

# **Integrating Gamification into Online Learning Sites**

**Cengiz Hakan AYDIN**  
Anadolu University, Eskisehir, Turkey  
chaydin@anadolu.edu.tr

**Murat SUMER**  
Usak University, Usak, Turkey  
murat.sumer@usak.edu.tr

## **Abstract**

This paper intended to reveal the results of a study that explored whether integrating gamification into online learning Web sites can attract students' interest toward using and spending time in these sites. The sequential exploratory mixed method study has not only shown attractiveness but also effectiveness of integrating gamification into these online learning sites.

Keywords: Gamification, Open and Distance Learning, Motivation, Engagement

## **Introduction**

Literature suggests that online and face to face learning result in equivalent outcomes for student in most higher education settings. Reporting on 16 meta-analyses, Bernard Borokhovski, Schmid, Tamim, and Abrami (2014) concluded that thousands of studies indicate that online learners and classroom learners succeed at equivalent rates at a wide variety of outcome measures. For decades, researchers have been investigated "what makes the difference?" For example, Wladis, Conway, and Hachey (2016) found that while students enrolled in online courses were more likely to drop out of college, online course outcomes had no direct effect on college persistence.

The figures show that there is a big demand for open and distance learning (ODL) in Turkey same as all over the world. In 2016-2017 academic year, the number of students registered to distance learning programs was 3,152,398 (47.1 percent of all students) while total number of higher education students was 6,689,185 (HEC, 2018). There is an important point the readers should know about Turkey that 'open education' and 'distance education' are legally considered as two different forms of education: the term Open Education is used for those institutions employ traditional open university strategies while Distance Education is used for those synchronous interaction based online learning programs (HEC, 2014). The big majority of distance learners are actually in open education programs (in 2016-2017, total 3,077,779 out of 3,152,398 were open education students). On the other hand, these open education programs are also considered as traditional ODL, which refers to exam preparation model that requires students to study the specifically prepared print-based materials with their own pace and take proctored face-to-face exams organized in certain times in a semester (Peters, 2003). In many ODL providers including Anadolu University, this print-based self-study is supported with several online support services via mainly a learning management system (LMS). These services include synchronous and asynchronous interaction opportunities with course facilitators and other students, interactive learning materials (video, multimedia, ebooks, audio books, etc.), online and offline trial exams, opportunities to join social student clubs, and so forth. However, the analytics (Anadolu, 2017) as well as a previous study (Hakan et al., 2013) have shown that only a small percent of the students were using these online services (according to Hakan et al. only 16.4% and according to analytics only 24.7%). On the other hand, studies such as Mutlu, Erorta, Kara, & Aydın (2005), have uncovered that those students engaged in online services got better scores at the exams than those who did not use these services. May be, the low completion (graduation) rates in ODL can be explained with this engagement problem. According to the 2016-2017 figures, total 257,068 (8.1 percent) of the large body of open and distance learners were able to graduate from their programs (HEC, 2018).

Gamification is one of the tools can be used to motivate learners to engage in online learning (Werbach, 2013). Gamification in general refers to use of game components into non-game environments. Awards, leader board, challenges, and batches are among the most often used game components for gamification. Coccoli, Iacono, and Vercelli (2015) classified game elements, which Werbach and Hunter (2012) describe the subset of the elements that characterize game design, putting in evidence only those useful in the gamification processes. They are listed in the following, ordered on the basis of the abstraction level from the specific design element:

- *Dynamics*: the higher abstraction level. They include constraints, emotions, narrative, progression, relationships.
- *Mechanics*: the way to push interactions and create engagement. They include challenges, chances, competition, cooperation, feedback, resources acquisition, rewards, transactions, turns, win states.
- *Components*: the instantiations of mechanics and dynamics. They can appear in the form of achievements, avatars, badges, boss fights, collections (of objects, badges), combat, content unlocking, gifting, leaderboards, level, points, quest (predefined challenges with objectives and rewards), social graph, team, virtual goods (game assets with perceived or real-money value).

In education (both online or face-to-face) gamification means use of these components into learning environments. Studies such as Barata, Gama, Jorge, and Goncalves (2013), Dominguez, et al. (2012), Herranz, Colomo-Palacios, and Seco (2015), Sheth, Bell, and Kaiser (2012), suggest that gamification motivates the learners toward online learning and boost in interest and participation. However, the majority of the studies in the literature covers integration of gamification into small scale single courses, and there is a scarcity of research on integrating gamification into online learning program sites.

