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An examination of opinions of teacher candidates on a course enriched through gamification

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Highlights

- Gamification effects on enhancing learners' motivation participation and achievement.
- Gamification increases the value of education
- Factors affecting participation, motivation and achievement in the course were the score tables, active learning, exam stress, collecting points and entertainment.

Article Info: Research Article

Keywords: *Gamification*, *Cooperative/collaborative learning, Improving classroom teaching, Interactive learning environments*

Abstract

Gamification in education is the use of game-based mechanisms, game aesthetics and game thinking to ensure student motivation and engagement, superior learning, and a behavioral change. This study was conducted to investigate the nature of the students' opinions on gamification and on activities that were carried out to create a rich instructional environment through gamification with Scratch. This study was conducted as a qualitative case study. The sample consisted of 37 students (12 females and 25 males) who took the course during the spring semester. Data were collected from the students by using observation and interview forms. Findings of a content analysis showed that gamification significantly influenced the students' motivation, participation and achievement. It created an enjoyable educational environment, and consequently, enriched academic achievement. Gamification can be used to transform educational contexts, especially the subjects that are problematic, difficult, and boring for students and avoided by students for due responsibility.

1. Introduction

The difficulty to find students who are self-motivated and the lack of student participation in lessons have always been a problem in the teaching and learning (Kumar & Khurana, 2012). Learning is considered by people as a tedious, difficult and laborious process. For that reason, students do not actively take part and do not wish to participate in it (Prensky, 2001). However, active participation in learning makes it meaningful and improves the quality of the learning experience (Eryılmaz, 2014). According to Prensky (2001), the sine qua non for a successful learning experience is motivation. One of the most important factor determining the academic success or failure of an individual is motivation (Pintrich,2003, Uyulgan and Akkuzu, 2014; Yilmaz, Sahin, & Turgut, 2017). According to research, there is a relationship between motivation and student engagement, and motivation is the basis of engagement (Saeed & Zyngier, 2012; Sivrikaya, 2019). However, results of some studies indicating no significant relation between motivation and student engagement (Wu, 2019). Appleton et al. (2006) emphasized the importance of both

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motivation and participation in learning, but stressed that they should be separated as independent constructs. Motivation promoted prior to or during a lesson ensures participation in the lesson, which in turn leads to achievement and learning (Linnenbrink & Pintrich, 2003; Saeed & Zyngier, 2012).

The lack of participation and motivation of especially university students is also a serious problem today, and it is difficult to find students who are self-motivated (Yıldırım & Demir, 2014). This is because instructional contexts do not have proper means to sufficiently motivate learners (Prensky, 2001). According to Prensky (2001), we cannot expect students to be motivated since the learning content is directly presented to them in a monotonous and plain way. On the one hand, there is a learning experience that is difficult, tedious and laborious for students; and on the other, there are computer games which have the ability to have people sit in front of computers for hours and even for days without boring them, and which provide the player with high motivation. This fact implies a contrast between the motivation for computer games and the motivation for school. As this is the case, integrating computer games into classes to improve motivation and participation simultaneously might give better results. The simultaneous effectiveness and usability of game content and tasks and educational content may not be convenient and usable for every game and content. It might be expensive and/or time consuming to develop appropriate game for every content in education. Therefore, using game mechanisms in environments where there are no games may produce favorable results in terms of motivation and participation. This method is called gamification (Ibanez, Di-serio & Delgado-Kloos, 2014). In short, content and the course are designed in such a way that the students entertain while being educated. Prensky (2001) called this as edutainment.

2. Literature

Gamification in education is the use of game-based mechanisms, game aesthetics and game thinking to ensure student motivation and engagement, superior learning, and a behavioral change (Kapp, 2012; Kapp, Blair & Mesch, 2013). The most critical element of the gamification process is to think of the educational process as a game (Kapp, 2012). Gamification does not diminish the importance or value of education, but rather it makes this process more effective and attractive for learners by facilitating learners to be more motivated for learning (Kapp, 2012). Moreover, the use of gamification elements in the educational environment prevents lessons from being monotonous, and transforms them into a more enjoyable and better form (Deterding, Dixon, Khaled & Nacke, 2011; Landers & Armstrong, 2017). Gamification can generally be used as a potential to get unmotivated and unsuccessful students involved and ensure their participation (de-Marcos, Dominguez, de-Navarrete & Pages, 2013).

Gamification improves student motivation, helps students become more active in the course and in extracurricular activities, facilitates collaborative learning, and makes learning interesting (Simoes, Redondo & Vilas, 2013; Tsay, Kofinas & Luo, 2018; Sailer & Homner, 2020). Gamification is a collection of practices providing socialization, interaction, and entertainment. Moreover, the use of gamification in education also helps students gain 21st century skills (Lee & Hammer, 2011). As Vidergor (2021) stated experiences of students in game based digital escape room has effects on motivation and collaboration. The students in his study indicated that the digital escape room develop the internal (intrinsic) and external (extrinsic) motivation to cooperate and improve social experience. Moreover, gamification has more stable effects on intrinsic motivation than extrinsic motivation (Zhang & Yu, 2022). It is possible to motivate students more through gamification as it has the potential to reduce their adverse feelings like fear, failure, jealousy, and so on. Therefore, educational activities should be designed accordingly (Sailer, Hense, Mandl & Klevers, 2013).

The main goal of gamification is to encourage learners to study for instructional objectives and to ensure their participation in the learning process by using game elements. In gamification, elements such as the following are used: a system of points, badges, liberty to make mistakes, competitions, challenges, and feedback. In gamification, instructional rules are also added to other usual game rules. Instructional rules are the rules that indicate what the player should learn during or after playing a game and they are

considered to be the main objective of gamification in education (Kapp, 2012). Therefore, the instructional design dimension should be given a little more attention when gamifying a course (Fabricatore & Lopez, 2014).

