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Gamified Learning Activities in a Teacher Education Course

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Abstract

This is an action research study which attempts to solve some issues using gamification in learning environments. This study focuses on motivations of prospective teachers regarding courses rather the course content itself. During 2012-2013 academic year, gamification in education was practiced in the elective course "Innovative Technologies" offered by CEIT (Computer Education and Instructional Technology) program. The researcher e-mailed a questionnaire with 7 open-ended questions to identify prospective teachers' opinions about the gamified learning implemented. The responses from 15 participants regarding these four themes were analyzed individually. Four themes emerged in relation to the research problem: the general level of satisfaction, benefits, challenges and suggestions. According to the findings, the general level of course satisfaction is quite high. These prospective students stated that the use of gamified learning activities had increased their motivation both individually and as group. However, for several reasons, a small number of them were observed to be demotivated.

Keywords: gamified learning activities, gamification, teacher education, satisfaction, motivation

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Introduction

The increasing competitiveness in world markets leads to a need for individuals in every sector to develop themselves. Hence, graduates compete by bolstering their qualifications with additional diplomas. It is inevitable that senior students will suffer from stress in meeting the challenges of professional world. The expectations placed on them bring additional workloads and pressure. Additionally, they also need to be ready for possible changes following constant scientific and technological advancements (Oliveira, Caregnato, & Câmara, 2012). Like all senior students, prospective teachers may well experience similar challenges. In the Turkish context, prospective teachers need to pass a centralized exam to become teachers for the Ministry of National Education, and those who want to pursue graduate studies need to succeed in the graduate entrance and foreign language exams as part of a competitive and selective employment process. Students studying on Computer Education and Instructional Technology (CEIT) programs have to go through all these stages in order to be appointed as IT teachers. Graduates from this program differ from other graduates, however, in that they have to follow developments in advanced technologies continuously. Studies (Altun & Ateş, 2008; Karataş, 2010) have revealed that prospective IT teachers' future concerns are mainly related to finding a position and where they will be appointed. In addition, students in Turkey continue their school practice for one day per week in their final year of undergraduate study. All these pressures, future concerns and an intensive working schedule may lead to the development of negative attitude towards courses, irregular attendance, whether intentionally or not, and low motivation with regard to their courses in the final year.

Student attitudes might influence their behaviors related to achievement and motivation (Gal, Ginsburg, & Schau, 1997). Motivation cannot be maintained solely through the teacher's efforts; the student must be intrinsically willing to learn (Uçgun, 2013). Ryan and Deci (2000) report that instructors expect their students to be internally motivated. Nevertheless, the pressure on senior students might cause them to lose this motivation. Cheok and Wong (2015) confirm that attitudes affect behaviors, behaviors reflect satisfaction and that attitudes thus determine satisfaction. Studies (Kuo, Walker, Belland, & Schroder, 2013; Moore & Kersley, 1996; Yükseltürk & Yıldırım, 2008) show that the satisfaction levels are indicators of a high-quality learning experience. One of the ways to improve satisfaction is to offer students learning experience and make it turn into performance. In addition to the instructor's qualifications, the student's motivation, the level of the course, the expectations of the class, its academic focus and difficulties all influence satisfaction (Duffy & Ketchard, 1998).

The relationship between educational processes, student motivation and satisfaction has been the subject of various studies (Hassan, Malik, & Khan, 2013; Karadağ et al., 2012; Myers & Goodboy,

2014; Pan, 2013). Madonna, Jr. and Philpot (2013) observed a moderate correlation between satisfaction and intrinsic motivation. As previously stated, intrinsic motivation is an essential factor in learning engagement. Instructors are able to choose different methods and techniques to increase intrinsic motivation, one of which may be gamification (Kapp, 2012). McGonigal (2011) states that gamification in class creates an enjoyable atmosphere and promotes intrinsic motivation which reflects the nature of the game. It is believed that implementing game mechanics in class can also awaken the intrinsic motivation of students (Hanus & Fox, 2015). Gamification can be used as an approach designed to increase motivation (Myhre, 2015). More than three million hours a week is spent on gaming worldwide. A well-designed video game is able to keep the gamer engaged for hours. Therefore, why would educators not take advantage of video-game dynamics in learning engagement? Instructors are already integrating game mechanics and game based thinking (Perry, 2015) and also gamification into their courses.

