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Prospective Teachers' Views on Gamified Online Assessment Tools

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Abstract: Gamification, which refers to the integration of game mechanics, dynamics and components into non-game contexts, has attracted significant attention in education in recent years. When the literature is examined, it is possible to find many applications that can gamify content. This study aims to explore students' perspectives on gamification in education with a special focus on the widely known Kahoot application. Within the scope of this research, it aims to explore students' views on the application of Kahoot-based gamification techniques in formal and distance education courses. The study was conducted with a mixed research method in which both quantitative and qualitative methods were used together. Quantitative data were analyzed using statistical measures such as arithmetic mean, standard deviation and independent sample t-test. Qualitative data were collected and analyzed through interviews. In the fall semester of 2021-2022, 278 pre-service teachers enrolled in the education programs of a state university in Turkey participated in the study. While 162 students participated in the study with distance education method, 116 students participated with formal education method. A 19-item opinion questionnaire on gamification using Kahoot and a form consisting of open-ended questions were used to collect data. The participants regularly participated in Kahoot gamification activities at the end of classes for 8 weeks. According to the results, the participants were generally satisfied with the gamification applications with Kahoot. They found these applications both fun and instructive. Students generally agreed that Kahoot is a useful application. However, it was concluded that some participants experienced internet connection problems, internet quota problems, insufficient response time and fear of being left behind in the ranking. According to these results, it is recommended to use Kahoot application and gamification activities in classrooms. In order to reduce the problem of lack of interaction in distance education environments, it is recommended to include Kahoot-like applications in distance education.

Keywords: Gamification, Kahoot, Distance education, Formal education.

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Introduction

Gamification's appearance in the literature coincides with 2008 and its popularization with the influence of conferences and meetings in the second half of 2010 (Deterding et al., 2011). This concept started to become evident with the statement that the features of digital games that connect individuals to them actually exist in real life (Schell, 2010). McGonigal (2011) emphasized the engagement and motivating aspect of games by stating that the feelings of fun, enjoyment and satisfaction found in digital games are actually applicable in the real world and that games can provide this.

Kapp (2012) states that the use of gamification in education using various game mechanisms can promote learning achievement and positive attitudes towards learning. Gamification can engage learners in a meaningful learning process with the help of reward and reputation systems and extrinsic motivations such as earning points, increasing levels, avatars, leaderboards (Kapp, 2012).

Gamification involves the integration of game elements into non-game settings. Its aim is to facilitate the teaching of educational content by using students' interests in games as a motivating factor (Arkün Kocadere & Samur, 2016). Gamification has gained significant attention as a topic of discussion in education, with its implementation evident in various sectors. Recently, gamification has become an increasingly popular area of interest within the field of education. Arkün Kocadere and Samur (2016) outline simple examples of gamification in education, such as displaying the best work on a board, awarding certificates of appreciation, and giving a ribbon to a student who has learned to read. Technical term abbreviations will be explained upon first use.

Pyramidal Design Model, developed by Werbach & Hunter (2012), shows that gamification is categorised into three components: dynamics, mechanics, and components. According to this model, game design is a procedural matter that commences with choosing dynamics and proceeds with ascertaining mechanisms and components (Bozkurt & Genç Kumtepe, 2014). The structure of the pyramid design model is shown in the figure below.

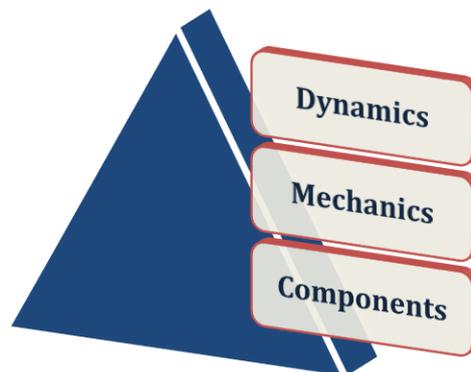


Figure 1. Pyramid Design Model

Dynamics are at the top level of the pyramid and form the basis of gamification. Dynamics may include elements such as constraints, emotions, and progression that support gamification (Werbach & Hunter, 2012).

