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THE EFFICACY OF A DIGITAL GAMIFIED ASSESSMENT TOOL IN TEACHING ENGLISH TO YOUNG LEARNERS

Gülin Unay[1]

Sedat Beceren[2]

Abstract

Assessment is an essential and inextricable component of the teaching process, regardless of the educational pedagogies employed. Although many educators continue to rely on traditional assessment methods, technological advancements have significantly transformed teaching practices, providing access to diverse digital educational resources, including digital games. An increasing number of these games have been integrated not only as pedagogical tools but also within evaluative frameworks. This study aims to explore the role of digital games in supporting the formative assessment process for young learners in comparison to traditional assessment methods. A mixed-method design was employed in the study. The study was conducted at a private educational institution in İzmir with a sample comprising 62 fifth-grade pupils and 4 instructors of English as a Foreign Language (EFL). The participants were purposefully assigned to the experimental and control groups from two different proficiency levels, enabling a comparative analysis of digital and traditional assessment approaches. Formative assessments conducted after two units of teaching revealed there were no statistically significant differences in success between the experimental and control groups. Nevertheless, qualitative findings from teacher interviews and student response papers indicated a significant increase in the motivation, participation, and engagement of students involved in digital gamified assessments compared to those involved in traditional paper-based assessments.

[1] Instructor, School of Foreign Languages, İzmir University of Economics, Türkiye. E-mail: gulin0959@gmail.com. ORCID: 0009-0008-1242-2020

[2] Assist. Prof. Dr., English Language Teaching Department, Çanakkale Onsekiz Mart University. E-mail: sbeceren@comu.edu.tr. ORCID: 0000-0002-4603-5079

These results highlighted the potential of digital gamified assessment tools to enhance learner motivation and active participation in educational settings.

Keywords: Game-based Assessment, Formative Assessment, Gamification, Kahoot

Introduction

Substantial transformations in pedagogical and evaluative methodologies have emerged as a direct consequence of technological integration within educational settings. In the 21st century, the use of digital tools and internet applications has become indispensable in classrooms, enriching the lesson content through the extensive use of visuals, videos, audios and fostering the use of various digital tools that enable teachers to implement diverse strategies (Butler, Someya, & Fukuhara, 2014). Among these innovations, assessment - a core component of teaching - has undergone substantial transformation. While traditional assessment techniques are increasingly criticized for their limitations in addressing the needs of 21st-century learners (Cirit, 2015), there is a growing emphasis on developing assessment types that are learner-centred, engaging, and capable of comprehensively evaluating language skills (Çekiç & Bakla, 2021; Wang & Tahir, 2020). Therefore, educators are compelled to explore novel pedagogical strategies, particularly gamified evaluations, in response to the inadequacies inherent in conventional educational approaches.

Gamification, characterized by the incorporation of game-like elements such as points, competitive rankings, leader boards, and online rewards for educational purposes, has gained traction in English as a Foreign Language (EFL) classroom (Kapp, 2012). Research indicates that gamification, along with game-based assessment (GBA), not only enhances student engagement and motivation, but also fosters active learning and knowledge acquisition (Çetin Köroğlu, 2021; Sercanoğlu, Bolat, & Göksu, 2021; Yürük, 2019). Research has also indicated its potential to contribute to strong academic performance (Çekiç & Bakla, 2021), and it creates a positive association between learning and enjoyment, contrasting with the anxiety often associated with traditional assessments (Csapó, Lörincz, & Molnár, 2012). Tools like Kahoot, a game-based assessment platform, exemplify these advantages. It facilitates active participation, increase motivation, and reward high-performing learners, thereby creating a competitive yet supportive learning environment (Alharthi, 2020; Şad & Özer, 2020; Wang & Tahir, 2020). Utilising Kahoot as a Gamification-Based Assessment (GBA)

tool demonstrates its efficacy for both formative and summative assessment contexts, thereby alleviating significant concerns among educators.