As the use of gamification in education is accepted and is increasing recently according to The New Media Consortium (NMC) Horizon Report (2012), and it is relatively new approach in (Alsawaier, 2018; Sümer, 2017) and it will increasingly be used in higher education (NMC Report, 2012; Sarıkaya, 2020) — The use of gamification it is thought that a gamified course can transform the learning process into a more enjoyable experience, which can positively affect student participation, motivation and achievement (Yıldız, Topçu & Kaymakçı, 2021). The number of worldwide studies on the use of gamification in education is ever increasing. Nevertheless, most such studies do not specify issues such as how lessons are gamified (Kumar and Khurana, 2012), what kind of practices are implemented in lessons that are gamified (Hakulinen, Auvinen, & Korhonen, 2015; Polat, 2014; Richter, Raban & Rafaeli, 2015), and which elements are utilized (Hanus and Fox, 2015). There is a need for further research on how to gamify courses and how the interfaces and practices that can be used look (Simoes et al., 2013). In this sense, we believe that this study will make a positive contribution to the literature as it presents detailed information about a gamified course, practices carried out in it, and gamification elements that were utilized. In this study, we sought answers to the following research questions: In a course utilizing an instructional curriculum enriched through the gamification of design and programming, what are teacher candidates' opinions on how the gamification of the course affects their participation, motivation and achievement in the course?

The number of studies conducted worldwide on the use of gamification in education is increasing. Meanwhile, the number of studies in domesticalso is also increasing. When the studies on this subject in recent years are searched, some of the studies examine: the effect of gamified platforms for formative evaluation such as Kahoot (Yürük, 2019; Sanchez, Langer, Kaur, 2020; Zainuddin, Shujahat, Haruna & Chu, 2020; Göksün & Gürsoy, 2019; Öden, Bolat & Göksu, 2021), the effect of the use of gamification interfaces of LMS systems such as Classsdojo (Bozkurtlar & Samur, 2017), the effect of scoring in gamification on success (Attali & Arieli-Attali, 2015), meta-analysis studies in which gamification studies conducted in recent years (Yiğ & Sezgin, 2021; Tay, Goh, Safiena & Bound, 2022; Zang & Yu, 2022). In these and other studies, it was observed that there were studies on different variables ((reading performance (Chen, Li & Chen, 2020), motivation (Roy & Zaman, 2018; Hanus & Fox, 2015; Mert & Samur, 2018; Yildiz, Topçu, Kaymakçı, 2021), engagement (Zainuddin, Shujahat, Haruna & Chu, 2020), academic achievement (Attali & Arieli-Attali, 2015; Hanus & Fox, 2015; Karamert & Vardar, 2021), effects of badges and redeemable rewards (Ortega-Arranz, et. all., 2019; Mert & Samur, 2018)). Although the number of studies is increasing, it has been observed that studies on technology teaching are limited (Park, Liu, Yi & Santhanam, 2019). However, the number of studies in which all these variables are examined at the same time and which includes technology education is limited.

In the Scratch program, an increasingly difficult structure is used, in which a continuous problem solving is aimed. In addition, in this study, a competitive environment was not created only with badges and points, but with the activities designed in Scratch, the students were given Scratch activities in which they would compete and focus on a problem every week, thus creating a fantastic environment, attracting the curiosity of the students and providing an environment for them to struggle. In this way, the elements that provide intrinsic motivation were brought into the gamification process with Scratch.

The results of this study provide researchers and educators with empirical insights into a gamification and contribute to a deeper understanding of the factors that encourage gamification in technology learning. Based on the results and implications of the current study, application gamification may be implemented more effectively to enhance inter alia student motivation and learning.

3. Methodology

3.1. Research Model/Design

This study was conducted as a qualitative case study. In case studies, researchers focus on a specific situation, group, or individual and comprehensively explore the event that they examine. As a result of the examination, the applicability of the observed event in other areas or the generalizability of the outcome is determined (Creswell, 2003; Fraenkel, Wallen & Hyun, 2012). In this study, the nature of teacher candidates' thoughts on applications designed in the Scratch program and their thoughts on the gamification of a course in general was investigated through a course utilizing an instructional curriculum enriched through Scratch and gamification.

3.2. Sample or Study Group

The sample of this study was determined through convenience sampling (Fraenkel et al., 2012). It consisted of sophomore students studying in the Department of Computer Education and Instructional Technology at Uludağ University Faculty of Education during the academic term of Spring 2015 and taking the course titled Graphics and Animation in Education. A total of 37 students participated in the study, including 12 females and 25 males. The students were informed that they would be interviewed at the end of the semester, and 11 of them volunteered to be interviewed. The students who were interviewed were grouped according to achievement at the end of the semester. Accordingly, three students showed high performance, five showed moderate performance, and three showed low performance. The classroom atmosphere was observed for 12 weeks. In this way, the 37 students were observed during the course, and notes were taken during the observations.

3.3. Research Procedures

The course was designed according to the basic elements of gamification by using the Scratch program, where the students both designed software programs and wrote codes. In this study, the Scratch program was chosen because it is a suitable environment to use the tasks and activities to be designed for gamification. This program was preferred because it provides an environment where students can both gain programming skills and design, as well as provide an entertaining environment that attracts students' curiosity and allows them to compete with each other (Figure 1).

