality.

Gamification of Educational Process

The students took an active part during the process in which mechanics, dynamics, and components of gamification were included, and they completed the game-like course as players. Gamification principles were taken into consideration in the curriculum design. At first, additional educational attainments about game dynamics, mechanics, and components were determined. After that, integration of the gamification process consisting of dynamics, mechanics, and components into the educational process began.

Dynamics used in design are emotions, constraints in design, advancement structure, and narration technique. At the very beginning of the semester, students were exposed to the idea that the course was actually a game and that completing semester successfully meant finishing the game with a narration technique to make them emotionally more positive to the implementation process. In addition, the structure design was not in bulk in that there was a necessity to complete the present content before obtaining the latter ones as constrains in the design. This design represents "constraints" in game design. There were also optional exercises.

Mechanics contain chance, competition, cooperation, exchange, and challenge. The competition mechanism was formed through the game components in the educational structure. Students became willing to progress as they became aware of their fellows' level, medals, cups, and badges. In addition, as each student had a chance to observe his/her own development process clearly, the student competed with himself/herself in potential. Cooperation and exchange mechanisms had been put into practice by means of awarding "helpful" badges to students who created a common output in writing on the wall exercise or helped a friend in class.

The components of game design, which are points, badges, levels and experience points (xp), were integrated into the teaching, learning, and assessment processes. Achievement points were given in consideration of student engagement in class activities and blogging, students earned bonus points when they participated in class activities. In the study, the total number of badges was six. The badges were of particular importance as an element of prestige despite the fact that they were not taken into consideration in the assessment and evaluation unlike the achievement points. The students earned some of the badges (super cup, blogger, diligent, contributor, helpful, speedy) with class activities, while some of them were gained in the distance learning procedure. The students were aware of the number and types of badges they had earned through their own webpage.

Medals demonstrated the students' experience points. They were distributed to students who worked on course materials voluntarily without the expectation of any kind of award to keep students attention and to encourage them to complete the game-like course. During the 14-week period, there were two bronze, eight silver, and six gold medals. As can be inferred, while it was easier to gain a bronze medal, the gold medal required harder work compared to that of the silver medal.

As the students' progressed, they gained medals referring to their present levels. There were seven levels symbolizing the students' degree in the educational procedure. The first two were referred to as apprentice levels, the next three were assistant master levels, and the last two were master levels.

Application for Q Methodology

The structural design was used in the Q methodology implementation. In this kind of design, the items should be formed based on the literature. A total of 18 items based on the literature were created about game design, including both a positive and a negative statement for each of the nine main dimensions, and they were randomly distributed.

Table 1. Q Methodology Items

Dynamics	Logic of the process	A gamified presentation of the lesson makes the course process more effective. (1) Gamification of a lesson just consists of scoring permanently. (7)
	Emotions	I am pleased to participate in a lesson with gamification. (11) The process of gamification is boring. (2)
	Advancement structure	It is motivating to progress by studying the issues in a specific sequence. (15) It is an unnecessary obligation to review previous issues before studying the next ones for a lesson. (8)
Mechanics	Competition	Being in competition keeps my excitement alive. (3) A competitive environment alienates me from the course. (17)
	Cooperation	I put forth better products together with my friends. (12) I prefer working alone on a study.(4)
Components	Achievement Point	Points awarded in the course are encouraging. (9) It is unnecessary to give scores in the course process. (16)
	Medals (xp)	Earning medal improves commitment to the course process. (5) Earning medal doesn't have any importance. (13)
	Badges	It motivates me to win badges. (10) There is no impact of earning badges on commitment to the process. (6)
	Level	I make an effort to reach the highest level. (14) Levels are simple steps that everyone passes. (18)

As shown in Table 1, three of nine dimensions are relevant to the dynamics, two of them are related to the mechanics, and four of them are associated with the components of gamification. As shown in Table 2, the normal distribution schema between the edges of -3 and +3 was used in the Q string.

Table 2. The Q String

Disagree			**Neutral**			**Agree**
-3	**-2**	**-1**	**0**	**+1**	**+2**	**+3**

Before the application stage, a pilot study was done with seven participants, and the items were finalized. The items were placed on small piece of papers on the Q string by the students according to their degree of participation in items, and the students views' were collected about the gamification design. Data were analyzed via the PQMethod 2.35 software package.