Formative assessment, which occurs during the learning process, aims to monitor student progress and provide timely feedback, whereas summative assessment evaluates achievement at the final phase of a course or program (Kırkgöz, Babanoğlu, & Ağçam, 2017). Effective teaching requires clear objective setting followed by strategic activities designed to achieve these goals (Black & William, 2009). However, effectively leveraging formative assessment requires substantial teacher expertise (Bennett, 2011), and EFL teachers, in particular, often need ongoing training to address gaps in their practical application of assessment strategies (Önalan & Gürsoy, 2020).

Existing research has extensively examined teacher perspectives and the theoretical advantages of GBA (Cirit, 2015; Çetin, 2018; Ebadi, Rasouli, & Mohamadi, 2023), yet there is a considerable dearth of studies focused on its pragmatic application, particularly within EFL contexts featuring young learners (Faber & Visscher, 2018; Mada & Anharudin, 2019). The current literature predominantly emphasizes the perceptions of pre-service teachers, thereby creating a knowledge gap regarding the gamified assessment experiences of in-service educators and younger students (Alharthi, 2020; Kapsalis, Galani, & Tzafea, 2020). In an effort to rectify the existing knowledge deficiencies, this investigation endeavours to provide responses to the following research questions.

1. Is there a significant difference between the test scores of digital gamified and paper based formative tests?
2. What is the influence of the implementation on students and teachers' choice of formative assessment?
3. What are the perceived benefits and challenges of gamified assessment according to the participants?

Literature Review

The Role of Technology in Teaching and Assessment

The 21st century, often called the era of technology, has transformed education through digital advancements. The rise of Web 2.0 in the early 2000s expanded internet accessibility, significantly influencing teaching

and learning (Ifentheler, Eseryel, & Ge, 2012; O'Reilly, 2005). Technology enhances student engagement, with interactive tools such as gamified quizzes fostering active participation (Mada & Anharudin, 2019; Timmis, Broadfoot, Sutherland, & Oldfield, 2016; Wang & Tahir, 2020).

Personalized learning environments have also emerged, allowing teachers to customize content using multimedia based on students' needs (Wang & Tahir, 2020). Additionally, digital platforms have transformed classrooms, enabling online assessments and dynamic evaluation methods (Csapó et al., 2012; Doğan, Kıbrıslıoğlu, & Kelecioğlu, 2020). Technology-driven assessments offer diverse tools that cater to different learning objectives, thereby expanding evaluation beyond traditional methods (Buchanan, 2002; Csapó et al., 2012).

Therefore, technological advancements have a pivotal impact on contemporary educational frameworks, facilitating streamlined accessibility, heightened interactivity and diverse assessment procedures, thereby culminating in a student-centric and globally interconnected learning dynamic.

Traditional and Game-Based Assessment

Evaluation is an integral component of pedagogical practice that naturally emerges through various forms of student interaction, including the provision of oral responses and the expression of personal viewpoints (Brown, 2004). For over a century, traditional paper-based assessment (PBA) has predominantly served as the cornerstone of evaluation techniques in academic settings (Csapó et al., 2012) and remains widely used in Türkiye's elementary schools (Kırkgöz et al., 2017). PBA relies on scores for feedback, emphasizes correct answers, and promotes extrinsic motivation (Brown, 2004). However, it often lacks interactivity, restricts critical thinking, and may fail to provide meaningful feedback on students' strengths and weaknesses. Alternative assessments address these limitations by offering interactive, formative, and comprehensive evaluation methods.

Technological advancements have introduced digital assessment tools, with games emerging as accessible and effective alternatives (Csapó et al., 2012; Çetin Köroğlu, 2021; Doğan et al., 2020). The role of games in learning dates to Plato, who recognized play as reinforcing behaviour (Wilkinson, 2016). Modern gamification integrates game mechanics to enhance engagement

and learning (Ibrahim & Ibrahim, 2020; Kapp, 2012). However, not all games are suitable for game-based assessment (GBA), which requires elements such as interactive problem-solving, adaptive challenges, continuous feedback, and engaging sensory features (Shute & Ke, 2012). The benefits of GBA include instant feedback (Doğan et al., 2020), improved content retention (Moss, 1977), diverse assessment opportunities (Kato & Klerk, 2017), and increased participation (Mada & Anharudin, 2019).

