A Mixed-Method Research on the Effectiveness of Using Gamification Elements in an Online English Course

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In this study, the embedded design mixed method in which qualitative and quantitative data were applied together and was aimed to determine the effectiveness of gamification applications and LMS use in online English lessons. The study was implemented in a secondary school in Istanbul. The purposeful sampling method, a non-random sampling method, was performed. The students were divided into control and experiment groups randomly. The control group consisted of 44 students, and the experiment group was 47. A pre-test via an online testing tool adapted from a norm-referenced/academic achievement test designed by the Ministry of National Education (MoNE) to examine the students' background knowledge level related to the topic chosen. In this study. The control group was taught the 7th unit of the 5th grade English book 'Party time via traditional presentation methods. In contrast, the experimental group was the same subject via versatile gamification apps such as Kahoot, Classdojo, Quizziz, and web-based games. As a result, there was a significant change between the pre-posttest change in the experimental group. Accordingly, the Posttest means of those in the experimental group are statistically significant. Following the post-test, semi-structured interviews were conducted with ten students in the experimental group, who were selected by criterion sampling method. According to the data obtained from the interviews, the students were satisfied with the course activities. Moreover, students stated that other lessons should be conducted with interactive applications in addition to English lessons.

INTRODUCTION

It cannot be denied that technology affects every part of life, from a global perspective to individual aspects. Transformation in every field is inevitable with all current advances in technology. One of the areas where technology has a significant effect is education. Also, education can be a complementary part of society using and benefiting from technology (Selwyn, 2013).

Technology and its reflection on education is not a new idea or development. It dates back to the first technological devices. Karademirci (2010) stated that educational instruction was provided through television in the 1960s, computers in the 1980s, and then the internet in the 1990s, which shows the historical background of the effects of technology on education. However, the past two decades have determined technology's status.

The World Wide Web (known as the web), introduced in 1989 by Tim Berners-Lee, has changed over the years and is stated to have four generations Web 1.0, Web 2.0, Web 3.0, and finally, Web 4.0 (Aghaei et al., 2012). In web 1.0, websites were created for many readers and defined as ''read-only'' by Tim Berners-Lee (Naik & Shivalingaiah, 2009). On the other hand, in Web 2.0, people can read and react to online content, indicating that there is duplex communication between the users. These include transforming Web 3.0 into a database for artificial intelligence(Naik & Shivalingaiah, 2009).

Defined as letting interactive community, Web 2.0 has enormously influenced education because learners can control their learning in collaboration with others with Web 2.0 tools (Ng, 2012). Sahin-Topalcengiz and Yıldırım (2020) state that Web 2.0 tools are significant for learners and that teachers are responsible for using these tools in learning environments. Quizizz, Kahoot, and Google Forms are some of the most famous Web 2.0 tools for educational purposes.

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With these technological advances, the future of education has always been a topic of discussion. Heick (2022) defines ten powerful educational ways for learning in the future: Visual Learning, Evolved Currencies, Personalization, Gamification, social media, Game-Based Learning, Connectedness, and crowdsourcing. Among these, gamification has become a trending topic in education with its positive reinforcement of learning. Gamification can be defined as integrating game-based elements into a somewhat different context (Kiryakova et al.,2014). Gamification is also defined as implementing game design and setting to enhance non-game contexts by a higher level of student engagement(Gamification in education,2018). Furthermore, gamification is not only the adjustment of game elements and techniques in non-game contexts but also the foster learners' motivation toward learning and creating a positive classroom atmosphere, and creating more game-like classroom activities(Flores, 2015; Werbach & Hunter, 2012; Werbach,2014) Gamification approach can be achieved through online language learning applications such as Kahoot, Duolingo, Quizziz or the use of classroom games such as taboo words, charades, or Pictionary to teach a foreign language.