Results

In the data analysis of students' views about the gamification of educational processes, whether the students' views unify around a common ground for the concept of gamification at the first step was examined. For this purpose, the principal component analysis and rotations were made in the PQMethod 2.35 software package, and the results are presented in Table 3. The participants are numbered as p1, p2, etc., in the table.

Table 3. Factor Loadings Table

Part. / Faktör	1	2	3	4	5	6
p1	**0.8467X**	-0.2123	-0.0291	0.0160	0.2592	-0.0272
p2	**0.6214X**	-0.3193	-0.3263	0.4748	-0.0937	-0.0428
p3	**0.6987X**	0.3807	0.2654	-0.3394	-0.1155	0.2293
p4	0.4002	-0.3637	**0.6565X**	0.0702	-0.0184	-0.2794
p5	**0.6236X**	0.4421	0.3262	0.0420	0.2851	-0.0731
p6	**0.9139X**	0.0203	-0.1040	0.1176	0.0088	-0.1676
p7	**0.8485X**	-0.1714	-0.1200	-0.1378	0.0401	-0.1090
p8	0.2510	**0.6028X**	0.1279	0.2873	-0.4681	-0.2287
p9	0.3264	-0.1715	-0.5401	**-0.6317X**	0.0584	-0.0316
p10	**0.8682X**	-0.1580	-0.0029	-0.2427	-0.1782	-0.0071
p11	**0.7749X**	-0.4623	0.1062	0.0483	-0.0089	0.2463
p12	**0.6165X**	0.3809	0.4047	0.3226	0.0445	-0.1467
p13	**0.5957X**	-0.5233	0.0234	0.2508	0.0216	0.2564
p14	**0.8120X**	-0.0257	-0.2939	0.2722	-0.1873	0.1478
p15	**0.7614X**	-0.2895	0.0295	0.1345	0.1205	0.2178
p16	**0.8016X**	-0.2363	-0.3204	0.1285	0.0999	-0.0150
p17	**0.7805X**	0.2325	-0.1042	-0.2239	0.0729	0.1196
p18	**0.6913X**	0.0089	-0.4584	0.0307	0.2247	0.2062
p19	**0.7565X**	-0.4920	-0.0454	0.1336	0.0958	-0.1899
p20	**0.7188X**	0.4448	0.0278	-0.2698	-0.0072	0.2345
p21	**0.7534X**	-0.4863	-0.1848	0.0058	0.0351	0.0757
p22	0.1859	**-0.6617X**	0.4164	-0.1819	-0.2294	-0.0512
p23	**0.6069X**	-0.0894	-0.3628	0.0989	0.3260	-0.0876
p24	**0.7215X**	0.1122	0.1117	-0.2372	-0.3461	0.2832
p25	**0.5977X**	0.1759	-0.1923	-0.0552	-0.3094	-0.2745
p26	0.5655	**-0.6006X**	0.2324	0.1680	-0.2822	0.0348
p27	**0.7609X**	-0.3205	-0.3414	-0.0526	-0.0736	-0.0568
p28	**0.7899X**	-0.0496	-0.1138	-0.1739	-0.2833	0.2620
p29	0.2277	0.2019	0.2325	0.3793	0.4861	**0.6472X**
p30	**0.7454X**	0.3953	-0.1813	-0.2470	0.0621	-0.3414
p31	**0.7236X**	0.1719	-0.2650	-0.1313	-0.2034	0.4131
p32	0.1500	**0.7726X**	-0.0849	0.3701	-0.1493	0.1080
p33	0.1736	0.1318	-0.4274	**0.6760X**	-0.1656	-0.1216
p34	0.4765	0.2994	0.0992	-0.1290	**0.6758X**	-0.2853

The factor loadings of 34 participants in the sample are shown in the table. As a result of the principal component analysis and rotations, the 34 participants were grouped under six factors. The symbol *X* was used to demonstrate the participants involved in the relevant factor, and the values were marked in bold. It was established that there were 25 participants in the first factor (column), 4 participants in the second factor, 2 participants in the fourth factor, and 1 participant in the third, fifth, and sixth factors. It can be interpreted as a general character of the group that 25 of total participants (74% of 34 students) were grouped under one of the dimensions in the research. In this respect,

students' views regarding the gamified course process are similar to great extent, and it is a requisite to examine on which common ground this similarity is and which items are considered more important. Table 4 presents the items, Z values for the items, and Z score rankings of items in each group (factors). The items are listed according to the participation degree of the 25 students grouped under the first factor.