Motivation is a significant advantage of GBA, influencing participation, willingness, and enjoyment. Students perceive Kahoot as a game, increasing engagement and excitement (Çekiç & Bakla, 2021). Research indicates that Kahoot encourages intrinsic motivation, with students reporting higher levels of enjoyment and participation compared to PBA (Butler et al., 2014; Çetin, 2018; Mada & Anharudin, 2019). Cirit (2015) contrasts the extrinsic motivation associated with traditional assessment with the intrinsic motivation promoted by alternative methods, which aligns with Brown's (2004) findings.

In short, while PBA remains prevalent, digital gamified assessment offers interactive and engaging alternatives that enhance motivation and learning outcomes.

Digital Gamified Assessment

Formative assessment was first conceptualised by Michael Scriven in 1967, primarily to evaluate the curriculum rather than individual student learning. Later, in 1969, Benjamin Bloom expanded on this concept, establishing the modern definition of formative assessment (Çekiç & Bakla, 2021). In 1973, Peter Mittler also coined the term "Assessment for Learning," which emphasizes the ongoing evaluation of students throughout the teaching process, where their progress directly influences their success (William, 2017). According to Çekiç and Bakla (2021), for formative assessment to be effective, teachers must clearly define learning objectives and focus on activities that elicit and observe language usage in meaningful contexts. Immediate and precise feedback is critical, highlighting both strengths and areas for improvement. Additionally, peer feedback exercises can also be incorporated, allowing students to reflect on and assess their own learning while setting personal goals.

In Türkiye, formative assessment is increasingly favoured by numerous EFL teachers (Önalan & Karagül, 2018) to gauge students' comprehension of learning objectives. However, traditional assessment methods remain dominant in both state (Kırkgöz et al., 2017) and private schools (Önalan & Gürsoy, 2020) due to teachers' familiarity with these approaches. In contrast, digital gamified assessments (DGA) offer a more dynamic and student-centred learning environment, supporting continuous feedback and collaboration, which enhance language proficiency (Çekiç & Bakla, 2021). DGA is also more engaging than traditional tests, utilising activities such as online quizzes and interactive exercises. These tools are particularly appealing to younger students (Şad & Özer, 2020), motivating them and reducing anxiety, which in turn increases their participation and test scores (Wang & Tahir, 2020). DGA provides instant feedback, making learning more enduring through repeated exposure to content (Şad & Özer, 2020). Studies, such as those by Çetin Köroğlu (2021) have shown that students using DGA tend to achieve higher scores than those who rely on traditional methods.

Despite these advantages, several challenges associated with DGA tools have been identified, particularly technical issues such as device malfunctions, internet connectivity problems, time constraints, and difficulties in reviewing responses (Çekiç & Bakla, 2021; Şad & Özer, 2020; Wang & Tahir, 2020).

Among various DGA tools, Kahoot is one of the most popular and widely utilised platforms for assessment purposes (Çekiç & Bakla, 2021). Kahoot is known for its exciting and competitive format, where participants compete to answer questions quickly, thereby enhancing student engagement and motivation (Mada & Anharudin, 2019). While many students perceive assessments as a measure of their achievement, which can hinder active participation, Kahoot effectively reduces this anxiety and promotes a more authentic expression of students' abilities (Kapsalis et al., 2020; Önalan & Gürsoy, 2020; Şad & Özer, 2020). By transforming the learning environment into one that is enjoyable and interactive, Kahoot encourages students to engage actively, thereby boosting their intrinsic motivation and ultimately improving their test scores (Alharthi, 2020; Çekiç & Bakla, 2021; Çetin Köroğlu, 2021; Kapsalis et al., 2020; Mada & Anharudin, 2019; Şad & Özer, 2020; Wang & Tahir, 2020). For this reason, it is regarded as a valuable digital gamified assessment tool in this study.