Gamification has been especially popular in foreign language teaching and learning. In the study on gamification in language classes, Stocker (2020) reached data supporting that gamification increased students' autonomy, competence, and emotional and behavioral engagement. Putra and Priyatmojo (2021) found that students had positive feelings towards gamification elements in foreign language classes, decreasing boredom and creating a fun environment. This popularity of gamification in learning and teaching is due to the apparent change between the generations. However, it is incorrect to expect the present Generation Z (Gen Z) to keep learning the same way as the previous generation, as technology has changed rapidly. Govindarajan (2020) defines Gen Z as digital natives whose life the internet and social media mean a lot. He adds that educators have noticed the potential games can offer this generation.

For many reasons, traditional teaching methods may not suit each learner type. Szymkowiak and others (2021) state that it is essential to integrate modern technology into teaching in the 21st century because the new generation of students, called Gen Z, only has a short attention span. Moreover, they can reach information from every point in the world through different sources of information and need to be continuously fed with new and various types of information. In line with this, Sartor (2020) also expresses that Gen Z students are constant technology users and therefore look for technology while being educated. According to Rothman's (2016) list of the characteristics of Gen Z, it is seen that these students are keen on interactive multimedia, prefer to get instant feedback, like to see clear aims in whatever they do, and get motivated by getting rewards and facing challenges. With this, gamification can meet the new generation's expectations by considering their needs. Through games with Web 2.0 tools, it is possible to engage students, motivate them, give them a chance to challenge each other, and get rewards at the end.

After admitting the relationship between Gen Z and their specific need for technology in classrooms, this study aims at determining the effectiveness of gamification applications and LMS use (to support game-like tasks) in online 5th-grade English lessons. Studies in the literature support the positive effects of gamification in foreign language lessons in face-to-face classrooms (Kayseroğlu & Samur, 2018; Stocker, 2020; Putra & Priyatmojo, 2021; Veljković Michos, 2017). Few studies investigate gamification in English classes during emergency remote teaching (ERT). Therefore, this study will provide teachers with a new perspective regarding gamification applications during online English teaching.

Within the scope of the research, the following questions will be answered:

Q1. How do the pre-test and post-test scores of the participants in the whole study group change?

Q2. How does the gamification application in the 5th grade online English lesson affect participants' learning of the topic/achievement test scores?

Q3. How do the participants in the experimental group evaluate their experiences in online English lessons integrated with gamification?

Q4. How do the qualitative findings help to understand the nature and results of the experiment?

METHOD

In this study, the embedded design mixed method was applied (Creswell, 2013). In the study, qualitative data collection methods were integrated into a quantitative experimental model to measure the effect of using gamification elements through Web.20 tools and LMS on learning fifth-grade English class ''party'' theme and obtaining students' ideas about course activities (Creswell and Plano Clark, 2011). Therefore, qualitative data obtained through teacher observations during the intervention and semi-structured interviews after the

intervention had a secondary role in supporting the quantitative data obtained from the preliminary research. Pre-test and post-test were applied to the students to determine the effect of using gamification applications and game-like activities sent via an LMS application on academic success in online English lessons.

Study Group

The research was conducted online with 5th-grade students in a public secondary school in Istanbul, Turkey. Ninety-one students studying in four different 5th-grade classes voluntarily participated in the research, which was selected with the critical situation sampling method, one of the purposive sampling methods which examine a limited situation with the research problem in depth (Patton,1987). The study group comprises 91 students, 45 male, and 46 female. The students were divided into control and experimental groups by cluster sampling according to their classes. The control group consists of 44 students, and the experimental group consists of 47 students.

The current 5th-grade English curriculum, developed by the MoNE in 2018, was aimed at students at the primary education level in line with the Common European framework of reference for languages set by the Council of Europe(CoE, 2001). In this context, the English of the students participating in the research was at the A1 level. When examined in terms of language functions, the students could greet each other, ask permission, express their likes and daily routines, and tell the time.

Following the post-test, semi-structured interviews were conducted with ten students in the experimental group to learn their views on the online English course in which gamification elements were used and to support the quantitative data. The students were selected by criterion sampling, and the test score changes were heterogeneous.