Table 4. Z Values and the Order of Importance of the Items

Factor / Item	Factor 1		Factor 2		Factor 3		Factor 4		Factor 5		Factor 6	
	Z	*Rank**	*Z*	*Rank**	*Z*	*Rank**	*Z*	*Rank**	*Z*	*Rank**	*Z*	*Rank**
Points awarded in the course are encouraging.	***1.35***	***1***	-0.45	11	0.54	7	-0.21	11	**1.62**	**2**	-1.62	18
A gamified presentation of the lesson makes the course process more effective.	***1.21***	***2***	1.29	4	-0.54	14	0.86	4	0.00	11	0.54	7
I am pleased to participate in a lesson with gamification.	***1.05***	***3***	**1.49**	**2**	-0.54	14	0.34	8	0.54	7	0.00	11
It motivates me to win badges.	***1.01***	***4***	0.24	8	-0.00	11	0.06	9	0.54	7	**1.08**	**4**
It is motivating to progress by studying the issues in a specific sequence.	***0.99***	***5***	-0.65	12	**1.62**	**2**	-0.40	12	-0.54	14	0.00	11
I make an effort to reach the highest level.	***0.91***	***6***	-1.56	18	-0.00	11	-1.88	18	0.54	7	**1.08**	**4**
Earning medal improves commitment to the course process.	***0.54***	***7***	-0.89	14	**1.08**	**4**	0.00	10	**1.08**	**4**	**1.62**	**2**
I put forth better products together with my friends.	***0.53***	***8***	0.55	5	-1.08	16	-1.08	15	**1.08**	**4**	0.54	7
Being in competition keeps my excitement alive.	***0.45***	***9***	-1.03	17	-0.00	11	0.80	5	-1.62	18	-0.54	14
I prefer working alone on a study.	***-0.10***	***10***	-0.93	15	**1.62**	**2**	**1.41**	**2**	0.00	11	0.00	11
Levels are simple steps that everyone passes.	***-0.12***	***11***	0.28	6	**1.08**	**4**	0.68	7	-0.54	14	-0.54	14
Gamification of a lesson just consists of scoring permanently.	***-0.87***	***12***	-0.87	13	-1.08	16	-1.14	16	-1.62	18	-1.62	18
Earning medal doesn't have any importance.	***-0.98***	***13***	-0.11	10	-0.54	14	-0.46	13	0.00	11	-1.08	16
A competitive environment alienates me from the course.	***-0.99***	***14***	**1.73**	**1**	0.54	7	0.68	7	**1.62**	**2**	0.54	7
There is no impact of earning badges on commitment to the process.	***-0.99***	***15***	0.27	7	-0.00	11	-1.41	17	-0.54	14	-1.08	16
The process of gamification is boring.	***-1.17***	***16***	-0.98	16	0.54	7	-0.86	14	0.00	11	0.00	11
It is unnecessary to give scores in the course process.	***-1.27***	***17***	**1.45**	**3**	-1.62	18	**1.41**	**2**	-1.08	16	**1.62**	**2**
It is an unnecessary obligation to review previous issues before studying the next ones for a lesson.	***-1.53***	***18***	0.17	9	-1.62	18	**1.20**	**3**	-1.08	16	-0.54	14

*Indicates the order of individuals' paying attention to the item in the relevant factor.

The most positively evaluated item by the 25 participants in the group of Factor 1 is "Points awarded in the course are encouraging" while the most negative opinions are about the item "It is an unnecessary obligation to review previous issues before studying the next ones for a lesson." The instrument of the study consists of 18 items; half of them are in a positive manner, while the other half are in negative manner. The participants under Factor 1 compiled all of the positive items on the right side of the Q string, and the Z values of these items are positive, meaning that these participants have positive thoughts about the gamification of educational processes. The evaluation of top three items in the remaining factors (2-6) reveals that there are nine positive and eight negative items, indicating that

the other five groups comprising nine students were almost neutral to the educational gamification process. Thus, while Factor 1 can be named as the "group of positive thoughts," Factors 2-6 can be named as "group of neutral thoughts."