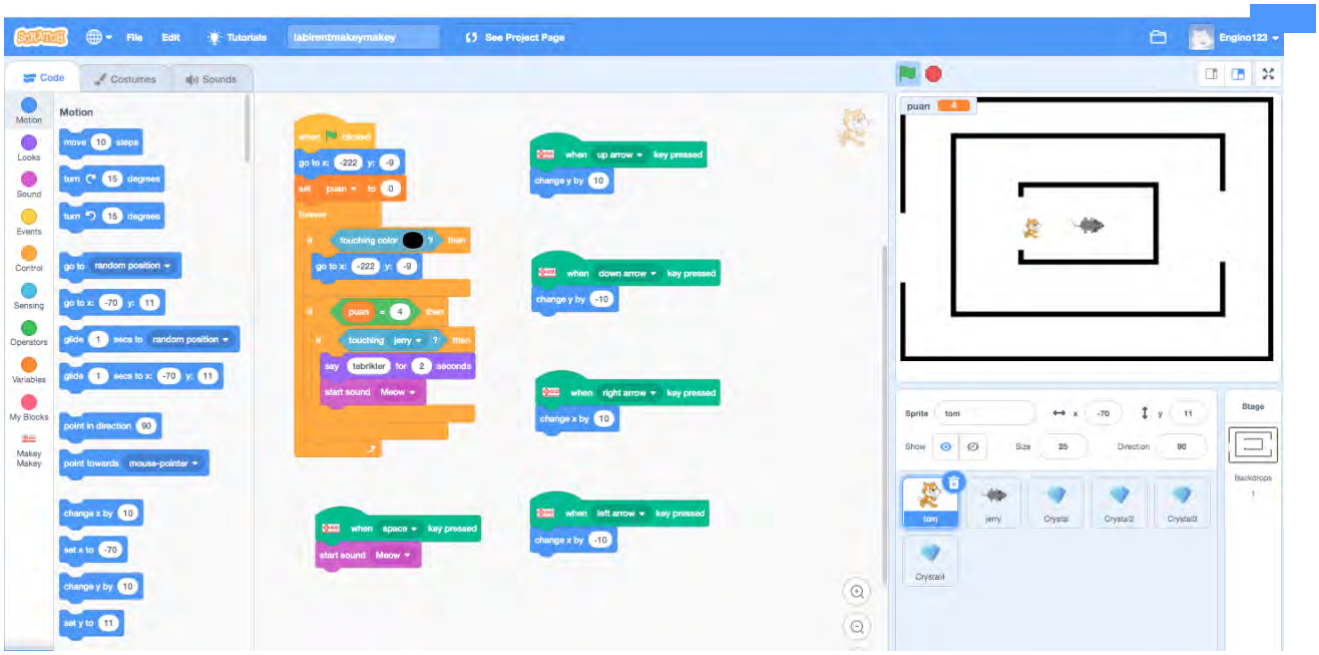

Fig. 1. Screenshot of the Scratch Program

Lessons were carried out face to face. Edmodo, a social networking platform developed for educational purposes, was used as an instructional medium that is appropriate for gamification to give badget as shown in the Figure – 2.

Fig. 2. Badges can be used in Edmodo.com

Certain elements/activities were created to be employed throughout the course: the rules that students must adhere to during the semester, the tasks they had to complete, the activities where they could earn extra points, the badges they would earn as a result of specific tasks, and the weekly score tables listing the points they would earn. In this way, the activities specific to gamification were integrated into the course. In order to ensure that the students came to the course with curiosity, it was ensured that they would not know the course activities or scores they would earn based on the activities. It was also ensured that they would not be able to predict what their weekly tasks would be. The students were provided with tasks, feedback, rewards, scores, and score tables through Edmodo. In order to fulfill their tasks, students were given a certain period of time for each task. For assignments that could not be sent within the specified period of time, the students had to lose as many points as the number of days that they sent the assignment late. Moreover, there were no exams in this course. The points accumulated by the students every week determined their midterm and final grades. The students earned points in response to everything they did for the course during the semester. They were always given extra points when they completed the tasks assigned in the course, when they did their assignments outside the school, when they attended the class and so on. The points given also varied depending on the difficulty of the tasks. At the end of the semester, the highest score (number of points) that the students could earn was determined to be 250 for the midterm and 160 for the final exam. The midterm and final grades were determined by calculating the percentage values of these scores out of 100. The students were rewarded with various badges in return for specific tasks and according to their behavior in the course. In total, 20 badges were given through Edmodo, and the badges the students earned would go to them personally as notifications. These badges did not have an extra score equivalence. A table that listed the points that the students earned for the given tasks was given as a score table. The score tables were the tables in which there were score equivalents of the studies carried out by the students each week and the total points received by the students as a result of their studies.

3.4. Data Collecting Tools

Data were collected from the students at the end of the spring semester by using two types of data collection instruments. These were the observation and interview forms prepared by the researcher.

3.4.1. Observation form

The students were observed for their general attitudes and behaviors towards the course, interactions with each other, statuses during activities, reactions to points, rewards and score tables. The observations were based on student reactions to specific events during the course. The situations observed in the course included the level of participation in the lessons, effects of the competition environment, approaches to

teamwork, and so forth. This study utilized the naturalistic observation technique. Naturalistic observation involves observing an environment without any manipulation (Fraenkel et al., 2012). In this study, the students were not observed individually. The researcher, who was a participant observer, observed the natural behavior of the students throughout the course. As the class was crowded, it was not possible to observe the students individually. A significant number of data on gamification were recorded in the observation notes. There were various activities and tasks that the students had to complete during the semester. Each week, students were asked questions that would enable them to do research on the topic of the week before the lesson. The purpose of these questions is to ensure that students come to the lesson prepared and have preliminary knowledge about the subject. These are the projects that students design in the Scratch program within the framework of certain rules in the light of a theme determined every two weeks, depending on their creativity. For example, the Scratch design task is for students to make a desired design based on their imagination, provided that they use each of the code blocks in the figure at least once. Students were given a program with faulty codes in the Scratch program and an instruction describing the error in the program. The students were first asked to find out which codes caused the error, and then to run the project by finding the correct codes by editing the codes or adding-removing new codes. In these activities, students compete against each other against time. The difficulty of these activities, which were developed for students to earn extra points during the course, increased every week. In the light of the research questions, various activities were carried out during the course to determine whether the students came prepared or not. For example, a taboo-like word game was played about visual design principles and elements.

The circumstances that were observed during the course in general are as follows: the reactions of the students when the weekly score table was posted, their reactions when they saw that they were rewarded with cups and badges, their general behaviors during the activities in which they competed against time, their reactions when the tasks were explained, the competition status, the effects of competition, and so forth. The data collected through weekly observations constituted the qualitative data and contributed to the creation of an interview form. It was aimed to ensure the consistency of the observation data with the interview data.

3.4.2. *Interview form*

In this study, a semi-structured interview form was used based on the principles of Carspecken (2013). The form consisted of four questions. In the first main question, the students were expected to express their general thoughts about the use of gamification in the course. Sub-questions were also prepared to expand on that. In the other main questions, more details were asked to investigate the impact of gamification on motivation, achievement and participation in the order given. The form was initially checked by a lecturer who was a subject matter expert in qualitative research. The interviews were conducted on a voluntary basis with 11 randomly selected students. Each of the interviews took approximately 20–30 minutes and was conducted face-to-face. In order to minimize data loss, the interviews were voice-recorded with the permission of the students.