Data Collection Procedures

Quantitative Data Collection Process

Before the study started, a consent form was obtained from the participants and a parental consent form because the participants were under 18 years old.

Afterward, the reliable and valid 5th-grade outcome comprehension test of unit 7 on the Education Information Network (EIN) portal was administered to the experiment and control groups in a single session, simultaneously, as a pre-test online via the Quizziz application. Students were given 30 seconds for each question during the application and participated in the exam with their cameras on.

After the pre-test, the 5th grade party time unit was taught online for 15 hours through gamified English teaching tools to the experimental group. Kahoot, Quizlet, wordwall.net, and Padlet were online gamification applications. Students were given assignments with puzzle and game content during their education, and extracurricular tournaments were organized through Kahoot. Classdojo, a popular LMS, was used to observe students' progress and assign extensive game-like learning activities. The control group taught the same unit using traditional teaching strategies such as teacher presentation and completion of grammar exercises.

At the end of the process, the same outcome comprehension test was applied to the experimental and control groups as a post-test. The application was again made through Quizziz by removing the elements that could threaten the reliability and validity.

Qualitative Data Collection Process

This embedded mixed-design study used qualitative data to support the quantitative experimental results (Patton, 1989).

The collection of qualitative data consists of two stages:

1. Observation (During the Experiment)

In this study, as stated in Hammersley and Atkison (2007), one of the researchers was also the instructor of the planned course as a participating observer. Direct and indirect observation techniques are used simultaneously. Indirect observation is observing a behavior through a score of a video recording, whereas direct observation is observing the behavior itself (Bernard, 2006).

2. Semi-structured interviews (post-experiment)

Semi-structured interviews were conducted following the intervention with the ten students from the experiment group with heterogeneous post-test scores chosen according to criterion sampling. Interviews were held one-on-one with each student in the half-hour period specified for them over the Zoom application. During the interviews, webcams of the participants were turned off. The interviews were recorded as audio only with the permission of the students and their parents.

Data Analysis

Quantitative Data Analysis

The kurtosis and skewness coefficients were examined to determine the conformity of the measurements to the normal distribution. The kurtosis and skewness values obtained from the scales were between +3 and -3 for normal distribution (De Carlo, 1997; Groeneveld and Meeden, 1984; Hopkins and Weeks, 1990; Moors, 1986). Since the skewness and kurtosis values obtained from the pre-test and postop values in the group separation were between +3 and -3, normality was ensured, and parametric test techniques were used in our analyses.

Table 1: Normality test in group separation

Group		n	kurtosis	skewness
Experiment	Pretest	47	,340	,037
	Posttest	47	-,171	-1,164
Control	Pretest	44	,255	-,126
	Posttest	44	-,238	-,394

Repeated ANOVA and independent groups t-tests were used in our analyses. Examining Pre-Post Test Change in Perspective of the Group It was analyzed with the repeated ANOVA test. Examination of Pretest and Posttest Scores in terms of Groups; on the other hand, independent groups were examined with the t-test.

Qualitative Data Analysis

In qualitative data analysis, all data are read repeatedly to apply to content analysis, and then crucial thoughts or concepts in the text are revealed. After taking note of the researchers' opinions, the key phrases expressing each idea appear as codes. Next, categories are created by associating the codes with each other. Categories make the codes meaningful. Finally, themes are designed to cover all these (Morse & Field, 1995). Yildirim and Simsek explain content analysis in four steps: 1. Coding of data, 2. They were identifying the themes, three and organizing the codes and themes, 4. identification and interpretation (Yıldırım & Şimşek, 2013).

The qualitative research content analysis process is as follows (1) The researcher collects data from text files such as field notes and transcriptions, (2) The researcher transcribes the fieldnotes or records, (3) The researcher reads the data carefully, (4) the researcher assigns a code label to text segments and locate them accordingly. Finally, the researcher codes to text for descriptions or themes in the research report (Cresswell, 2012, p.237).