It has been determined that all of the positive items were regarded as necessary by the group of positive thoughts comprising 25 participants. In the group of positive thoughts, the analysis of positive items in relation to the dimensions they relate to indicate that the dimensions were, in order of how much effect they had on the students, achievement point, logic of the process, emotions, badges, advancement structure, level, medals (xp), cooperation, and competition. In other words, cooperation and competition had less effect on the students in the group of positive thoughts, while the most influential elements were achievement point, logic of the process, and emotions.

An analysis of Z scores covering all participants in the study would lead to a better understanding. Table 5 shows the average Z scores calculated for each variable in the factors. The formula of average Z scores is as follows:

Z_{ave}=*(Z value of the positive item about the dimension - Z value of the negative item about the dimension)*/2

In addition, overall mean scores for the dynamics, mechanics and components were obtained.

Table 5. The Average Z Values Concerning the Elements of Gamification

		Factor 1 (25 per) Z_{ave}	**Factor 2 (4 per) Z_{ave}**	**Factor 3 (1 per) Z_{ave}**	**Factor 4 (2 per) Z_{ave}**	**Factor 5 (1 per) Z_{ave}**	**Factor 6 (1 per) Z_{ave}**	**Weighted Ave.**	**$\bar{x}$**
Dynamics	Logic of process	1.04	1.08	0.27	1.00	0.81	1.08	**1.01**	
	Emotion	1.11	1.24	-0.54	0.6	0.27	0.00	**0.99**	**0.96**
	Advancement Structure	1.26	-0.41	1.62	-0.80	0.27	0.27	**0.89**	
Components	Achievement Point	1.31	-0.95	1.08	-0.81	1.35	-1.62	**0.83**	
	Badges	1.00	-0.02	0.00	0.74	0.54	1.08	**0.82**	**0.62**
	Level	0.52	-0.92	-0.54	-1.28	0.54	0.81	**0.22**	
	Medals (xp)	0.76	-0.39	0.81	0.23	0.54	1.35	**0.61**	
Mechanics	Competition	0.32	0.74	-1.35	-1.25	0.54	0.27	**0.23**	**0.27**
	Cooperation	0.72	-1.38	-0.27	0.06	-1.62	-0.54	**0.30**	

The analysis of overall average Z scores including all participants reveals that the dynamics ($\bar{x}_z$=0.96) are the elements which had the most positive influence, followed by the components ($\bar{x}_z$=0.62) and the mechanics ($\bar{x}_z$=0.27). Logic of the process, emotions, and advancement structure were in top three according to the analysis based on dimensions. Achievement scores and badges came to the fore among the components. It is obvious that cooperation had the least positive effect.

Discussion and Conclusion

The present study, conducted with Q methodology, aimed to determine how the gamification of the educational process is perceived by students and whether the students' views unify around a common ground regarding the concept of gamification, and to highlight the prominent elements of gamification. The participants of the study consisted of 34 sophomores in elementary mathematics education in Faculty of Education, and they had taken the Instructional Principles and Methods course in a gamification design. The data were collected with 18 Q statements. In this context, the results of the study were limited to the lesson of Teaching Principles and Methods at the undergraduate level, the gamification design of this lesson, and the Q method data collected from the 34 sophomores in elementary mathematics education in Faculty of Education. In addition, it was assumed that the participants responded truthfully to the data collection tools and that the gamification design was applied successfully as it had been planned.

According to the research findings, the students have a common positive thought about the educational gamification procedure. The prominent elements of this process are logic of the process, emotions towards the procedure, advancement structure, achievement points, and badges. Furthermore, the sum of the Z scores of dynamics and mechanics were doubles that of components. Therefore, it can be asserted that dynamics and mechanics, like the invisible part of an iceberg, have a greater importance in the procedure, though components are in the public eye. In other words, the use of components alone without the dynamics and the mechanics cannot be considered as gamification. Kim (2015) also highlights that components such as points, badges, and ranking are just the feedback mechanisms of the procedure.