Gamification displays similar attributes to the behaviorist learning approach. Positive reinforcement, the principle of small steps, immediate feedback and progressive challenges are among these features (Biro, 2013). Huotari and Hamari (2012), conceptualized gamification as follows (Figure 1):

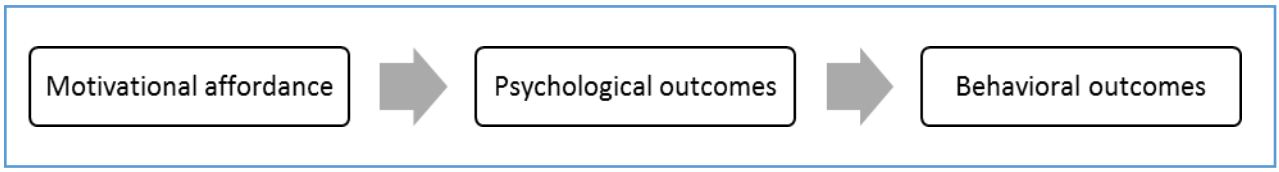

Figure 1. Gamification (Source: Huotari and Hamari 2012)

As seen in Figure 1, motivational affordances lead to psychological outcomes that lead to the emergence of behavioral outcomes. This study is based on Huotari and Hamari's (2012) conceptualization of the gamification approach. The aim was to improve the attitudes and increase the motivation of senior students in the CEIT program (in other words prospective IT teachers) towards the "Innovative Technologies" elective course, thereby improving their levels of satisfaction. It was expected that this will sharpen learning outcomes, and within this scope, the action research model was adapted by the researcher of this study. This study focuses on senior students' (prospective teachers') development of positive attitudes towards the courses rather the course content itself. Hence, implementing of gamification that is becoming increasingly popular was selected.

The research questions were as follows:

1. What is the general satisfaction level of prospective IT teachers?

2. What do prospective IT teachers gain from practicing gamified learning activities?
3. What are the challenges that prospective IT teachers face during gamified learning activities?
4. What recommendations do prospective IT teachers make about gamified learning activities?

Literature Review

Games enable individuals to escape from real life and assume a different identity in a virtual world with unique characteristics, with the aim of keeping themselves engaged in tasks while having fun. The emotional aspect of games involves both success and failure. With each new accomplishment, gamers feel positive; games reinforce these feelings with points, rewards or objects. On the other hand, it is expected that gamers feel manageable amounts of anxiety when they lose. Low levels of anxiety are acceptable, but feelings of panic or fear are not. Hence, the organization of each task needs to match the gamers' skills (be neither too difficult nor too easy) (Domínguez, Saenz-de-Navarrete, de-Marcos, Fernández-Sanz, Pagés, & Martínez-Herráiz, 2013). Balancing the difficulty of tasks will keep the gamers in a state of 'flow'. According to Csikszentmihalyi (1990), this state of flow refers to the balance between gamers' feelings of being fully in control of the task on which they are concentrating, and the sense of accomplishment they feel through feedback received. McGonigal (2011) considers goals, feedback, rules, and voluntary participation as four key points in experiencing this process. Jackson & Eklund (2002) sees the flow which is the challenging part of the activities as an integral part of the individual concentration and the emergence of his/her skills.

The history of games in education is quite old. E-games are now commonly integrated into education. Some researchers have concentrated on transferring the benefits of video games into educational environments where games are not used for education, instead of using video games for instructional purposes (Domínguez et al., 2013). A concept has thus been developed which is not related to education but which is applicable to it: gamification. Before discussing gamification in education, the term gamification needs to be defined. Many studies have given definitions in which similar features are identified. A comprehensive definition of gamification is that it refers to using video game elements in non-game systems, either to improve the experience of users or to connect users to the environment. These elements consist of reward or reputation systems including points, badges, levels, leaderboards and similar features. (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011). These components build social engagement and competition (Hanus & Fox, 2015). Common game elements and their features are introduced below:

Game Elements and Features

Achievements are predefined goals. Achievements may or may not result in rewards or winning (Hunter & Werbach, 2015).

Points are numerical representations of the progress in games (Hunter & Werbach, 2015).

Badges are visual presentations of achievements (Hunter & Werbach, 2015). Educational badges have attracted instructional designers of courses as an alternative assessment method (Alberts, 2010). Badges are symbolic rewards presented by an educator or educational institution to show the degree of success for a skill, information or achievement. Having a badge as a symbol can help to show others one's mastery of specific knowledge. Therefore, instructional designers use badges for the purposes of engagement (Abramovich, Schunn, & Higashi, 2013).

Badges can be an alternative method to present evidence of learning for students and provide students with opportunities to learn skills and achieve results (Davis & Singh, 2015; Gibson, Ostashewski, Flintoff, Grant, & Knight, 2013). Some companies, such as Mozilla Open Badge Infrastructure or the Khan Academy (Abramovich, Schunn, & Higashi, 2013), have integrated badges into their existing systems to inform users about users' competency levels. Hamari, Koivisto, and Sarsa (2014) point out the integration of gamified systems into the existing practices of various institutions and give Codeacademy, a firm teaches its users coding, and a more traditional firm Badgeville, as more examples. Recently, the limited use of badge systems has been widely seen in diversified educational environments (Davis & Singh, 2015).

The badge system is a typical example of extrinsic rewards. Badges are presented upon completing a task or reaching a milestone. Users should be able to see or access previously-earned badges in order to assess their need to earn new ones.