Mechanics are the elements that make players more motivated and committed. Mechanics are the basic processes that engage players and advance movement, and include elements such as

challenge, chance, competition, cooperation, feedback, reward and interactions. (Werbach & Hunter, 2012).

Components are the elements that users interact with design objects in the front section. Apart from gamification components such as points, badges and leaderboards, other gamification components used are levels, tasks, achievements, avatars, content unlocks, social schedules, teams, virtual items (Werbach & Hunter, 2012).

Motivation can be defined as a state of mind that leads people to behave in a certain way and makes them willing to do a job (Başaran, 1991). Motivation can be integrated into lessons by using it appropriately in different learning approaches. Learning environments that are interesting and provide active participation of students can positively affect student motivation (Ünsal, 2007).

There are many gamification applications used in learning environments. Busuu, Classcraft, Doulingo, Quizlet, Socrative, Kahoot, Quizizz, Plickers, ClassDojo and Flipquiz are examples of online gamification applications that can be used in educational environments (Marangoz & Marangoz, 2021). It is possible to create online quizzes and surveys with different question types by using Kahoot. With Kahoot, questions prepared by the teacher are displayed one by one on the screen, students mark the answers via the internet with their mobile devices and collect points. When the questions are finished, the names of the ranking students are displayed on the screen. Within the scope of this research, Kahoot application was preferred for the study. The teacher can reveal students' deficiencies by examining the result reports (Byrne, 2013; Dellos, 2015). The reviewed studies emphasize that it is possible to increase students' motivation towards the lesson by using Kahoot application.

In the light of this information, the aim of our research is to examine the views of pre-service teachers towards Kahoot-based gamification approach in digital literacy teaching. For this purpose, the following questions were tried to be answered:

1. What do students believe about the impact of the Kahoot application on motivation?
2. What do students think about the impact of Kahoot on learning?
3. How does Kahoot impact student interaction?
4. What is the level of satisfaction among students regarding Kahoot?
5. What are the students concerning the positive and negative aspects of the Kahoot application?

Methodology

Research Model

This study was designed according to a mixed research design in which both quantitative and qualitative research methods and techniques were used. There are different reasons why mixed methods are preferred in scientific research. According to Creswell (2017b), combining statistical trends with personal experiences to better understand the research problem is more advantageous for the researcher than using any of these methods alone.

In this study, the survey model was preferred. The survey model is defined as one of the descriptive research methods. The survey model is one of the research methods that aims to describe a past or present situation as it is (Büyükoztürk et al., 2016).

In the study, quantitative data were collected and analyzed first and then qualitative data were collected to support the quantitative data. Therefore, in this study where quantitative research method was more dominant than qualitative research method, sequential explanatory

mixed design of mixed method was used. While quantitative data were collected through a questionnaire, qualitative data were collected through open-ended questions. In this study, it was tried to determine the effectiveness of the application within the framework of student views on gamification with Kahoot.

Working Group

The study was conducted with 278 pre-service teachers studying at Kilis Aralık University Kilisli Muallim Rifat Faculty of Education in the fall semester of 2021-2022 academic year and selected by convenience sampling method. Convenience sampling method is defined as the researcher turning to the easiest elements that the researcher can reach while forming the sample (Patton, 2005).

Although the convenience sampling method is weaker in terms of representing the universe compared to other sampling methods, it provides benefits in terms of time and cost in terms of reaching the participants. The frequency distribution of the students participating in the study is presented in Table 1.

Table 1
Frequency distribution of pre-service teachers

Departments		f	(%)
Guidance and Psychological Counseling		58	20.9
Elementary Mathematics Teaching	Distance Education	52	18.7
Turkish Teaching		52	18.7
Social Studies Teaching		33	11.9
Classroom Teaching	Formal Education	43	15.5
Preschool Teaching		40	14.4
Total		278	100.0

Considering the data in Table 1, it is seen that the participants of the study consisted of 278 pre-service teachers in total, including 58 guidance and psychological counseling candidates, 52 pre-service elementary mathematics teachers, 52 pre-service Turkish teachers, 33 pre-service social studies teachers, 43 pre-service classroom teachers, and 40 pre-service preschool teachers. While 162 teacher candidates participated in the practice with the distance education model, 116 teacher candidates participated in the training in a formal education environment.