In this scope, the researchers transcripted the audio recordings and followed content analysis steps to obtain codes, categories, and themes.

FINDINGS

a) Qualitative data findings based on intervention

Table 2: Group distribution

		n	%
Group	Experiment	47	51,6
	Control	44	48,4
Gender	Male	45	49,5
	Female	46	50,5

While the rate of those in the experimental group was 51.6%, the rate of those in the control group was 48.4%; the rate of male students was 49.5%, and the rate of female students was 50.5%.
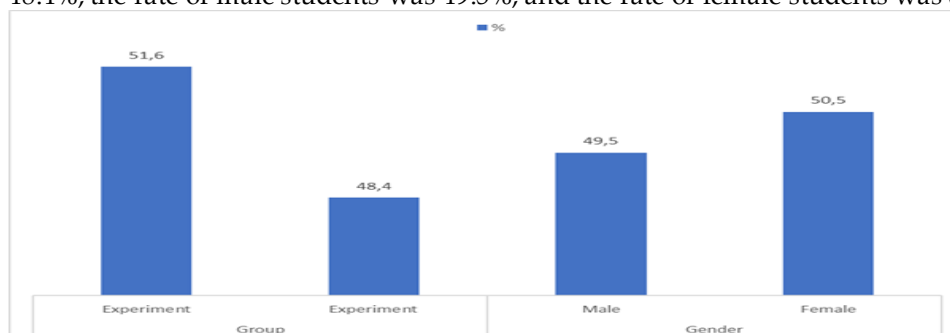
Table 3: Number of correct answers for pre-post test questions in group separation

		Pre-test		Post-test		
		n	%	n	%	Change
EXPERIMENT	Question 1	18	38,3	29	61,7	23,4
	Question 2	10	21,3	21	44,7	23,4
	Question 3	24	51,1	42	89,4	38,3
	Question 4	23	48,9	40	85,1	36,2
	Question 5	26	55,3	36	76,6	21,3
	Question 6	9	19,1	24	51,1	32,0
	Question 7	16	34	32	68,1	34,1
	Question 8	24	51,1	37	78,7	27,6
	Question 9	23	48,9	35	74,5	25,6
	Question10	30	63,8	39	83	19,2
	Question11	29	61,7	38	80,9	19,2
	Question12	16	34	30	63,8	29,8
	Question13	35	74,5	41	87,2	12,7
	Question14	5	10,6	19	40,4	29,8
	Question15	25	53,2	40	85,1	31,9
	Question16	23	48,9	35	74,5	25,6
	Question17	30	63,8	39	83	19,2
	Question18	16	34	29	61,7	27,7
	Question19	28	59,6	43	91,5	31,9
	Question20	3	6,4	19	40,4	34,0
CONTROL	Question1	17	38,6	26	59,1	20,5
	Question 2	5	11,4	21	47,7	36,3
	Question 3	21	47,7	28	63,6	15,9
	Question 4	23	52,3	28	63,6	11,3
	Question 5	32	72,7	34	77,3	4,6
	Question 6	11	25	13	29,5	4,5
	Question 7	17	38,6	24	54,5	15,9
	Question 8	28	63,6	31	70,5	6,9
	Question 9	24	54,5	27	61,4	6,9
	Question10	31	70,5	31	70,5	0,0
	Question11	32	72,7	33	75	2,3
	Question12	31	70,5	30	68,2	-2,3
	Question13	38	86,4	38	86,4	0,0
	Question14	10	22,7	13	29,5	6,8
	Question15	29	65,9	34	77,3	11,4
	Question16	23	52,3	22	50	-2,3
	Question17	33	75	34	77,3	2,3
	Question18	23	52,3	26	59,1	6,8
	Question19	34	77,3	39	88,6	11,3
	Question20	10	22,7	10	22,7	0,0

The questions with the highest increase in the correct answer rate in the experimental group are questions 3, question 4, question 7, question 20, question 6, question 19, and question 15, respectively.