Levels show predefined stages in a learner's progress (Hunter & Werbach, 2015). Levels do not have to be linear; they can even be curved (Zichermann & Cunningham, 2011). Levels assist users to learn and regulate rewards as well as other mechanisms (Hunter & Werbach, 2015).

Leaderboards are visual representations, which show the players' progress and level of achievement (Hunter & Werbach, 2015). Their basic use is for simple comparisons (Zichermann & Cunningham, 2011). As Camilleri et al. (2011) and Kapp (2012) stated, leaderboards support engagement through competition and badges display learners' progress visually. Using leaderboards in relation to a task or a badge earned in gamification environments provides the basis for comparing classroom performance upwards or downwards (Christy & Fox, 2014).

Considering demotivated students and their instructors who faces the issues with motivation of their students, gamification could have a potentially motivating effect in traditional education. Gamification offers potential not only in face-to-face learning but also in e-learning environments where teacher-student eye contact is missing and where students do not fully benefit from the instructors' expertise (de-Marcos, Domínguez, Saenz-de-Navarrete, & Pagés, 2014). Gamification may indeed be used for numerous learning objectives. However, this does not mean gamifying the whole educational content or the environment. Gamification enables progress with regard to content, affects behaviours and facilitates motivation and innovation (Kapp, 2013). Lee and Hammer (2011) emphasize the motivating influence of games on the cognitive, emotional and social domains and suggest that these issues should be considered in gamified learning environments. In addition, in order to ensure the success of gamification in learning environments, Hamzah, Ali, Mohd Saman, Yusoff, and Yacob (2015), proposed a new model combining the ARCS motivational design model and gamification, and called this model ARCS+G.

Gamification in the educational context is not limited to adding games to the process of instructing or developing skills, but its potential to facilitate learning through the integration of gaming characteristics can be exploited. As with educational games, gamers may also use gamification for a variety of purposes in addition to using it as a source of enjoyment and fun. Gamification should not be tied to certain contexts, goals or scenarios. The user needs to focus on enhancing their experience, enjoying themselves and being engaged (Deterding, Khaled, Nacke, & Dixon, 2011).

Recent Studies

Dicheva, Dichev, Agre, & Angelova (2015), analysed empirical studies on gamification in education. In their study using systematic mapping design, the categorizations included gamification design principles, game mechanics, the context of applying gamification, implementation, and evaluation. As the result of this study, a need emerged for more empirical work investigating the effects of gamification on intrinsic and extrinsic motivation. Similarly, Hamari, Koivisto, and Sarsa (2014) concentrated on empirical studies of gamification. The study demonstrated that research on gamification examined motivational affordances as an independent variable, and psychological/behavioural outcomes as dependent variables with a focus on the gamification context and study types. It was then revealed that positive results were observed depending on the specific gamification context and users. In the study by Hamari, Koivisto, and Sarsa (2014) examining empirical studies, 10 different motivational affordances were identified among which points, leaderboards and badges were at the forefront.

de-Marcos, Domínguez, Saenz-de-Navarrete, and Pagés (2014) focused on social networking and gamification in e-learning environments in their own paper, and then they additionally summarized numerous studies on gamification in education, such as Lee and Doh (2012), who identified game design principles as educational activities. Raymer (2011) analyzed supporting engagement and participation in e-learning systems. Erenli (2012) worked on teachers' perception of gamification. Simões, Redondo, and Vilas (2013) supported teachers in adding game elements to teaching activities. Kapp (2012) perceived gamification in education as a "serious" approach, while Domínguez et al. (2013) sought empirical evidence regarding the effectiveness of gamification for learners and educational designers. Studies have revealed the effectiveness of gamification on student engagement (Fitz-Walter, Tjondronegoro, & Wyeth, 2012); increased participation (Decker & Lawley, 2013); affected online social networking preferences (Cho, Gay, Davidson, & Ingraffea, 2007; de-Jorge-Moreno, 2012; Tian, Yu, Vogel, & Kwok, 2011) and the desired learning level attained (Thoms, 2011).

Karataş (2014) systematically examined 62 articles on gamification trends out of 206 he accessed. The study presented the following findings: 35.48% of the literature dates from 2014; studies with undergraduate students are popular (n=38; 64.41%); a concentration on ICT as a learning domain is observed (n=19; 33.93%). The studies examined mainly investigated the effects of gamification on academic achievement/performance (n=18; 31.58%); the most commonly referred-to game components were found to be badges (n=25; 19.38 %) and points (n=19; 14.73%), and motivational theories were most commonly focused on (n=8; 18.61%).

In a study analyzing a 16-week-long course, an experimental group exposed to gamified education with leaderboards and badges was compared to a control group with traditional education in terms of motivation, social perspective, effort, satisfaction, student progress and academic performance. The results were in favour of the group in the gamified learning environment (Hanus & Fox, 2015).