Data Collection Tools

Student opinion survey and interview questions were used as data collection tools. The survey was developed by Korkmaz and Tetik (2018) and is a 5-point Likert type consisting of a total of 19 questions. Open-ended interview questions were prepared to support the questions in the survey. Structured interview technique was used when asking questions to the students. Interview questions were added to the bottom of the survey form and students were asked to fill in the blank sections.

The questionnaire consists of three sub-factors: motivation, learning and interaction. An exploratory factor analysis was conducted and $KMO=0.944$ and $Bartlett=2430.487$, $df=171$, $p<0.001$. Cronbach's alpha reliabilities for motivation, learning and interaction sub-factors were

$\alpha=0.973$, $\alpha=0.975$ and $\alpha=0.944$ respectively. The item numbers for the sub-items of the questionnaire are given in Table 2.

Table 2
Sub-dimensions of questionnaire

Sub-Dimensions	Item Numbers
Motivation	1,2,3,4,5,6
Learning	7,8,9,10,11,12,13,14
Interaction	15,16,17,18,19

Results of Cronbach's alpha reliability analysis of the sub-dimensions of the questionnaire is presented in Table 3.

Table 3
Cronbach's alpha analysis results of questionnaire

Sub-Dimensions	Cronbach's Alfa(α)
Motivation	0.792
Learning	0.844
Interaction	0.746
Total	0.931

Cronbach's alpha internal consistency coefficient for the questionnaire items of our study was calculated as $\alpha=0.931$. The first sub-factor had a Cronbach's alpha coefficient of internal consistency of $\alpha=0.792$, while the second sub-factor had a coefficient of $\alpha=0.844$, and finally the third sub-factor had a coefficient of $\alpha=0.746$. Kaiser Mayer Olkin (KMO)=0.937 and Bartlett=2083.551, $df=171$, $p<0.001$. As a result of the reliability analysis conducted according to these values, the scale and sub-scale dimensions and the entire scale were found to be reliable.

Teaching Material

Kahoot is a Web 2.0 tool for designing quizzes, creating online quizzes, surveys or discussions. It requires membership and has paid and free packages. Using this tool, gamification activities can be designed both in the classroom environment and in live lessons on distance education systems. Within the framework of this research, it was aimed to design a fun competition environment using Kahoot as an activity for measurement and evaluation, receiving feedback on learning levels, and providing motivation in the digital literacy course.

The application was conducted over 8 weeks, with 8 online exams administered to students at the end of each lesson. The teacher controlled the initiation of the game, progression to the next question and the conclusion of the competition. In this context, the teacher adapted a technology-based quiz application to in-class activities (Dellos, 2015).

Students can access the quiz by entering www.kahoot.it from their phones and typing their names with the given pin code. The names of the students participating in the application are displayed on the main screen as shown in Figure 2. After all students participate, the application is launched.

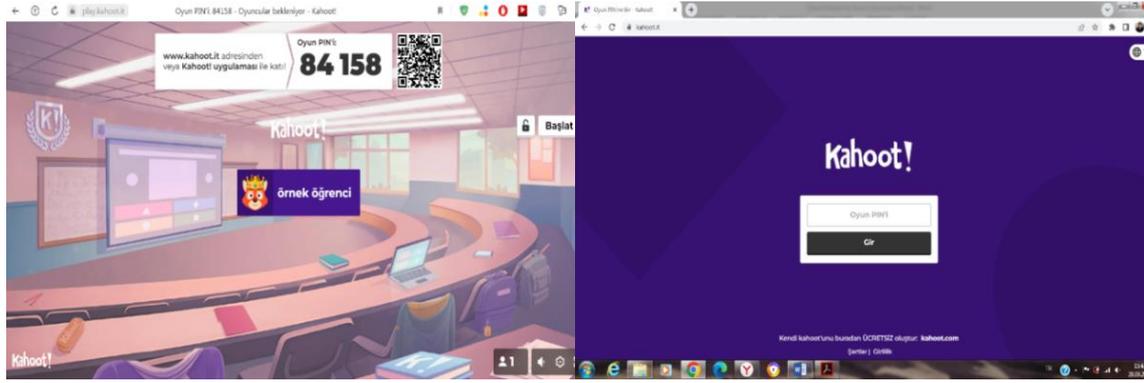


Figure 2. Competition Pin Code and Student Login Screen

Students answer the questions and answers projected on a smart board or screen on their phones within a certain period of time (Özdemir, 2017).