Methodology

Study Design

The study employs a mixed-method approach, as both qualitative and quantitative methods are essential for addressing the research questions. Creswell (2014) emphasizes that combining these methods enhances understanding. While the implementation forms foundation of the study, teacher interviews and response papers provide insights into students' motivation in English lessons, helping assess the success of gamified digital assessment.

Setting and Participants

The study was run within a private educational institution located in İzmir, Türkiye, which offers English instruction from kindergarten through the completion of high school (12th grade), surpassing the scope of English language offerings available at state-run educational establishments. The focus group comprised 62 fifth-grade students preparing for a young learners' test. The school has four 5th-grade classes; however, students do not remain in the same groups for all subjects. While core subjects such as Turkish, Math, and Science are taught in mixed-level classes, English classes are organised by proficiency. To determine these proficiency levels, a placement test is administered at the beginning of the academic year, categorising students into two levels: Level 1 (A1) and Level 2 (A2). Each level consists of two classes, with 32 students in Level 1 and 30 in Level 2. Among the 62 students, 24 are female and 38 are male, all aged 10 or 11. These predefined groups facilitated the division into control and experimental groups.

Four tenured middle school English educators, with an average of 12 years of teaching experience, participated in the study. After being informed about the research, they consented to serve as interviewees and observers. They administered the unit tests—the primary instrument of the study—during 10 hours of English language instruction. Additionally, since they taught skills lessons to the other class at the same level, they had the opportunity to observe both the control and experimental groups throughout and after the implementation.

Instruments

Students use a course book for 14 hours of English lessons each week, which incorporates a teacher-specific learning management system (LMS). In the first phase, end-of-unit test questions were adapted from the LMS to align with the lesson content. Two units were selected, and minor modifications were made to create revision tests consisting of 20 multiple-choice and true/false questions, covering listening, language use, reading, and vocabulary. Following the second end-of-unit test, students in the experimental group were asked to complete a response paper that included questions related to their experiences with PBA and DGA.

The second phase involved conducting open-ended interviews based on quantitative data analysis. After obtaining consent, teachers responded to demographic questions and shared their perspectives on unit tests as formative assessments. The main body of the interview included six primary questions, each accompanied by seven sub-questions, examining the effects of digital gamified assessment, student engagement, and the applicability of the tool. Additional questions were posed as necessary.

Procedure

The study included an implementation process involving student participants as well as an exam preparation and interview process with teacher participants.

The implementation process lasted two and a half months and was divided into three phases: teaching and assessment for Unit 1, teaching and assessment for Unit 2, and a response paper to gather students' opinions on an alternative assessment method. The two-month duration was set to observe changes in student motivation. Kahoot was selected as the digital gamified formative assessment tool due to students' familiarity with it. A pilot test was conducted beforehand to introduce the tool to four students who had not previously used Kahoot.

Revision tests were administered simultaneously. Control group students took paper-based tests in their classrooms, while the experimental group used Kahoot in the computer lab. The results of the paper test were announced the following day, facilitating discussions in class, whereas Kahoot provided instant feedback, enabling same-day discussions.

The process in Unit 2 mirrored that of Unit 1, with the addition of a response paper for the experimental groups. Students answered questions

anonymously on colourful paper in either Turkish or English. Teachers collected the responses and submitted them to the researcher. Throughout the study, the researcher provided support to teachers both inside and outside the classroom.

The study procedure with teachers was divided into three phases: test preparation, test implementation, and interviews. In the first phase, the researcher conducted a comprehensive review of the 5th-grade textbook and held an initial meeting with the teachers to discuss the test preparation. They collectively agreed to use the book's teacher resource materials. The researcher then developed two tests for each level and supplied a test evaluation checklist to assess both validity and reliability. All teachers affirmed the validity of the test.

During the second phase, teachers administered unit revision tests after completing their teaching and review sessions. Teachers 1 and 3 conducted paper-based tests in classrooms, while Teachers 2 and 4 used digital gamified assessments in computer labs. The researcher assisted the experimental group teachers to mitigate any technical issues.

In the final phase, teachers were interviewed individually about their observations before, during, and after the process. The interviews, averaging 30 minutes in duration, were recorded and subsequently subjected to in-depth analysis by the researcher.