Myhre (2015) questioned the effect of gamified mobile learning in teaching Norwegian to immigrants in relation to student satisfaction. Although Myhre identified an increase in satisfaction due to gamification, he did not find an increase in perceived satisfaction.

First-year undergraduate students learning French were engaged in a mobile environment called Explorez that integrates virtual, quest-based and virtual reality-based games into education. Perry (2015) evaluated the potential of this environment.

In another study, by adding badges and achievements to an online course management system, changes in 200 student behaviours, such as taking the exams in a timely manner, were observed (McDaniel, Lindgren, & Friskics, 2012).

These studies provide evidence for the promising educational potential of gamification.

Methodology

During 2012-2013 academic year, gamification in education was practiced in the elective course "Innovative Technologies" offered in the CEIT program. This study sought solutions for senior students' feelings of demotivation about the course; therefore, it was a practice-oriented action research study. Action research is handled in two groups as practice-oriented and participatory (Mills, 2000). Practice-oriented action research aims to produce solutions to problems teachers face in their classes, to improve the learning levels of their students in a specific topic and to improve their professional performance (Creswell, 2005). Classroom action research includes practice and activities to solve problems rather than theoretical information (Aksoy, 2003; Kemmis & McTaggart, 2000). This study aimed to solve issues related to student attitudes to the course, to test gamified educational activities developed by the researchers, to identify the levels of satisfaction of prospective teachers after implementation, to determine challenges and to suggest practical implications. It was composed of three stages. Initially, literature on gamification was reviewed and data were collected to identify the reasons for the problems. Afterwards, an action plan was developed and administered. Finally, the data collected were analyzed.

Action Research Cycle

Action research, as is known, utilizes a cyclical model of action. This cycle involves planning, action, observation and reflection/evaluation (Carr & Kemmis, 1986). The stages for the cyclical model designed for the gamified learning activities are given below.

The gamified learning activities developed in this study were prepared for the "Innovative Technologies" course offered in the CEIT program. These learning activities have three main aims:

1. To contribute to the development of prospective IT teachers' positive attitudes towards current innovative technologies in addition to educational technology,
2. To contribute to the development of prospective IT teachers' positive attitudes towards this research,
3. To contribute to prospective IT teachers' field-specific general cultural knowledge.

In maintaining a positive attitude towards courses and building field-specific cultural knowledge, a balance was sought between more difficult and more simple aspects. At the same time, as an essential element in gamified environments, flow theory (Csikszentmihalyi, 1991) was adopted. Csikszentmihalyi's flow theory is defined as motivation leading to a deep focus on the challenge which users (here, the prospective teachers) face. Moreover, Sweetser and Wyeth (2005) proposed a new model for flow with 8 elements: Concentration, challenges to gamers' skills, control, open targets, feedback, immersion and social interaction. All these elements bring enjoyment to the course. Elements relevant to the course activities are given below in italics.

An e-mail group was set up before implementation to deliver the gamified learning activities (social interaction). Tasks set for the prospective teachers were distributed through this group. Prospective teachers were expected to share their responses/reactions through this e-mail group (*control*). However, as they at first copied and pasted their peers' responses without doing any research themselves, after the second task, they were asked to send e-mails to the instructor individually. Their responses were discussed afterwards both in class and through e-mails. In the14-week-course, the gamified learning activities were first implemented in the 7th week and lasted for 7 weeks, i.e. until the end of the course. The prospective teachers were expected to explore the current and new information within the gamified learning activities (*concentrate*). In these activities, a time limitation ('until 15:00', 'for 30 minutes', etc.), a personal limitation ('the first 7 people', '50% of the respondents', etc.) and points limitation ('7 points', 'as many points as the number of people' etc.) were implemented (*challenge*).

The researcher choice for the first activity – finding out what the abbreviation "PLATO" (Programmed Logic for Automatic Teaching Operations) stands for (Figure 2) – had advantages and disadvantages. The researcher intentionally chose this acronym, because this system is directly relevant to the IT field, was actively working until 2006, and can even be considered as the foundation of many concepts covered in the prospective teachers' undergraduate education. When this task was assigned, only 15 students were in class and all of them completed the task. The researcher needed to provide clues about the acronym to help prospective teachers identify the real meaning because 'plato' (which is not an acronym) literally means 'plateau' in Turkish and is also the name of a vocational distance education school in Turkey. Most of the prospective teachers thought that "Plato" was a distance education school. The need to provide clues was the disadvantage of this activity. However, this provided a serious warning to the researcher with regard to the following activities (*clear goals*).

I don't know about you but I get bored in class...So I wanted to have some fun! We're going to do some activities...Of course, if you want to join in, you can!

Our goal: To improve our course-related general knowledge.

I will add an extra 20, 15, 10 and 5 points respectively to the grade of the top four high-achievers:

Find and explain the concept of PLATO, which is associated with this course. The first person to do this will get 25 points (since this is the first task!), and the 2nd - 10th people will get 15 points. After this, unfortunately, no points will be given.