3.5. Data Analysis

Content analysis was carried out on the interview and observation data. Content analysis is a technique that allows human experience — that cannot be directly observed or measured — to be revealed through the examination of various relationships (Fraenkel et al., 2012). According to Ryan and Bernard (2002) in content analysis, the data in the audio recordings and the sentences in the observation form recorded in line with the information received from the students during the observation process are transcribed with word-for-word. All the texts in the transcript are read line by line and divided into small sentences. Sentences are coded. Codes and themes are created according to the meanings of the sentences. Sentences with similar meanings are gathered around the same themes and interpreted in a way that the reader can understand. The extracted sentences are divided into smaller units and coded according to the meanings they express. One

or more sentences are encoded with a code. Codes with similar meaning are combined under the same theme. Grounded theory approach is adopted while working with data. Instead of starting with a theory existing in the literature, the researcher creates a theory based on the data he has collected. The data are collected during the research, not before the research, and the researcher is expected to make a generalization by examining the collected data (Creswell, 2013). In the Grounded theory, data is collected by interview method, but it is expected to collect data through document analysis and participant observations. As a result, ten codes were created under three themes. A codebook was prepared for the generated codes and sent to another researcher to code the data.

3.6. Validity and Reliability

After the researcher coded the data, the Cohen's Kappa coefficient was calculated to determine the interrater reliability coefficient. The Cohen's Kappa coefficient was .86. This indicates that the coherence between the two raters was high and satisfactory (McHugh, 2012). After the coding, the codes chosen by the researcher were used. In this study, the names of the participants were kept confidential, and pseudo names were given for each participant.

3.7. Findings and Discussions

The data obtained through the observations and interviews were analyzed according to the research questions and grouped under two themes. These themes are "the teacher candidates' opinions how gamifying the course affected their participation, motivation and achievement in the course." Themes and codes are discussed by indicating their frequencies and giving some example statements in the following lines.

Teacher Candidates' Opinions about Activities Created in Scratch

The aim of the activities designed to make the course more enjoyable was to ensure that the students earned extra points not only from the assignments but also from the activities carried out in the course. The activities that were prepared are given in detail under the Research Settings section. A different Scratch activity was prepared every week. It was aimed through the activities to improve the students' motivation for the course in addition to granting them extra points. This positively affected the students' motivation.

Although some of the students did not like Scratch (n = 7), they had a lot of fun and were constantly active in the course as they were having fun. This implies that whether a student likes a course does not depend on whether he or she likes the content. This can also be supported by what the students said: *"I liked how the course was taught but I did not like Scratch"* (Mert) and *"I didn't like Scratch"* (Ece).

The analysis of the interviews indicated that the students (n = 7) mostly liked the Scratch-repair activities. Through repair activities, the students were given a flawed program prepared in Scratch and asked to rearrange the program codes and/or add codes that would enable the program to work correctly. The students were given a certain period of time and were asked to compete against this time period. They were told that the person who would finish the activity first and error-free in the end would win the highest grade or the cup. *"Repair activities helped us learn since they let us solve problems by having us analyze them,"* Ece said, and added, *"It was more memorable because you could implement what you designed."* Engin said, *"They were good for me to learn. It was like a practice."* Başak stated her views by saying, *"What I like this week the most was the repair activities through which we gained points every week."*

The activities carried out during the course in the classroom made the course more colorful and allowed avoiding monotony. The students expressed their comments about the activities in the course as follows:

Sude says: *"My interest in the course was* intense *thanks to the activities we have done."*

Deniz says: *"The activities we have done have also influenced my interest in and motivation for the course."*

Alp: *"These applications and activities helped people come to class enthusiastically, and you know that you will have fun in the class anyhow... If you just taught the activities — that you were doing today — on the board and left the class, maybe I could remember them a week or two, but you forget at some point. Nevertheless, since you transformed them into activities, this time it's not just the lesson that will revive it in my memory, you know, it's the dialogue, the activity, our dialogue with friends there. That is, the happiness I got at that moment, the place where I focused at that moment, and so forth. All of them have a more permanent place in my memory. It provides nicer and permanent learning."*

It was also reflected in the observation notes that the students were happy when we announced that we would do activities in the class. *"Let's do repairs again," "Shall we do an activity where I can get a lot of points?" "Are we going to do an activity? Yay," "*Send *the points; we are ready"* were some of the statements that were reflected in the observation notes. Sometimes there were voices in the classroom such as the following: *"Let's start this class with an event," "Will we do an activity, professor? Please, let's do. We have a lot of fun when we do."* One of the students also stated that they were not bored and disconnected from the course thanks to the activities.

Teacher Candidates' Opinions on How Gamifying the Course Affected Their Participation, Motivation and Achievement

The factors that affected the teacher candidates' participation, motivation and achievement were categorized under the codes of score tables, active learning, exam stress, collecting points, competition, entertainment, feedback and weekly assignments/tasks.

Score tables

Score tables are considered as a powerful motivational tool (Werbach & Hunter, 2012). Score tables emerged as a competitive element among the students in this study, as well. The students had the chance to review their scores and their friends' scores in the score table, and to see who was ahead or behind of them and what the difference was point-wise (Figure 3). It is possible to see the impact of the competition on many students' words:

Mert says: *"It was important to see everyone's scores. When you see that score difference, you try to close the gap, or so. So, it's nice. Seeing those scores have a huge impact on the competition."*

The score tables were also thought of as an element by the students that could be used by them to prove themselves. When the students saw that they could go up in the table by earning high scores, they felt satisfied as well as proving their success to their friends and to the instructor of the course. Sarp's opinion, *"I wanted to show that I was successful. In the score table, for example, a person wants to prove himself to the teacher in the end,"* supports this situation.

Scratch is a program that allows anyone who is a member of the Scratch program to see the designed projects. For this reason, students had the opportunity to examine each other's Scratch designs. Based on the scores on the score tables, it was determined that the students who got high scores wanted to examine their work. It is thought that they also examine each other's work and have different perspectives. Normally, no one is interested in what anyone is doing, but this situation makes the student want to investigate how the successful student is successful. Ali's views are as follows: "*I saw where I am compared to my other friends. How much better there are those who do this, I learned that from me. I figured out what style I should do a little bit more*." A student's statements on the 5th week observation notes were "*I looked at the projects that you gave high on the scoreboard, I examined them. They didn't actually do anything very different from me. But I understood better what to do in other assignments*." reflected in the form. Again, this situation was reflected in the observation notes of the 10th week. The expressions of Ahmet, who came

to show his project, were: "*I worked with İpek for hours on design, my teacher. The top rated designs last time were very good. This time, we did the design beautifully, will you check it out?*" has been in the form.