Figure 3. Kahoot Question Screen

On students' phones or tablets, the answer choices of the projected question appear in different colors. Students mark the color that represents the correct answer according to them from the answer choices of the question they see on their own screens.

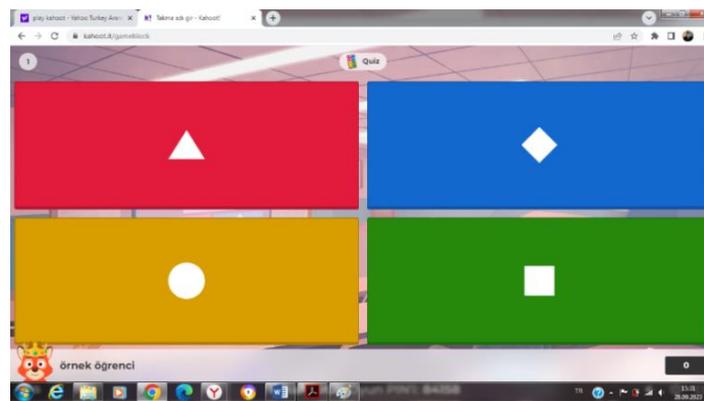


Figure 4. Answer Options on the Student Screen

At the end of the answering time for each question, the correct answer and how many students answered correctly are displayed on the screen. The students who give the correct answer in the shortest time score higher points than the other students who give the correct answer.

In the application carried out within the scope of this research, 8 quizzes were held at the end of classes every week for 8 weeks, both as an in-class activity in formal education and as a live lesson activity in distance education programs. In each application, students earned points as they solved the questions correctly and quickly. After all the questions are answered, the competition is terminated and the ranking students are displayed on the podium (Figure-5).

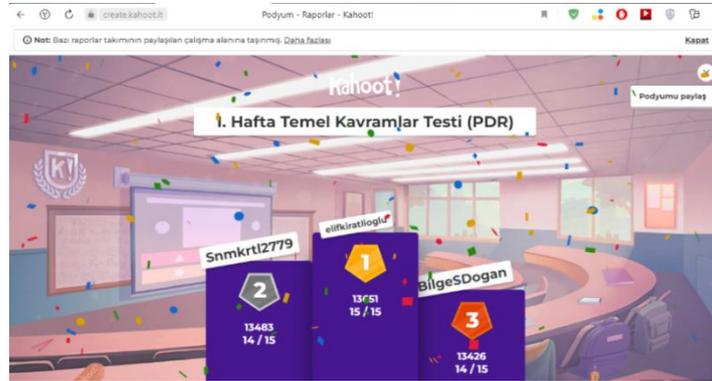


Figure 5. Podium Screen Showing Ranking Students

At the end of each activity, the leadership sign was projected on the screen so that students could see their rankings. In addition, the score sheet showing the scores of all students participating in the competition can also be downloaded from the system in excel format. The teacher can review the outcome reports and disclose any shortcomings (Byrne, 2013).

Data Analysis

SPSS 25 package program was utilized to analyse the quantitative data in this research. The analysis of the quantitative data employed frequency, percentage, arithmetic mean and independent sample t-test. The qualitative data was examined using content analysis.

Findings

Table 4

Normality test values for survey sub-dimensions

Sub-dimensions	Formal Education		Distance Education	
	Skewness	Kurtosis	Skewness	Kurtosis
Motivation	-.754	1.288	-.824	1.084
Learning	-.582	1.464	-.218	-.026
Interaction	-.439	.811	-.323	.238
Total	-.637	1.672	-.365	.471

When Table 4 is examined, it is seen that the kurtosis and skewness values of the survey in general and in its sub-dimensions are between -2 and +2. These values show that the survey is suitable for normal distribution and therefore can be used in parametric tests (George and Mallery, 2003).