If there's not much participation in this task, I'll end this activity!

Figure 2. The first message of the instructor

The instructor graded the first activity and prepared badges using a simple visual processing program with the names and scores of the students and e-mailed them to the students (Figure 3) (feedback). Moreover, the students were asked to keep those badges. Five prospective teachers did not get any points as they could not answer the question correctly.

Figure 3. Sample badges

On the same day, another activity included Google Doodle when Google Doodle covered "Leonhard Eulher" and the students were asked about Pi. This activity was sent to students at 14:45 and they were given 15 minutes to complete it. The first seven respondents were promised 7 points. 10 students participated in the second activity, one of them did not answer correctly, and one sent a belated response. The instructor sent the 7-points badge through the e-mail group.

The researcher followed a systematic grading scheme for the activities. Accordingly, there was a minimum of 5 and a maximum 25 points. The activities lasted a minimum of 15 minutes. The students were allowed to develop their outputs by the end of the semester. The difficulty of tasks, the need for foreign language and the need for product development were considered in determining the points and the duration of tasks. Sometimes all students were graded. Therefore, each participant was awarded points. Some challenging tasks (limited in time, hard-to-access information) were designed for highly motivated and knowledgeable participants. Both conditions were designed to modify the level of challenge (Csikszentmihalyi, 1991).

A gamified learning activity was prepared as a midterm exam question to keep professional and course-related motivation high (Figure 4) (Immersion).

Goal	: To be aware of areas where innovative practices are followed.
Question	: What is the project support code for TÜBITAK's (Türkiye Bilimsel ve Teknolojik Araştırma Kurumu/The Turkish Scientific and Technological Research Council's) project award for the innovation and entrepreneurship competition?
Points	: 25
Number of students	: First 8 students to email the response to the instructor in 2 hours

Figure 4. The gamified learning activity for the midterm exam

All 21 students e-mailed the correct answer to the instructor at the end of the exam. One student e-mailed and complained stating that he had to leave the exam early to send the response. Hence, the instructor agreed that for future applications and extend the deadline for submitting further tasks after the exam.

The researcher varied their activities to eliminate possible boredom arising from the same type of activities. The instructor tried to build rapport and empathy in all e-mail correspondence. Another activity is given below (Figure 5) (*immersion*):

Dear .....(Student name),

I want to vary the activities.

I've chosen **you** for this activity, and I've chosen one of the e-commerce categories: selling flowers.

Your task is to send an email to one of your classmates in the list and add another category. The next person will do the same.

If this happy e-mail chain is completed in 2 hours, I will give 10 points to the whole class... Attached is the list. Good luck! Don't let the chain get broken...

Figure 5. A different sample of a gamified learning activity

The objectives of the study were strictly followed in designing the activities: developing positive attitudes towards educational and non-educational innovative technologies and towards internet research and contributing to IT-specific general knowledge.

Announcing the names of the leaders and all the participants who received points through the email group using activity-specific designed badges is essential for game dynamics in gamified environments. As previously mentioned, using leaderboards and announcing the points collected acted as a form of feedback to increase motivation.

Participants

Twenty-one senior students studying at the CEIT program during the 2012-2013 academic year and who were enrolled in the elective course "Innovative Technologies" participated in the study. The graduates generally worked at primary or high schools as IT teachers or worked as instructional technologists in various institutions. 10 of the participants were male, 11 were female and their average age was 23.

Research Design and Data Collection

Before the course started, the delivery methods of the course and the assessment method were explained to the prospective teachers. They were asked to research and present the assigned topics which would count as 50% of the midterm exam grade. The remaining 50% of the midterm grade was distributed between completing the student questionnaire (10 points), attendance (10 points) and course activities (30 points). The final grade was assigned for developing an e-commerce website (which was a popular topic in the year this study was conducted) in groups of 3 or 4.

The prospective teachers were informed that if their attendance rate for the gamified learning activities was low, the study would come to an end. They were asked for consent through a Google questionnaire. Twelve students out of 21 responded positively, while 6 of them responded negatively and 2 were indecisive. The positive response from the majority and the high attendance rate (15 out of 15) in the first activity were counted as sufficient grounds to pursue the study.

The researcher e-mailed a questionnaire with 7 open-ended questions to identify prospective teachers' opinions about the gamified learning activities in the final week of the "Innovative Technologies" course. Two academic staff (with PhDs) at the CEIT program were consulted about the appropriateness of the questionnaire. Upon their approval, the questionnaires were sent to the participants. The questions, prepared in line with the research objectives, were as follows:

1. Were you generally satisfied with the course learning activities? Please explain your answer.
2. Were there any benefits from the course learning activities? If yes, can you explain?
3. Did you experience anything that bothered you about the course learning activities? If yes, can you explain?
4. Were there any challenging situations that you face to engage in this learning activity? If yes, can you explain?
5. Do you have any suggestions about the learning activities?
6. Do you have any other comments about the course learning activities?
7. What do you think your peers think about the course learning activities?