Data Analysis

Quantitative data analysis involves evaluating data in accordance with specific research questions. The researcher selects the appropriate statistical tests to analyse the data effectively (Creswell & Clark, 2017). In this study, unit tests were employed to determine whether there was a significant difference between the control and experimental groups. While the researcher scored the control group tests, Kahoot provided a report based on the experimental group test results. Both sets of scores were initially compiled, entered into Excel, and then coded for analysis in SPSS 21 along with descriptive statistics. The data were analysed by running an independent t-test. Following Creswell's design of two separate groups, the different data sets were compared, with x variables from each group being analysed to yield a y result (2014).

According to Creswell (2014), qualitative data analysis consists of five steps: First, the researcher formulates general ideas based on prior knowledge and existing literature. Next, they identify recurring patterns or themes within the data. The data is then classified into meaningful categories, followed by the collection of open-ended responses from participants. Finally, the researcher conducts an in-depth analysis. In this study, qualitative data was collected from students' response papers. Since students were allowed to write in their preferred language, many Level 1 students used their mother tongue. Their Turkish responses were translated into English, and to ensure reliability and avoid unintended bias, an expert cross-checked the translations (Cohen, Manion, & Morrison, 2007). The responses were subsequently grouped into codes based on the research questions. Additionally, two other researchers coded the data, ensuring high inter-rater reliability.

The teacher interviews were conducted in Turkish at the participants' request to more clearly express student behaviours. The researcher recorded and transcribed the interviews, which were subsequently translated into English and then back into Turkish by the researcher and two additional researchers to ensure inter-rater reliability. The translations were compared to finalize the English transcripts. The transcribed data was uploaded to MAXQDA 24, where coding facilitated the identification of themes related to the benefits and challenges of using Kahoot as a digital gamified assessment tool. Finally, thematic analysis, as outlined by Braun and Clarke (2006), was employed to provide flexibility in interpreting the data, with themes and sub-themes generated using MAXQDA 24 software, and the results were analysed.

Findings

RQ1: Is there a significant difference between the test scores of the results of digital gamified and paper-based tests?

The placement test scores were analysed to confirm the homogeneity of class levels, revealing no significant differences between the experimental and control groups in both Level 1 (M = 36.75, SD = 11.69 vs. M = 37.25, SD = 11.12) and Level 2 (M = 75.00, SD = 8.95 vs. M = 76.80, SD = 11.09), with moderate and low effect sizes, respectively.

In addition to the average scores, the results of the tests were examined for normal distribution. According to Tabachnick and Fidell (2012), the values

should fall between -1.5 and +1.5. The skewness for Test 1 was -0.44, and for Test 2, it was -0.49, both indicating leftward skew. The kurtosis for Test 1 was 0.78, while for Test 2, it was -0.40. Based on these values, the compilation of the data reveals a pattern consistent with normal distribution.

Unit 1 revision test results were comparable across groups, though the experimental groups achieved slightly higher scores. In Level 1, the control group had an average score of 17.38, while the experimental group scored 17.88. In Level 2, the control group averaged 15.07, and the experimental group 16.07. However, the differences between the groups were not statistically significant.

Unit 2 test results followed the same pattern. In Level 1, the control group had an average score of 16.31, while the experimental group averaged 16.69. In Level 2, scores were 16.87 for the control group and 17.27 for the experimental group. As observed in Unit 1, the differences between groups were minor and not statistically significant.

Table 1. *Test 1 independent sample t-test results*

Level	Group	*N*	*M*	*SD*	*df*	*t*	*p*
	experimental	16	17.88	1.40			
1					30	1.96	.35
	control	16	17.38	1.54			
	experimental	15	16.07	1.33			
2					28	1.21	.24
	control	15	15.27	2.18			

As shown in the table, there was no significant difference in test 1 scores between the experimental and control groups for both Level 1 (p = .35) and Level 2 (p = .24) students.