The questions with the highest increase in the correct answer rate in the control group are questions 2 and 1.

Table 4: Examination of pretest and posttest scores in terms of group

Group		n	Mean	sd	t	p
Pretest	Experiment	47	8,79	3,75	-2,609	,011*
	Control	44	10,73	3,32		
Posttest	Experiment	47	14,21	3,45	2,420	,018*
	Control	44	12,32	4,01		

*p<0,05

The t-test results for the group analysis of the pre-test and post-test Scores are presented in the following.

There was a statistically significant difference between the experimental and control groups in the pre-test (p<0.05). While the average of those in the experimental group was 8.79, the average in the control group was 10.73. Accordingly, the pre-test mean of those in the control group was significantly higher.

There was a statistically significant difference between the experimental and control groups in the post-test (p<0.05). While the average of those in the experimental group was 14.21, the average in the control group was 12.32. Accordingly, the post-test means of those in the experimental group were significantly higher.

Table 5: Descriptive statistics of pre-test and post-test means by group and gender

Group		Mean	sd
Pretest	Experiment	8,79	3,75
	Control	10,73	3,32
	Total	9,73	3,66
Posttest	Experiment	14,21	3,45
	Control	12,32	4,01
	Total	13,30	3,83

While the pre-test mean of those in the experimental group was 8.79, the post-test mean was 14.21.

While the pre-test mean of the control group was 10.73, the post-test mean was 12.32.

Table 6: Group analysis of pre-test and post-test change

	S.S.	df	M.S.	F	p
Pre-Post t change	559,388	1	559,388	201,509	,000*
Pre-Pos t change * Group	167,080	1	167,080	60,188	,000*

*p<0,05

The results of the Repeated ANOVA test for the group analysis of pre-test and post-test change are presented below.

According to the analysis results, there was a significant change independent of the group for pre-post tests(p<0.05). There was also a significant difference between the pre-pots test change in the experimental group and pre-post test changes in the control group (p<0.05).

Table 7: Descriptive statistics of pre-test and post-test means by group and gender

Group			Mean	sd
Pretest	Experiment	Male	7,27	2,96
		Female	10,12	3,91
		Total	8,79	3,75
	Control	Male	11,30	2,87
		Female	10,10	3,71
		Total	10,73	3,32
	Total	Male	9,33	3,53
		Female	10,11	3,78
		Total	9,73	3,66
Posttest	Experiment	Male	12,95	3,47
		Female	15,32	3,09
		Total	14,21	3,45
	Control	Male	13,09	3,75
		Female	11,48	4,20
		Total	12,32	4,01
	Total	Male	13,02	3,58
		Female	13,57	4,09
		Total	13,30	3,83

While the pre-test means of the males in the experimental group was 7.27, the post-test mean was 12.95; While the pre-test means for the females was 10.12, the post-test mean was 15.32.