Data Analysis

Data were analyzed and interpreted through content analysis. This research technique includes text classification and comparison in order to reach theoretical inferences (Cohen, Manion, & Morrison, 2007). This study attempted to derive themes from the prospective teachers' opinions and to present them to the reader in an intelligible form (Bauer, 2000; Fraenkel & Wallen, 2000; Yıldırım & Şimşek, 2005). In this context, the researcher and another experienced coder who works in the same subject matter area coded the themes together.

Four themes emerged in relation to the research problem: general level of satisfaction, gains, challenges and suggestions. Responses to these four themes were analyzed individually. The first and seventh questions corresponded to the first sub-objective ("What is prospective IT teachers' level of

satisfaction about the course learning activities?"); the second question to the second sub-objective ("What are the benefits?"); the third and fourth questions to the third sub-objective ("What are the challenges?"); the fifth and sixth questions to the fourth sub-objective ("What are the suggestions?"). Data were examined in detail before the analysis to form categories with the similar responses. Categories and the frequency of responses are displayed in the tables which following. Moreover, data were descriptively interpreted by giving examples of the responses.

The [Consensus/ (Dissidence+Consensus)]*100 (Miles & Huberman, 1994) formula was used to assess the reliability of the emerging themes and 92.8% reliability was obtained. Hence, the themes were identified with the consensus of two coders (one of them is the researcher).

Findings and Discussion

Fifteen prospective teachers responded to the email with the questionnaire; the rate of response was 76%.

For the first sub-objective ("What is prospective IT teachers' level of general satisfaction about the course learning activities"?) the first, ("Were you generally satisfied with the course learning activities? Please explain your answer?") and the seventh ("What do you think your classmates think about the course learning activities"?) questions were analyzed. The findings of the content analysis are shown in Tables 1 and 2:

Table 1. *Prospective Teachers' Level of General Satisfaction with the Gamified Learning Activities*

Statements	n
I was extremely satisfied.	10
I enjoyed the course.	8
I learnt a lot about the field-specific content.	6
It made it more enjoyable.	4
It enhanced interest in the course.	2
I was happy to score points.	2
Our general knowledge increased.	2
It encouraged research.	2
It enabled active participation.	2
It became boring once it was routine.	1
I think it was a different and new method.	1
It promoted learning while researching.	1
It distracted my attention.	1
I didn't like being graded.	1
I had the chance to observe the effect of competition on behavior in class.	1
Total	43

Table 1 shows a general satisfaction with the course. Only three responses out of 43 can be considered as negative (becoming routine, attention distractor, effects on grades). As Hanus and Fox

(2015) point out, although badges can be rewards for completing tasks, they can also lead to demotivation, as in this case.

The responses of the prospective teachers (PTs) to the question "Were you satisfied with the course learning activities generally? Please explain your answer." are given below.

PT 1: *"Despite my low grade, I was satisfied."*

PT 2: *"I liked the idea, because listening to presentations can be boring. These activities made it more fun."*

PT 3: *"I was satisfied; it is a different and new method. It was a good activity in terms of our field and general knowledge."*

PT 4: *"Though I felt awkward in the first activity, I liked the way it combined research with fun."*

PT 5: *"It was fun and encouraged research, but sometimes I lost interest. Plus, I didn't like being graded."*

The statements also reflect a general satisfaction despite some negative points. They represent the students' degree of motivation with regard to the course.

Table 2. *Satisfaction Levels of Prospective Teachers' Peers with the Gamified Learning Activities*

Statements	n
We are satisfied in general.	10
They enjoyed the course.	4
A few of my friends did not participate.	3
We were happy about the extra marks.	2
We are constantly releasing adrenaline.	1
Some people are happy, some not.	1
Participation increased over time.	1
Everybody learned while having fun.	1
People who like competing liked it.	1
Total	24

Table 2 shows a general satisfaction among peers about the gamified learning activities. Among 24 responses, only one could be counted as negative ("Some people are happy, some are not"). Some of the responses to the question "What do you think your peers think about the course learning activities?" are given below:

PT 1: *"The class has a positive attitude; maybe I am the only opponent, but I also enjoy the activities..."*

PT 2: *"The winners are happy, the losers are disappointed. That's psychology..."*

PT 3: *"In the beginning we thought the activities were tricky but then we started to enjoy them as they got more fun and competitive. I don't know what my peers feel as I don't speak to the whole class."*

PT 4: *"It was surprising to see that even those who didn't like it participated."*

PT 5: *"Those who like to compete and see this as part of life enjoyed it most. I think I like competition to some extent."*

Responses to the question "Were you generally satisfied with the course learning activities? Can you explain?" reveal a high satisfaction level with the gamified learning activities (n=10), that students enjoyed the course (n=8), that activities increased the sense of fun (n=4) and they learnt more field-specific information (n=6). Furthermore, they realized that they find boring the routine use of these activities (n=1), that these activities distracted them (n=1) and that they did not want to be graded (n=1). A striking answer was about the opportunity to observe competitiveness and its effects on behaviors (n=1). Hanus and Fox (2015) explain this as the influence of social comparison on competition.