The study proposed to explore the attractiveness and effectiveness of gamification into online learning program sites. More specifically, the study intended to seek the answers of the following questions: (1) Was there an increase in the number of students engaging online learning services and average time spend in these environments after the integration of gamification? (2) how did the gamification influence the students' performance in the online courses? and (3) what did the learner think about integrating gamification into web sites?

## Method

A sequential exploratory mixed design was employed, and it was conducted in one of the largest foundation-based higher education institutions (semi-governmental, semi-private institutions) located in the West side of Turkey. It was originally planned to be conducted in Anadolu University (the open university of Turkey) but due to the limitations of the LMS and the security measures of Anadolu, it was quite difficult to do. So that an institution offering ODL programs and flexible to include gamification was chosen. It has around 12000 students and all are required to take core courses offered completely online. The instructional strategy is same as traditional ODL, exam preparation model in these core courses. For this study, several game components (a leader board, earning points, batches and levels) were integrated into the program web site and the courses. Data collected via computer logs, exam scores and semi-structured interviews.

Game elements are the toolbox of gamification which includes all the different components like points, leaderboard, levels, badges, and challenges/achievements that can be put together in different combinations to make up different game systems. In this study, we integrated following game elements into the courses and the program site:

- **Points** - In this study, "Learning Point" was used as the first element. These quantify the player's progress. In this research, players can earn points by downloading learning materials, watching videos, posting in discussion boards, and completing practice tests.
- **Leaderboard** - This is a list showing the ranking of students according to their learning points they collected. The leaderboard will be updated weekly, enabling the players to monitor their rankings. The leaderboard is specific for the courses. For example, a learner might take a place in UFND course's leaderboard with the points that he/she collects in this specific UFND course.
- **Badges** - Badges define the individual's performance by symbolizing desired outcomes in the game (Abramovich, Schunn & Higashi, 2013). In this design, badges serve the mechanics of competition of an

achievement. Badges are employed for different purposes. They can be used for setting goals, providing explanations about learning activities, identifying players who have shared experiences, providing them with status and giving them the right to brag (Antin & Churchill, 2011). This design uses them to set goals, impart status and give the right to brag. We think to give out badges during the semester and at its end. For example, the student who got the fullest points was given the badge of “Ready to Teach” at the end of the semester.

- **Levels** - These are the features been used to categorize the students. There were 4 levels used in the design. They can level up based on the learning points they collected.

### Findings

The reporting of the findings was organized into two sections. Quantitative findings about learners’ access to various learning activities in the course in pre- and post-gamification situations were summarized in Table 1.

**Table 1.** Investigation of the learners’ access behaviors before and after gamification.

| Measurement      | Situation | n   | $\bar{X}$ | S     | sd  | t       | r    |
|------------------|-----------|-----|-----------|-------|-----|---------|------|
| Access - Site    | Before    | 294 | 5,83      | 10,79 | 293 | -12,75* | 0,62 |
|                  | After     | 294 | 17,99     | 20,07 |     |         |      |
| Access - Content | Before    | 294 | 13,84     | 28,19 | 293 | -9,35*  | 0,48 |
|                  | After     | 294 | 47,43     | 64,62 |     |         |      |
| Access – e-Book  | Before    | 294 | 3,74      | 9,62  | 293 | -2,35** | 0,14 |
|                  | After     | 294 | 5,16      | 7,71  |     |         |      |
| Access - Test    | Before    | 294 | 1,89      | 4,12  | 293 | -17,32* | 0,71 |
|                  | After     | 294 | 9,83      | 6,56  |     |         |      |

The average of access to the e-learning sites before the gamification was  $\bar{X}=5.83$ , while the average increased to  $\bar{X}=17.99$  after the gamification, and this difference found statistically significant. This finding suggests that integration of gamification into the e-learning sites has a significant impact on the students to access to the e-learning sites.

Also, it was found that there was a statistically significant increase in pre-gamification and post-gamification situations in terms of students’ access to the content in e-learning sites. While the average of content access in a pre-gamification e-learning environment was  $\bar{X}= 13.84$ , the average after gamification increased to  $\bar{X}=47.43$ . This finding suggests that integration into the e-learning environment has a significant impact on students’ content access behaviors in the environment.