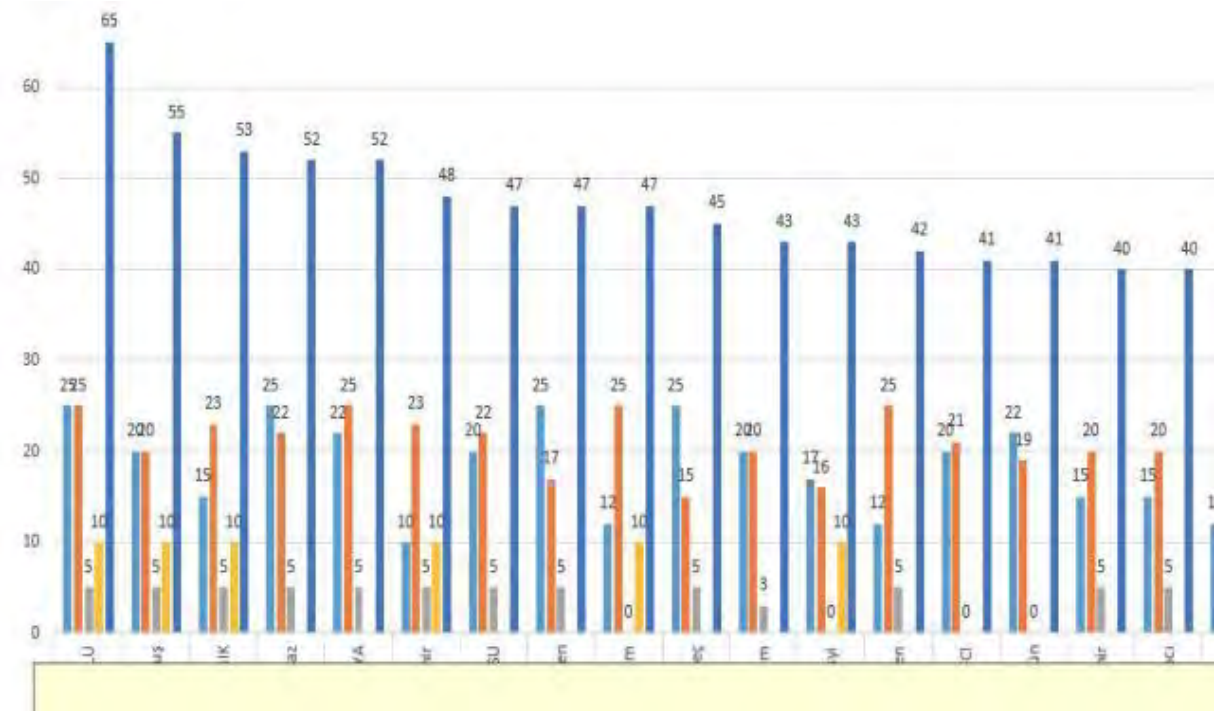

Fig. 3. Score table example

Another important aspect of the score tables was that they gave the student a goal to work and strive for. For example, Ece says that, *"We had to do something to move up in the score table every week."* On the contrary, Başak expressed her views by saying, *"I can't* say *that the score tables have influenced my work much, but I've always wanted to get to high levels. They gave such an ambition."*

Active learning

The students were told that they had the responsibility to pass the course, which would be determined by the effort they would demonstrate throughout the process. They had to be active both inside and outside the course every week in order to pass the course and succeed. Being active in the course meant participation in the activities, discussions and applications carried out during the course and was one of the most important elements that provided participation in the course. When the students were asked "How much do you think you participated in the course during this semester?" Mert commented that *"I actually think I have participated in the course more than anyone else during this semester. I've always sat in the front. Let me say, I've tried to participate more than anyone else..."*.

Some of the students (n=4) stated that they were constantly active in the course, and this had a positive effect on their learning. In this regard, Betül, for example, shared her thoughts as, *"We've been more active in this class. We've been talking in the class, and* we've *also been active in the course with the assignments that we've done or so. In other courses, you know, the instructor presents something. We would understand it if we were to understand, but we would leave it as it was if we didn't understand it. But, that's not how it has happened in this one. We've understood in this way. In other words, we've learned something."* A large majority of the students (n=9) stated they thought alike; in other words, they participated more in this course compared to other courses.

Exam stress

The students who participated in the study thought that the exams created stress. It was found that the students did not favor the idea that their success in a course should be measured with exams. A large portion of them (n=10) preferred to be assessed based on their performance that they had demonstrated. When a student knows that he or she is assessed according to the grade in the exam and nothing he or she does during the course counts towards the assessment, he or she also thinks that participation in the course has no meaning. For this reason, when students are assessed based on points, they can see their status in the course and decide how much they are supposed to improve their performance. When the students were asked the question *"Would you prefer having midterm and final exams (being assessed with an exam) to this system?"* most of the students (n=10) indicated that they did not prefer to be assessed with exams. Only one of the students stated that he would get a better grade if an exam was administered. Sarp, Sude and Deniz stated, by dogmatizing, that they did not prefer midterm exams and final exams. In addition to that, Deniz also added that *"I am unable to pass courses in that way anyway."* Başak said, *"It is in our hands whether we get good scores or bad scores. But, if there's an exam, you don't know what would be asked. And you're experiencing the stress."* Evrim's opinion was *"Sometimes I thought I would get a better grade if it was a midterm exam and a final exam."*

A large proportion of the students (n = 7) stated that it was not appropriate to measure course achievement through exams, and that exams were a daily thing. They stated that due to the exam stress, there were some cases such as being unable to show what they knew. In addition, when the students knew that they would be assessed according to their performance, not according to an exam, they thought to have a goal to succeed in the course. For example, Deniz said, *"I come to this course every week for a purpose. I am collecting my midterm and final points every time I come to the class. If I fail this week, I am able to be more successful next week and fill the gap. I was earning points every week by doing something."*

Assessing everything the students did for the course was considered to be one of the important factors that improved their participation in the course. It also allows them to have more chances to prove themselves. And, this affects their participation in the course. In addition, an exam does not give them a chance to compensate for their failures, whereas they had many options in this study to compensate for their failures. One of the students' thoughts on this subject is as follows:

Engin says: *"The midterm, for example, was going to be a written exam. I don't know, for example ... it may not come to one's mind at that moment. Otherwise, we were researching and learning. We were delivering projects. It was more useful. What people do* is *more important. After all, we were also getting points for what we were investigating. We were learning as well as getting points."*

Collecting points

The system of points is considered to be the most important element for competition and is considered to be a must in gamification (Werbach & Hunter, 2012; Zichermann & Cunningham, 2011). The activities, assignments and applications performed and the performance demonstrated in the course were graded with points. This was found to be one of the most important factors affecting the students' participation in the course. In addition to participation, points can also translate into competition, entertainment and motivation. Some of the students (n=4) indicated that they were happy to earn points. The points that they earned affected their achievement scores. This was an element that improved their participation to earn extra points and raise theirs grades.

Mert says: *"Collecting points is, of course, fun.* Ultimately*, we're doing something, and what we're doing is giving something back to us right away... I was participating more in the class because the points had an effect."*

The students stated that they participated in the activities, discussions and applications in the course to improve their scores. They added that they were performing better to earn higher scores. Engin said, *"When you asked questions, there was always an urge to answer. It was all about earning points."*

The effort shown by the students to improve their scores was also reflected in the observation notes. One of the students stated his opinion during the lesson as follows: *"I'm a lot behind the class. My score is too low. Can we do an activity where I can earn a good deal of points? Why don't you ask me questions? And, if I answer correctly, my score would be increased."*

Being Rewarded

Rewarding is a badge as a result of students' specific work. For example, completing the given task first, doing the homework completely, coming to the lesson by doing research, being the most participant of the day, etc. In some cases, students were rewarded with different visual badges with certain features. Most of the students (n=8) stated that earning various badges in return for their work increased both their performance and motivation in general. The rest (n=3) stated that they did not earn any badges during the term.

The award has come to the forefront as a factor affecting both motivation and competition, according to the data obtained as a result of observations and interviews. In addition, students stated that they are happy when they are rewarded, they come to other courses more motivated, and as a result, their course performance is positively affected by this situation. As a result of their work, the award-winning students expressed their thoughts as follows:
Betül said: "*I received a badge the week we made a presentation about a game we play with pleasure. We also did game research, and I bought a badge for it. For example, I was very happy during those weeks. I wish all classes were like this. So I like being rewarded. It reflected positively on my work as well.*"
Sude says: "…*I was looking at my badges, I was checking them all the time. I wanted to win as I won*"
Mert indicated: "*You know, I didn't come to class for a week, my friends got a badge that week... Then I said, why don't I have a badge, so I should have a badge too… He had the thought that if he says that for a little longer, I might get a badge. One wants to get a badge*."

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In addition, although the awards won do not have an additional point effect, they increase their self-confidence as they make students feel successful. Another important issue about the awards is that the students get the reward of their efforts as a result of any work they do, it is an element that makes the students feel good and happy. In other words, when the student knows that his work has a reward, both his performance and motivation are affected positively. The views of Sarp and Deniz are as follows, respectively:

"*I won a badge, sir. It motivated me a lot. I even remember that I know very well that I worked three days and four days for an assignment to earn a badge. Everyone likes to be rewarded*."

"*Winning a badge has motivated me to gain more. I am not successful in other courses. When you are successful in this course, and when you earn something, you will have to work even harder. That's encouraging.*" .

Competition

Having a competitive environment in a course is considered by students as an element increasing the interest in the course (Dominguez et al., 2013). The most important elements of competition in the course, which was the subject of the present study, were points and badges. The feeling that the students were in a race was positively affecting the performance they demonstrated in the course. Deniz, for example, said, *"Teaching the course this way has ensured that there has been competition. Everyone has tried to get cups or badges. I, at least, have tried to get a badge myself. I mean I've tried more."*

Competition also affected the students' ambition and effort. It raised the students' desire to succeed. Mert's comments in this regard are as follows: *"We normally appeared not to be in competition, but in general, we were always in a race. I was thinking, you know, I should be more successful than that person. I tried to get ahead of them, in other words, the others."* In this course, it was also observed that all students tried to successfully complete the given tasks in the applications against time. This was also reflected in the observation notes taken during the fourth week. When it was announced that a repair activity will be done in the class, the words *"Wow, is it going to be a repair activity? My favorite,"* were heard.

Some of the students (n=2) indicated that they were negatively influenced by the competition, especially in the activities carried out against a certain period of time. Başak said the following: *"The shortage of time was too bad, you see! They were doing it right away and finishing it. When a person can't do it, she gets stressed out while sitting. And you forget what you're going to do with the stress at that time. You won't remember at all. It was bad to compete against time."* Evrim expressed her opinions by saying, *"There is usually a time issue. You panic, and there are times you are unable to finish it on time. You do it wrong and make mistakes for that reason."*

Entertainment

Statements such as "an enjoyable course," "not being bored," and "coming to classes with enthusiasm" were covered under the heading of Entertainment. The question "What do you think about the overall teaching of the course?" was directed to the students to determine their views on the gamification of the course. A large portion of the students (n=11) stated that the course was fun. This was supported with the following two example views:

Mert says: *"The course was* generally *fun."*

Sarp indicates: *"The lesson was so* much *fun. While we were attending the classes, we were taught as if we were in a system based on a kind of entertainment, not like a course."*

Feedback

One of the most important factors that can motivate a student in gamification is instant feedback. Feedback can be given to the player in an informative way which guides the player and indicates that the action he or she has done was successful or unsuccessful. It can also be given in an intriguing way providing repeatable information which prompts the player to play (Kapp, 2012). In the activities carried out in the course and in the extracurricular assignments, the students were assessed according to their performance. They were informed about their mistakes and deficiencies, and what they should do on Edmodo. It was aimed that the students did not repeat the same mistakes throughout the semester. All students stated that they were

positively influenced by the feedback. The feedback given to each student individually was found to positively affect their success. Sarp's views are given below:

"The feedback was helpful in that I did what you said would be better, and I earned the full score. Our course was a game. We needed to know the preceding level because we progressed level by level. And, I think if we didn't know the mistakes we had made at the preceding levels, we would not be able to do anything after a while, because the mistakes in the subsequent level would be even bigger. So, if there's no feedback, there's a system in the human memory like this: If you don't tell a person his or her mistake, he or she'll move on without accepting his or her mistake."