The Z values for the dynamics of the gamification procedure are high, showing that they are vital in this process. The Z scores for the logic of gamification alone were over one, pointing out the importance of logic of the process. Nevertheless, the Z values for the mechanics were not that high. This result may have arisen from the fact that cooperation and competition were the driving forces for the students. In other words, competition and the idea of putting forward a product together as a group drove them to achieve a desired outcome, while all the other factors, such as achievement scores and advancement structure, had a positive impact to attain favorable results. The outstanding elements of components were achievement points and badges, while experience points and levels were subsidiary ones.

Various studies have indicated that gamification has a positive influence on student achievement (Buckley & Doyle, 2014; Faghihi et al., 2014) and motivation (Buckley & Doyle, 2014). On the other hand, in their study, De-Marcos et al. (2014) concluded that grade point averages and attendance levels of the students in the experimental group were relatively low, although they had positive attitudes towards gamification compared to the control group. In their study examining 24 experimental studies on gamification, Hamari, Koivisto, and Sarsa (2014) examined 24 experimental studies on gamification and they found out that gamification does have a positive effect on student outcomes. In the present study, it was extrapolated that the students have positive attitudes towards gamification, and the result is in line with the relevant literature.

It has been determined that achievement scores and badges are the foremost elements among gamification components. Attali and Arieli-Attali (2015) reached the conclusion that achievement scores alone have no effect in the gamification process. Antin and Churchill (2011) asserted that it would be difficult to say that using badges solely has any kind of effect, while Botra, Rerselman, and Ford (2014) stated that the use of badges positively affects the gamification procedure. These studies support the idea that the operation of the gamification process as a whole is a requisite; otherwise, it will not produce the anticipated results.

It has also been observed that the current research on gamification in education aims to create a literature (Deterding et al., 2011; Xu, 2011; Zicherman & Cunningham, 2011); make suggestions on how it can be used more effectively (Lee & Hammer, 2011; Muntean, 2011; Wongso et al., 2014); study its effects on student achievement, motivation, attitudes, and habits (Buckley & Doyle, 2014; De-Marcos et al., 2014; Faghihi et al., 2014); or study the effect of a game component alone, such as badges or achievement scores (Antin & Churchill, 2011; Attali & Arieli-Attali, 2015; Botra et al., 2014). There is lack of a study with the objective of establishing a relationship or ranking between the elements of the educational gamification procedure. According to Dicheva, Irwin, Dichev, and Talasila (2014), this lack of a clear road map for educational gamification procedure is a significant deficiency. Werbach and Hunter (2012) created a pattern for gamification consisting of a six-step procedure. In the present study, ranking the elements of educational gamification procedure has revealed the most important and outstanding items. Therefore, this study can contribute to the understanding about gamification of the educational process—that is to say; it provides a general framework for teachers about where to start and to which aspects to attach more importance when gamifying their lessons.

This research suggests a procedure for the gamification of the educational processes according to findings. For this purpose, the related context should be clarified first. In other words, one must determine how old the students are, what kind of an environment they have grown up in, what their genders are, learning domain, time needed, etc. The next step is to initiate a design process suitable to the present conditions. At the first stage of a design progress, an advancement structure should be identified, restrictions should be introduced, and the structure should be narrated. To exemplify, a map showing the process might be hung on the board, and the way everyone should follow (the teaching process) can be marked with a red pen. The conditions would be determined to move forward, and the students would be informed that it is impossible to move without fulfilling compulsory tasks (project, problem solving, etc.). Then, the components (e.g., achievement points, badges, experience points, levels) would be defined to be used in the process. Finally, balance between cooperation and competition would be maintained with cooperation promoting activities and extra points. In addition, a needle or another object on which the name of each student would be written would be attached to the level at which the students are in the process. In this way, students would clearly become aware of their and their friends' levels. Hence, educational process would have a basic level of gamification. It would develop further in time and would become more fun. Regarding suggestions for researchers, the meaningful gamification can be redefined in light of this procedure. Namely, researchers can design the effective gamification process according to prominent game elements.

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