While the pre-test means of the males in the control group was 11.30, the post-test mean was 13.09, and the pre-test means for the females were 10.10, and the post-test mean was 11.48.
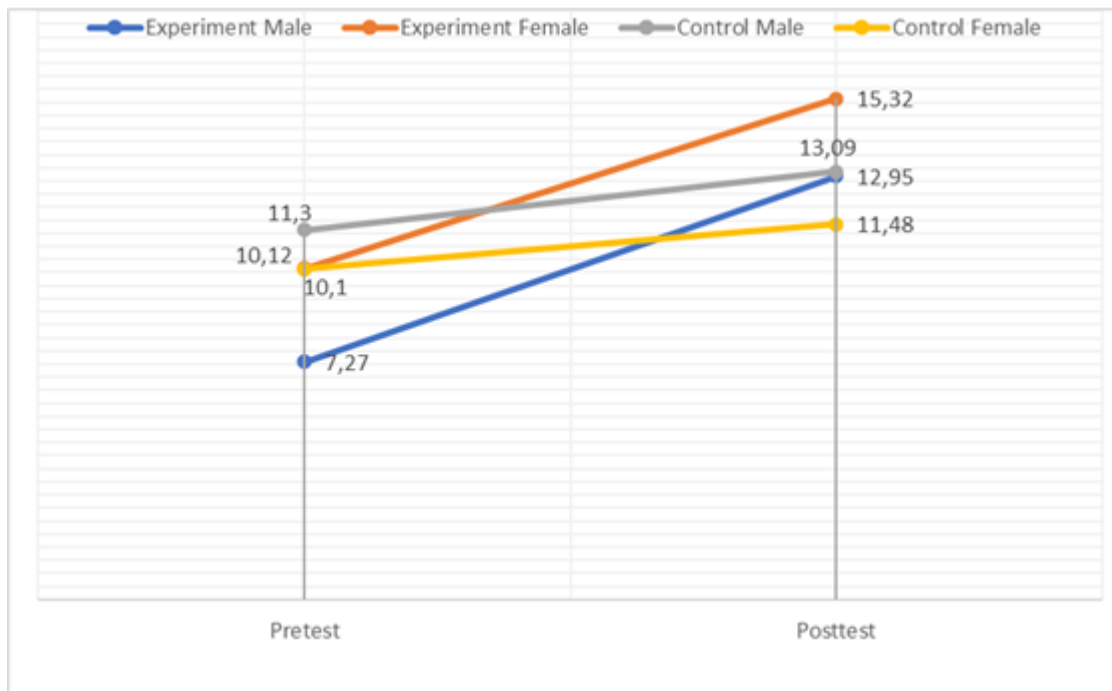
Table 8: Examination of pretest and posttest scores in terms of group and gender

	S.S.	df	M.S.	F	p
Pre-post	558,682	1	558,682	198,536	,000*
Pre-post * Group	168,708	1	168,708	59,953	,000*
Pre-post * Gender	2,210	1	2,210	,786	,378
Pre-post * Group * Gender	,018	1	,018	,006	,936

*p<0,05

The results of the Repeated ANOVA test performed for the Analysis of Pre-Post Test Change in Group and Gender are below.

According to the analysis results, there was a significant change independent of the group for pre-post (p<0.05). There was also a significant difference between the pre-pots test change in the experimental and pre-post-test changes in the control group (p<0.05). There was no significant difference between the pre-post-test change in males and the pre-post-test change in females(p>0.05). There was no significant difference between the pre-post-test changes in males and females in the experimental and pre-post-test changes in males and females in the control group (p>0.05).

b) Qualitative data findings

Observation

It was derived from the teacher's observations that gamification tools boost students' motivation and engagement during the activities. Furthermore, compared to the control group, the experiment group students were more willing to participate in the classroom activities. Again, the friendly and competitive environment between the groups in games promoted collaboration and contentment, which could be observed from their facial expressions and interactions.

From the classroom observation of student behavior, most of the students had the following characteristics during the intervention that shows students were engaged in learning activities :

◎ Active listening, attentive students,
◎ Responsive to the instructors' questions,
◎ Engagement in brainstorming activities,
◎ The open body language with a smile.

It could easily be seen that gamification had a more friendly classroom atmosphere and helped foster student participation. Furthermore, they invited each other for game challenges after class, which indicates their devotion to learning.

Semi-structured interview

Themes, categories, and codes extracted from students' answers from the semi-structured interview are presented below:

Table 9: Themes, categories, codes

Themes	Categories	Codes
tre		✓ Connecting ideas
	Cognitive outcomes	✓ Vocabulary acquisition
		✓ Sense of puzzlement
		✓ Information exchange (CoI Model, Garrison&Arbaugh 2007).
Strengths of Using Gamification elements (in online EFL class)	Behavioral outcomes	✓ Higher scores in achievement tests.
		✓ Boosts speaking
		✓ Engagement in games/activities
	Emotional Outcomes	✓ Higher motivation
		✓ Emoticons
		✓ Positive attitude
		✓ Friendly learning environment
		✓ Contentment
		✓ Encourages Collaboration

S1. ". Words become more memorable with games. I don't think I could remember that much if I just did exercises or wrote down the words. At home, I repeat what I learned in the lesson by answering questions through the gamification application.", (Cognitive outcomes).