Then, in terms of access of reading resources in e-learning environment, it was found that there was a statistically significant increase between pre-gamification and post-gamification situations. While the average of access to the reading resources in e-learning environment before the gamification was  $\bar{X}= 3.74$ , while the average after the gamification has increased to  $\bar{X}= 5.16$ . This finding shows that integration of gamification into the e-learning sites has a significant impact on students' access to the reading resources in the learning sites. Last but not least, it was found that there was a statistically significant increase between pre-gamification and post-gamification situations in terms of students’ access to the tests in e-learning sites. While the average of access to the tests in pre-gamification was  $\bar{X}=1.89$ , while it increased to an average of  $\bar{X}=9.83$  after the gamification. This finding shows that integration of gamification into the e-learning sites has a significant impact on students’ access to the tests.

On the other hand, the Pearson’s Correlation Analysis has shown that there is no meaningful relationship regarding to the learners’ academic performances in pre- and post-gamification situations.

**Table 2.** Pearson’s Correlation Coefficient related to academic success in pre- and post-gamification situations (n=69).

|                  | n  | r     | p    |
|------------------|----|-------|------|
| Learners’ Grades | 69 | 0,178 | 0,14 |

The semi-structured interviews with the participation of 16 students have shown that the gamification motivated them to enter the course sites more often than before. Almost all the students mentioned that they entered the system only once during the first half of the course (first 7 weeks before the gamification intervention started) but during the second half they visited the sites at least twice in every week. Gamification did not only increase the frequency of visits but also the learners’ satisfaction with the courses. Every student using the system and participating in the semi-structured interview stated that they were satisfied with the system. The following quotes represents the learners’ satisfaction and shared with different phrases by all the interviewees:

“So, in fact, it's a nice and competitive system. It was different from normal UFND courses. That's why I like it. I enjoyed seeing my name on the leaderboard.” 18 years old Female, studies Civic Engineering.

“At the beginning I did not give any attention to these game-like things; but later, after earning some points, started to talk with my classmates about these points and so forth, it, kind of, motivated me to do more in the courses and I did. I was fun and at the end I finished the courses successfully” 19 years old Male, studies Business Management.

During the analysis of the interviews, it was noticed that some students had some problems about how game elements work, such as how to collect points, and earn a badge. Here is a quote shared by a number of interviewees:

“Obviously I didn't quite understand how to earn a badge. I won sometimes, didn't other times. I don't know exactly but I followed the instructions that should be done in general.” 18 years old Fine Arts student.

It was also noticed that the learners valued/preferred the Leaderboard and Badges more than the points and levels. Even those students whose name had never appeared on the Leaderboard liked the idea of having such a board. They found it very motivating. Five interviewees mentioned that although their name was not on the board, they worked visited the site, downloaded the materials, watched the videos and completed the activities more than usually they do in their classes to be able to get more points to appear in the board. And those 3 students whose name were on the board mentioned that they did not need any other motivational elements, such as badges, etc., and seeing their names on the board were enough. The students also stated that earning awards was fine but did not really motivated them as much as badges and leaderboard.

## Conclusions

The results suggest that there is a statically significant increase in distance learners’ actions before and after the integration of game elements into the ODL program sites, including visiting the course webpage, clicking the content, downloading, and completing course assignments. The results also show that there is not any secret recipe for using game elements in a big scale open and distance learning system. The key for success is the correct selection of game elements. Different researchers use different game element combinations and most of them found positive results. For this reason, researchers or practitioners should be careful about integrating game elements into their systems because they are not just tools. In our case, we found out that the learners preferred the leaderboard and badges. The results regarding leaderboard might be related to competitive nature of the educational system in Turkey. Learners especially in K12 find themselves in a culture and climate that values test-preparation and competition. So, learners who came from this kind of a learning culture may easily value similar activities such as leaderboard. Similarly, the badges can be related to a trend observed among higher education students not only in Turkey but also all around the world toward earning as much certificate as possible while they are pursuing their regular degrees. The participant students might feel a similarity between badges (as micro-credentials) and certificates, and so that, they preferred badges rather than other elements.

As a result, we believe that gameful approaches in education have broad potential to reframe formal education, encouraging student engagement, and ultimately leading to deeper and better learning. As the momentum for gameful learning environments increases, it is crucial to develop empirically informed design principles and guidance for implementation so that this approach can be applied across multiple learning environments.

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