The responses to "What do you think your peers think about the course learning activities?" displayed a general satisfaction (n=10), enjoyment of the course (n=4) and satisfaction about the additional marks (n=2). Moreover, they apparently increased students' excitement (n=1) and those who liked competition enjoyed such activities (n=1). These responses signal that students were motivated in the course.

For the second sub-objective of the research ("What are the benefits from the gamified learning activities for the prospective IT teachers?") the responses to the second question (Were there any benefits from the course learning activities? If yes, can you explain?) were examined. The findings of the content analysis are summarized in Table 3:

Table 3. *Prospective Teachers' Gains from Gamified Learning Activities*

Statements	n
I learned new information.	14
My general knowledge increased.	2
I learnt new software/tools.	2
It contributed to my personal experience.	2
I learned about different perspectives in the research.	2
It enabled my active participation.	1
What I learned was not permanent.	1
I learned to do things quickly.	1
I liked the competition.	1
I watched my peers during the competition.	1
Total	27

Some of the responses for "Were there any benefits from the course learning activities? If yes, can you explain?" were as follows:

PT 1: *"We are constantly learning new things and our grades are not limited to the exams. This enables active participation."*

PT 2: *"We learnt about things, words and applications that we didn't know and weren't interested in. It is like my surprise after I learnt what PLATO is…"*

PT 3: *"Yes, there were, but I don't remember some of the questions and answers. It affected my learning, but not that much."*

PT 4: *"I learned about topics I did not have any idea about. I learned new tools/software. I rediscovered the importance of doing things quickly in life."*

PT 5: *"I learned about things that I should've known about but didn't. I learned the information I could say: "Look, there's something like that."*

PT 7: *"Except for some new information, as a person who already reads a lot of interesting news and information, I didn't learn a lot."*

PT 7 was already an intrinsically motivated student; hence, this comment might be related to a decrease in intrinsic motivation when a concrete reward is presented (Tang & Hall, 1995).

The responses to the question of "Were there any benefits from the course learning activities? If yes, can you explain?" show that they learned new information through gamified learning activities (n=14), they learned about new perspectives while researching (n=2) and that these activities contributed to their personal development (n=2). Additionally, one prospective teacher stated that the newly-learnt information was not permanent.

This sub-objective of the research ("What are the challenges prospective IT teachers face in gamified learning activities?") was analyzed through the third ("Did you experience anything that bothered you about the course learning activities? If yes, can you explain?") and fourth questions ("Were there any challenging situations that you face to engage in this learning activity? If yes, can you explain?"). This analysis is given below in Table 4 and Table 5:

Table 4. *Aspects of Gamified Learning Activities that Bothered Prospective Teachers*

Statements	n
Nothing bothered me.	11
I didn't like the time limitation.	3
I missed out on getting some points.	1
It could sometimes be boring.	1
Sometimes yes, sometimes no.	1
I didn't like that the number of people was limited.	1
I couldn't predict the answers to some of the questions.	1
The activities caused stress.	1
I had technical problems.	1
Total	21

Some of the responses to the question "Did you experience anything that bothered you about the course learning activities? If yes, can you explain?" are given below.

PT 1: *"As I couldn't predict the answer, my search was not productive, also because of the time limitation I had to copy-paste, although I prefer reading all of a text."*

PT 2: *"We had technical problems; each PC had a different Internet speed. Also, the grading made the amount of communication and interaction less."*

Table 5. *Aspects of Gamified Learning Activities that Challenged Prospective Teachers*

Statements	n
There was no challenging situation.	8
The time limitation was a challenge.	5
I had difficulties when there was no resource in Turkish.	3
Sometimes I had difficulty finding the answers.	3
Sometimes I didn't understand what was expected.	3
I had technical problems.	2
The activities caused stress.	1
The limitation in the number of persons was a challenge for me.	1
Total	26

Some example responses to "Were there any challenging situations that you face to engage in this learning activity? If yes, can you explain?" are as following:

PT 1: *"Sometimes we couldn't understand what was expected. In the first weeks, the e-mail arrived, and we went out – this caused us to lose points. Other than that, I didn't have any problems."*

PT 2: "*Though the questions in the activities seemed easy, they required a lot of effort. Both the lack of time and the need to know the subject can be considered as challenges."*

PT 3: *"I didn't have any real problems, but when there were not enough resources in Turkish I had to use English translation tools and interpreting these was a challenge."*

"Did you experience anything that bothered you about the course learning activities? If yes, can you explain?" was answered showing that the majority of prospective teachers (n=11) did not experience any bother. Three of them complained about the time limitation; one prospective teacher was dissatisfied with the stress created by the competition, which is in line with the findings from the Hanus and Fox's (2015) study. Another area of complaint was technical problems (n=1).