The students were more satisfied when they knew what to do or what was missing and where. Instead of accepting the mistake, in line with the feedback they received, they began to prepare their subsequent work more diligently by making more effort. One of the student explained his views on the subject as follows:

Deniz said: *"The feedback has been effective for me. I've seen my deficiencies. It's more satisfying to know where you've been wrong. If points were taken* off *me, it's been nicer to know where the problem was."*

Weekly assignments/tasks

The weekly assignments and tasks were positively reflected in the students' work and positively influenced their success. According to them, there were disadvantages besides the advantages of the weekly assignments. They found that the assignments were useful to practice and ensured the permanence of what they learned in the course. Some of the students believed that the fact that they were given assignments every week did not advance their studies, but rather constituted a disadvantage. Moreover, it was reflected in the observation notes that when the instructor began her sentence with the words "your assignment this week is," the students reacted with comments such as *"Assignments again?", "I wish you didn't give an assignment for one week,"* and *"Please don't give any assignments, let's do an activity."* The views of the students complaining about the assignments were as follows:

Evrim said: *"The fact that there were constantly assignments tired us a lot. It was boring."*

Sude indicated that: *"The assignments were* exhausting*, actually."*

As a result of the analysis of the interviews, it was determined that the students (n=7) liked the Scratch-Repair activities the most. With the Repair activities, the students were given a program that was prepared in Scratch and worked incorrectly, and the students were asked to rearrange these codes and add the codes that made the program work correctly (Figure 4). The students were given a certain time and were asked to compete against this time. As a result, it is stated that the person who finishes first and without mistakes will win the highest grade or trophy. Ece said, "*Scratch-Repair activities helped us learn by solving problems and enabling us to do it… It was more memorable because you could apply what you did*." Engin expressed his views as "*I think Scratch-Repari was good for learning, it was like an exercise anyway*".

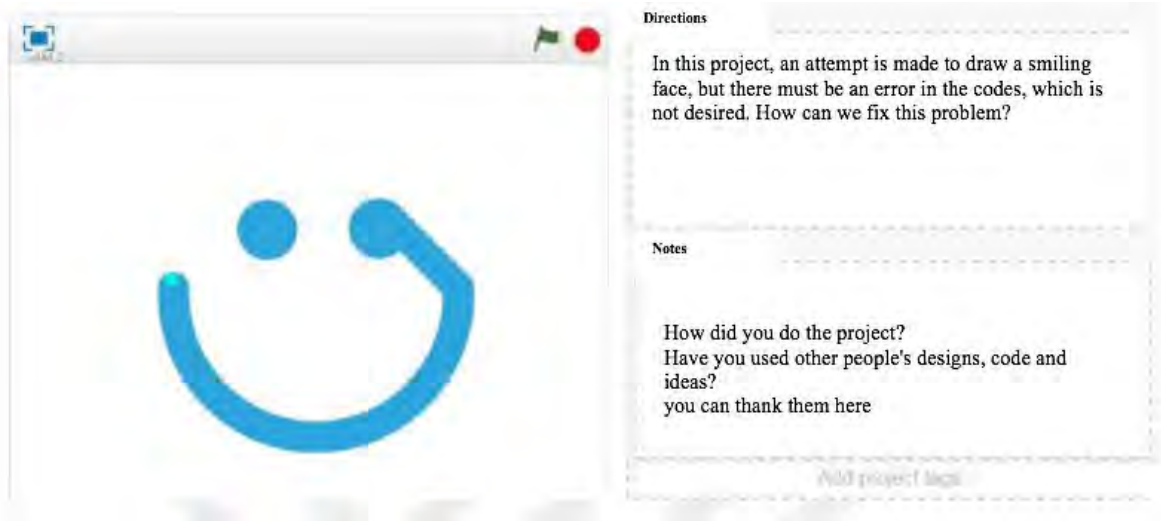

Fig. 4. Screenshot of a Scratch-Repair activity.

4. Conclusion and Suggestions

This study was conducted to investigate the nature of the students' opinions on gamification and on activities that were carried out to create a rich instructional environment through gamification with Scratch. The main goal was to determine how the gamification system — rather than the content — affected the instruction. It was found that the use of gamification in the Graphics and Animation in Education course was an important contribution to the participation, motivation and success in the course. In line with the literature (Ding, Kim & Orey, 2017; Marique, de Poël, Verpoorten, & Hoebeke, 2018; Meşe & Dursun, 2018; O'Donovan, Gain & Marais, 2013), gamification emerged as a powerful tool that ensured the motivation and participation of the students in the course. Gamification increases the value of education and is a more effective method than traditional learning methods (Landers and Armstrong, 2017; Tsay et al., 2018). The students' participation in the course was high in this study. An interesting detail was the fact that in almost every sentence the students mentioned participation, they also mentioned motivation. The students linked their being highly engaged to their being highly motivated. The positive influence of motivation on participation and achievement has also been stated in the studies of Linnenbrink and Pintrich (2003), Saeed and Zyngier (2012) and Karamert & Vardar (2021).

It was found — through both interviews and observations — that the majority of the students in this course actively participated in the course throughout the semester. Factors affecting participation, motivation and achievement in the course were the score tables, active learning, exam stress, collecting points and entertainment. According to the students, the score tables were elements that provided competition and raised a desire to participate in the course. Moreover, the students who accepted their positions in the score tables as a success indicator fulfilled most of the tasks assigned to them in order to move up in the score tables. Thanks to the program used in this study, the students were given the opportunities to attend the course and be aware of their creativity as well as their knowledge and skills. In the gamified course, it was ensured that the students felt that they had the responsibility to be successful in the course. That's why the students were always eager to be active and eager to collect points. According to de Rocha Seixas et al. (2016), in a gamified course, a student should feel that he or she is not only a player who is rewarded as a result of his or her own achievement, but also a person who is responsible for his or her success in the gamified course in light of his knowledge and skills. They have claimed that gamification creates an opportunity to transform a course to be more entertaining.