The viewpoints of students regarding the impact of the Kahoot application on students are shown in Table 5.

Table 5
Students' views on the effect of kahoot practice

Students	n	\bar{X}	s	t	SD	p
Formal Education	116	3.73	0.494	3.839	276	0.000
Distance Education	162	3.96	0.456			

When the values regarding the impact of Kahoot applications on students are examined in Table 5, the total score average of formal education students was calculated as ($\bar{X}= 3.73$) while the total score average of distance education students was calculated as ($\bar{X}= 3.96$). When the t-test results regarding whether these differences are significant or not are examined, it is seen that the general average of distance education students is significantly higher than formal education students. Accordingly, it can be said that distance education students think that Kahoot activities contribute to them significantly more than formal education students. Therefore, it can be concluded that the observed difference is significant ($p<0.05$).

The viewpoints of students regarding the impact of the Kahoot application by sub-dimensions are outlined in Table 6.

Table 6. Students' Views on the Effect of Kahoot Practice by Sub-dimensions

Sub-dimensions		n	\bar{X}	s	t	SD	p
Motivation	Formal Education	116	3.77	0.515	2.912	276	0.004
	Distance Education	162	3.97	0.600			
Learning	Formal Education	116	3.72	0.514	3.478	276	0.001
	Distance Education	162	3.94	0.525			
Interaction	Formal Education	116	3.71	0.456	3.784	276	0.000
	Distance Education	162	3.96	0.495			

When the values regarding the effect of Kahoot applications on student motivation are examined in Table 6, the total score average of formal education students was calculated as ($\bar{X}= 3.77$) and the total score average of distance education students was calculated as ($\bar{X}= 3.97$). When the t-test results regarding whether these differences are significant or not are examined, it is seen that the general average of distance education students is significantly higher than that of formal education students. Accordingly, it can be said that students think that Kahoot activities contribute positively to their motivation for the course or environment. Therefore, it can be said that the observed difference is significant ($p<0.05$).

When the values regarding the effect of Kahoot applications on learning are examined, the total score average of formal education students is calculated as ($\bar{X}= 3.72$) and the total score average of distance education students is ($\bar{X}= 3.94$). When the t-test results regarding whether these differences are significant or not are examined, it is seen that the general average of distance education students is significantly higher than that of formal education students. Accordingly, it can be said that students think that Kahoot activities contribute positively to their learning. Therefore, it can be said that the observed difference is significant ($p<0.05$).

When the values related to student interaction in Kahoot applications were examined, the total score average of formal education students was calculated as ($\bar{X}= 3.71$) and the total score average of distance education students was calculated as ($\bar{X}= 3.96$). When the t-test results regarding whether these differences are significant or not are examined, it is seen that the general average of distance education students is significantly higher than that of formal education

students. Accordingly, it can be said that students think that Kahoot activities contribute positively to student interaction. Therefore, it can be said that the observed difference is significant ($p < 0.05$).

Students' satisfaction levels regarding the Kahoot application: "If you were to evaluate the Kahoot application in classes out of 5 points, how many points would you give? Why?" was tried to be determined by asking the open-ended question. Student opinions reflected in this framework are summarized in Table 7.

Table 7
Students' satisfaction level opinions on Kahoot application

Sub-Themes	f
I give 5 points	142
I give 4 points	113
I give 3 points	23
Increases motivation	48
Makes the lesson enjoyable	41
Increases interest in the lesson	35
Increases interaction in the classroom	33
Enables competition in the classroom	25
Easy to use	16
Ensures permanent learning of information	12
Provides preparation for exams	8

When Table 7 is examined, it can be seen that a significant part of the students ($f = 142$) were very satisfied with the Kahoot activities and showed this by giving full points to the application. When the answers given according to the reason for the score they gave were examined, 48 students stated that it increased motivation, 41 students stated that it made the lesson fun, and 35 students stated that it increased interaction in the lesson. Accordingly, it can be said that students are largely satisfied with the Kahoot application.