Additionally, the responses to "Were there any challenging situations that you face to engage in this learning activity? If yes, can you explain?" demonstrated that there were no major challenges felt (n=8); nevertheless, the time limitation (n=5) and difficulty in accessing resources in Turkish in the issues they need to research (n=3) were mentioned. Three prospective teachers reported having problems in finding answers and three did not understand what was expected from them. Another problem mentioned was technical issues (n=2).

For the fourth sub-objective of the study ("What are suggestions of prospective IT teachers with regard to the gamified learning activities?") the responses to the fifth question (Do you have any suggestions about the learning activities?) and to the sixth question (Do you have any other comments about the course learning activities?) were analyzed. The content analysis findings were as follows:

Table 6. *Suggestions of Prospective Teachers about Gamified Learning*

Statements	n
The activities could take place out of class.	4
There could be different topics.	4
More time could be devoted to them.	3
There could be various activities.	3
It could be more systematic.	2
No limitation in number of people involved and/or stays the same each week.	2
N/A	2
We could prepare activities.	1
I recommend whole-class activities.	1
There could be no more than two activities a day.	1
The scope of the activities could be narrowed.	1
There could be activities that are easier to understand.	1
Total	25

Some of the responses to the question "Do you have any suggestions about the learning activities?" are given below.

PT 1: *"We could suggest some activities. We could e-mail you some different activities. If you approve, we could use them in class."*

PT 2: *"Activities like the [e-mail]'Chain of Happiness' could be fun. I think more students would join."*

Table 7. *Additional Comments of Prospective Teachers about Gamified Learning Activities*

Statements	n
I have no further comments.	6
N/A	4
We could prepare activities.	2
Participation in these activities helped us focus.	1
There could be a system for these activities.	1
The limit for the number of people could be fixed.	1
Activities should lead to permanent learning.	1
Total	16

Some of the responses to "Do you have any other comments about the course learning activities?" are given below:

PT 1: *"It would be good if it was more systematic and if it could be used not only for our discipline (CEIT) but for others as well. Also, if there were some challenging tasks, and if students engage…so that the system would offer transparent assessment…"*

PT 2: *"The activities were really creative; we could have helped to prepare the questions."*

In relation to the fourth sub-objective, the responses to the question "Do you have any suggestions about these learning activities?" show that participants favored out-of-class gamified learning activities (n=4), a variety in types of activity and the need for more time to complete the activities (n=3). Furthermore, one prospective teacher expressed his/her willingness to prepare the activities and another favored whole-class activities.

The responses to "Do you have any other comments about the course learning activities?" reveal that some prospective teachers wanted to prepare gamified learning activities themselves (n=2). Moreover, one of them emphasized the need for a more systematic approach that better concentrates on the course.

Results

This action research study attempted to solve some issues with regard to course attitudes, motivation and satisfaction of senior students by using gamification in the learning environment. According to the findings, the general level of course satisfaction was quite high. These prospective students stated that their motivation had increased individually and as a whole group with the implementation of gamified learning activities. However, a few of them were observed to be demotivated for some reasons (tasks becoming routine, distractions, and the points required for a pass mark). Additionally, they liked feeling excited and those who enjoyed competition especially liked the activity.

In addition to contributing to their levels of academic and general knowledge, gamified learning activities positively affected the students personally in terms of their speed in reading and mastery of research techniques. On the other hand, those who were already motivated and had a positive attitude with a high level of previous knowledge did not benefit at all from the gamified learning activities.

It is seen that the mechanisms for creating challenges within the gamified learning activities prepared for this study, such as limiting the time, the number of people and access to resources worked in the activity, because the prospective teachers were observed to struggle with these issues. All such challenges lead to an increased degree of excitement. However, with increased stress levels, a small number of the students gave up.

In general, the gamified learning activities prepared for this course led to an increase in general levels of satisfaction, motivation and positive attitude. Urh, Vukovic, & Jereb (2015) also pointed out that learning environments using gamification might increase satisfaction, effectiveness and student engagement. In successfully-designed learning environments, learning and gamification enable students to stay in flow by balancing tasks and skills.

The suggestions for further studies also came from the prospective teachers. They suggested a method in which gamified learning activities work more systematically. Kapp (2012) claims that the significance of gamification is not related to technology. The strength of gamification is its high level of engagement with increased motivation due to a system composed of game mechanics such as decision-making and rewards. Hence, this system does not have to be electronic.

It is believed that if prospective teachers contributed to the preparation of learning activities then these would be more enjoyable and more fun. Considering the research findings in general, it can be concluded that integrating gamified learning activities into teacher education may offer many promising outcomes.

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