S2. " It was so much fun to play team games with my friends. I like team games. It is more exciting to succeed together. When you lose, you are not alone. I can also learn new words from my friends. We do our best to win as a team.", (Emotional outcomes).

S3. "I thought it would be okay if I didn't do homework in distance education. However, I think I should do my homework since we upload the assignments to our Classdojo portfolio, and the teacher checks them. Homework is also important in the evaluation at the end of the lessons.", (Behavioral outcomes).

S4. " At first, I was afraid I wouldn't be able to use the game apps, but then I realized they were easy. Before starting the lessons, how to use it was explained. Then I started to note the similarities and differences between the applications. Thus, when it came to using a different application, it was easier." (Emotional, Behavioral and Cognitive outcomes).

S5. I used to get bored in the lessons, but now I look forward to the English lesson. Playing word games is more instructive than constantly learning grammar rules.

S6. "I think maybe we won't get bored if we play games in other lessons. We write too much in some lessons. We should play games as a general repetition when the topics are over."

S7. "I can say that I got very productive from this training. Judging by my score on the second test, there was quite a difference."

S8. "The jigsaw assignment was the most fun assignment in my life. For a moment, I couldn't believe it was the homework."

S9. "I was afraid that if I mispronounced the words, there would be people laughing. But this did not happen during the game. Everyone seemed to be having fun.

S.10." I started studying English at home and downloaded the applications you suggested for the competition's top three. These apps have helped me a lot.

According to the data obtained from the interviews, learning a foreign language through gamification has positively affected individuals in terms of cognitive, affective, and behavioral aspects.

Conclusion

Students' motivation is the key to success (Dörnyei & Ryan, 2015; Gardner & Lambert, 1972; MacIntyre, 2002). A gamification application was used to test their effectiveness for student engagement and academic achievement. According to the results of this mixed-method research, gamification in the English lesson was examined positively affect achievement test scores for students in the experimental group. Both groups scored

higher in post-tests, whereas the experimental group had a higher percentage increase between pre and post-tests. It was derived from the teacher's observations that the gamification applications promoted the students' motivation and. positive results on student engagement (Barcena & Sanfilippo, 2015; Berns et al., 2016; Bustillo et al., 2017; Castañeda & Cho, 2016; Gafni et al., 2016; Hung, 2017; Iaremenko, 2017, Kétyi, 2016; Liu et al., 2016; Palomo-Duarte et al., 2016; Perry, 2015; Purgina et al.,2019). Munday (2016) expressed that gamification apps are more efficient when a language user has an elementary, beginner, or pre-intermediate level of English, as in the current study.

As another study finding, students who participated in one-on-one interviews described online activities as motivating and entertaining. Furthermore, it was observed that cooperation and social interaction in the classroom increased. The presence of a leaderboard in most of the gamification tools used in this study motivated the students to complete the given tasks and is consistent with the results of the studies in the literature (Goehle, 2013; Ding et al., 2018). Gamification practices are particularly effective in foreign languages and foster the permanent acquisition of the target language. The students had the opportunity to correct their deficiencies, and they were given a chance to socialize through games and learn more deeply. According to the socio-cultural learning theory, mutual interaction creates a positive learning environment (Vygotsky, 1994). During the one-on-one interviews with the students, the learning process through gamification applications was described as motivating and entertaining by the students. Student opinions about the distance English course designed through gamification applications and LMS were generally positive. The students expressed their contentment with doing the activities using different technological applications. When considering the affective dimension, students stated that they were motivated by the lesson besides having fun.

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