Students' views on the positive and negative aspects of Kahoot application: "What are your opinions about the positive and negative aspects of the Kahoot application?" was tried to be determined by asking the open-ended question. Student opinions reflected in this framework are summarized in Table 8 and Table 9.

Table 8
Students' views on the positive aspects of Kahoot practice

Positive Sub-Themes	f
Maximizing motivation	54
Creating a fun environment	49
Increasing participation and interest in the course	43
Creating competition in the lesson	25
Providing permanent learning	12

When students' opinions on the positive aspects of the Kahoot application are examined in Table 8, it is seen that 54 students stated that it increased motivation, 49 students stated that it

provided an entertaining learning environment, and 43 students stated that it increased participation and interest in the lesson.

Table 9.
Students' views on the negative aspects of Kahoot practice

Negative Sub-Themes	f
No negative aspects	62
Slow internet connection speed	43
Fear of falling behind in the scoreboard	38
Technical problems encountered when projecting questions	25
Internet quota expiration	16
Limited response time	13

When students' opinions on the negative aspects of the Kahoot application are examined in Table 9, it is seen that 62 students did not report any negative aspects. 43 students reported answering questions late or being unable to answer due to disconnections and slowdowns in their Internet connections. Additionally, 38 students expressed fear of appearing at the bottom of the scoreboard.

When we look at the findings obtained in general, most of the students stated that they were satisfied with the Kahoot application and that there were no negative aspects of the application, while some of them stated that they had problems with internet connection and that they were uncomfortable with appearing in the last places on the scoreboard.

Conclusion and Discussion

When the students' answers to the survey questions are analyzed, they generally think that Kahoot activities contribute positively to their motivation towards the course, learning processes and classroom interaction. When distance education students are compared with formal education students, especially distance education students think that Kahoot activities contribute significantly more to their motivation, learning processes and classroom interaction than formal education students.

When the students' responses to the open-ended questions were analyzed, it was concluded that the students were largely satisfied with the Kahoot application. When the students' views on the positive aspects of Kahoot application were examined, they stated that it increased student motivation, made the lesson fun, contributed positively to interaction, reinforced learning, gave clues about the types of questions that may appear in the exam, and increased interest and participation in the lesson. When the students' opinions on the negative aspects of the Kahoot application were analyzed, most of the participants stated that there were no negative aspects of Kahoot, while a small number of participants stated that they had problems due to the slowness of the internet, they were afraid of falling behind in the scoreboard, they consumed their internet quota quickly and the answer time was insufficient. In this context, it was concluded that students were generally satisfied with the Kahoot application and thought that there was no negative aspect, but some students encountered technical problems and were afraid of falling behind in the ranking.

The student opinions analyzed above are also consistent with the literature. In studies on the effect of Kahoot on students' motivation, it was observed that students' work with Kahoot

made a significant positive difference on their motivation. In the studies conducted by Saraçoğlu (2019), Yapıcı and Karakoyun (2017), results were found to support Kahoot-like applications. Chaiyo and Nokham (2017) emphasize that Kahoot has positive effects on focus, connection, fun, motivation and satisfaction. According to this result, it can be stated that students are open to using web 2.0 tools such as Kahoot and will not have negative emotions, on the contrary, they will be motivated.

Based on the findings of Kahoot for learning, it can be concluded that this tool can be used as an effective method to increase academic achievement in the educational process. In a study conducted by Allran et al. (2021), it was concluded that Kahoot application was interesting for students and increased interaction and competition. According to the research results, Kahoot activities, which contribute positively to students' motivation, make it possible to learn while having fun.

Wang and Tahir (2020) evaluated the Kahoot application from the teacher and student perspective and emphasized that the application does not provide reliable results due to problems such as internet connection. In another study conducted by Chiang (2020), the use of Kahoot in high school was examined and it was observed that some problems related to the application were encountered. Students stated that they were not given enough time to answer the questions, so they could not answer the questions. In the light of these results, it is suggested that Kahoot applications should be included in the courses to solve the interaction problem in distance education environments.

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