It was reflected in the interview and observation data that the students attached more importance to this course than other courses. Especially the fact that the students gained points moved the learning experience

to a very different dimension, and ensured that the students had not been detached from the course during the semester. The fact that the students had scores corresponding to their achievements not only motivated them but also significantly enhanced their participation in the course. The score factor was also reflected in the assignments that were delivered. In this course, almost all of the students were found to do their best to get a high score.

Gamification in this study improved motivation. The students were highly motivated to come to the lessons, which we believe was linked to a number of factors: the fact that they were rewarded, they carried out activities in the course, the course was fun, and a competitive environment was created. The claim that gamification affects motivation has also been supported by various studies in the literature (Bicen & Kocakoyun, 2018; Ding et al., 2017; Dominguez et al., 2013; Hakulinen et al., 2015; Kumar & Khurana, 2012; Richter et al., 2015; Yıldırım, 2017).

Achievement in the course was assessed using badges and points. This was positively reflected in the students' performance, improved their motivation for lessons, and gave them a desire for being rewarded more. It appears the rewards were encouraging them to do the assigned tasks. Rewards were also an element that encouraged the students for future tasks because they helped the students feel successful. Apart from that, badges were seen by the students as a way of attracting teacher attention. Denny (2013) has stated that a badge is a method of assessment that improves user motivation and gives the user direct feedback. It has been reported that reward systems motivate students and rewarding makes the experience more enjoyable (Denny, 2013; Dominguez et al., 2013). As students gain a variety of badges, their expectation for success in future studies increases, and badges increase the interest in the course (Abramovich et al., 2013). Richter et al. (2015) have stated that reward mechanisms should be designed according to human emotion and belief systems to create intrinsic motivation, because the achievement of desired objectives depends on it.

In this study, competition was very important for overall student motivation. Competition changed the flow of the course, improved the students' interest in the course, and transformed the course into a more enjoyable environment. Moreover, it ensured that the students attended the lessons. Although the vast majority of the students were influenced positively by the competition, the students who indicated that they were affected adversely were not scarce. Such students stated that their motivation was influenced negatively by the fact that everyone did and finished the activities quickly, especially the activities against time. Similar results have been observed in the study of Hanus and Fox (2015). In their study, competition had no effect on learning outcomes and that competition was an element that negatively impacted intrinsic motivation. Similarly, it was found in a different qualitative study that some students did not find competition as entertaining, that they were adversely affected by score tables, and that gamification did not motivate some of the students (Dominguez et al., 2013).

In the present study, the students tried to avoid being detached from the course and being absent from the course in fear of losing points, going down in the score table and losing the opportunity to earn extra points. Hakulinen et al. (2015) have stated that activities carried out against time improve student motivation, but can reduce their attention towards content. Students can be hasty to win badges, which can distract them. Consequently, they may deliver sloppy assignments. In this study, activities that would be carried out against time were implemented every week throughout the course. Results that were similar to the ones in the literature were valid for the first weeks. However, when the students realized the gravity of the work — in other words, when they understood that they needed to be quick but careful, rather than being hasty but incomplete — they delivered more decent work, and many of them delivered almost complete work in the subsequent weeks. The students gradually gained momentum and solved the problems in a shorter amount of time as the weeks progressed, as the increasingly difficult activities became more prevalent, and as the time required to finish the activities became shorter.

One of the elements that enhanced the participation of the students was the idea that they came to the classes with curiosity and could not predict what would happen in the class. Moreover, the curiosity factor was

found to influence the students' intrinsic motivation significantly. The students' inability to predict the flow of the course, their coming to class with curiosity, and their being eager to curiously wait how the course would play out were found to be elements that prevented the course from being taught monotonously and attracted the students to the course. The curiosity factor is regarded as a factor that ensures students' intrinsic motivation (Malone, 1980).

Feedback attached the students to the course and increased their participation in the course. More so than that, feedback was identified by the students as a factor affecting achievement. Even badges can be considered as elements providing instant feedback (Werbach & Hunter, 2012). Moreover, in the feedback provided to the students, they saw their mistakes, their deficiencies, and the way their assignments were assessed, so they found the chance to not do the same mistakes again. This was reflected in other assignments and activities, as well. So, the effort and achievement increased. As stated by Polat (2014), the students were happier when they received instant feedback. The feedback let the students feel that they were cared for and that each of them was considered valuable.

The limitations of this study included the inability to involve another researcher in the classroom observations, the extensive workload caused by the crowdedness of the class, and the lack of a control group and an experimental group.

Gamification can be a good solution to ensure participation and motivation, especially in this digital age where it is difficult to ensure the participation and motivation of university students. It is a fact that games attract the attention of people of all ages. It is also a fact that it is almost impossible to find games suitable for university-level courses. Considering that not every faculty member has the knowledge and skills of game design, it is thought that gamification of the lesson can eliminate some problems. The lessons that students have difficulty in understanding or are bored, avoid certain duties and responsibilities, and see as a problem can be gamified. When students feel included in the process in the gamified lesson takes on the responsibility of learning. The student who takes the responsibility of managing the learning process is also expected to be successful, and situations that appear to be problems may cease to be a problem. Although gamification requires some workload, gamification of the content or the structure of the lesson can be achieved in a few simple ways.

Instead of presenting the course content to the students with traditional methods, presenting the content to the students in the form of games with different activities will produce more effective results. The idea of learning while having fun will be more attractive to the student. In addition, points, badges, etc. The creation of a competitive environment with elements is important in terms of providing motivation.

There are very few experimental studies in the literature to determine the effect of gamification. Therefore, emphasis should be placed on experimental studies. In addition, research should be conducted on how gamification is done in detail so that it can be an example for other educators in different fields.

In this course, gamification was administered to a crowded class, and therefore it was a little difficult to deal with the students and evaluate their projects one by one. As a solution to this problem, it may help if some of the activities are transformed into group activities. In addition, through group activities, students can also be given opportunities to work in collaboration. With the use of the gamification method, each student can be given the chance to feel valuable, to feel that he or she is attended, and what he or she does inside and outside the class is important and valuable. Students' awareness of their own abilities can be raised.

Empirical studies to determine the effect of gamification are quite few. Therefore, emphasis should be placed on experimental studies. Moreover, further research should be carried out on how to achieve gamification in detail in order to set examples for educators in other fields.

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