Table 2.*Test 2 independent sample t-test results*

Level	Group	*N*	*M*	*SD*	*df*	*t*	*p*
	experimental	16	16.69	1.70			
1					30	.43	.67
	control	16	16.31	3.07			
	experimental	15	17.27	1.28			
2					28	.49	.63
	control	15	16.87	2.90			

According to Table 2, no significant differences were observed in the results of the second unit, with Level 1 at $p = .67$ and Level 2 at $p = .63$. This suggests that while there were slight differences between the groups, the type of formative assessment did not significantly influence student success. Furthermore, the students' level had no effect on test scores, as no significant difference was found between Level 1 and Level 2 group achievement in both test 1 and test 2.

In summary, neither the use of the digital gamified tool nor the students' levels had any impact on the formative assessment results.

RQ2: What is the influence of the digital gamified assessment tool implementation on students and teachers' preferences of formative assessment?

The first analysis focused on student response papers, with only experimental group students participating since they experienced both assessment types. The questions explored their preferences and attitudes toward formative assessment tools. In Level 1 (N=16), 14 students preferred digital gamified assessment, while two chose paper-based. In Level 2 (N=15), 11 preferred digital, three chose paper-based, and one was undecided. Some answers of level two students without any correction and translated answers of level one students are illustrated below.

Level 2 - "*I prefer digital because it is better to me. You play it with your friends, and it is more fun. You can concentrate better.*"

Level 2 - "*Digital is better because it you use paper; you use stuff that is made with trees. And they cut 17 trees for 1 ton of paper. I don't want even a single tree, so that is why I prefer this.*"

Level 1- "*Kahoot is better. I get tired of writing on paper.*" (translated)

Level 1- "*Digital because it is like playing a game to solve questions by looking at the board.*" (translated)

Both groups provided repetitive responses. Most Level 1 students described the digital gamified tool as fun and easy to use, while Level 2 students emphasized its competitive nature. Additionally, some Level 2 students expressed concerns regarding environmental issues. Overall, the students' opinions about DGA were more positive. More students preferred digital gamified assessment to paper-based assessment. The findings indicate that the implementation had a positive impact on participants.

The second analysis focused on teacher interview. It is essential to point out that the participant teachers had been using formative assessment through end-of-unit tests prior to the study, but they always relied on paper-based assessments. When asked about the purpose and importance of formative assessment, all teachers agreed that it is essential for identifying students' weaknesses and their ability to meet lesson objectives. One teacher even emphasized that formative assessment is more important than summative assessment.

T3 "*I think it is more useful than summative assessment because when each unit is separate, we can examine the students in more detail.*"

Compared to their prior experience, they were asked to indicate their preferences of assessment tool. Two of them chose DGA, one chose PBA and one wanted to combine both in the assessment process. Their sample answers are given below.

T1– "*It will definitely be digital… because I don't think there is any harm in it, provided the necessary precautions are taken. Moreover, there will be more benefits...*" (DGA)

T2 – "*Kahoot can be a useful tool for assessment. However, since it is a gamified system, I do not see it as an adequate system in terms of scoring because we only evaluate them within the game…*" (PBA)

T3 – "*...Paper-based alone can be boring. Game-based may also not seem formal enough to students because applications on the internet or computers are games in the eyes of children. But from now on, … I don't want to ignore this game-based system. That is why I prefer a system that blends the two.*" (Both)

T4 – "*I prefer game-based because, as I said before, why would I use another when there is something clearly better in front of me? Of course, it is game-based…*" (DGA)

The positive developments primarily linked to student motivation rather than academic success, influenced teachers' preference for DGA tools. Teachers emphasized that students demonstrate their true knowledge when assessed in an engaging way. However, they still value PBA and wish to retain its benefits alongside digital methods.

RQ3: What are the perceived benefits and challenges of gamified assessment according to the participants?

To answer the final research question, the results from the teacher interview were analysed and presented as themes and codes. Positive themes were reported 54 times in total. The main themes identified were 'fun', 'participation', 'motivation', 'decreased anxiety', and 'others' which included 'learning environment', 'permanent learning', and 'environmental issues'. The figure and the table below show the themes, and the codes associated with them.

Figure 1. *Repetitions of motivation themes*

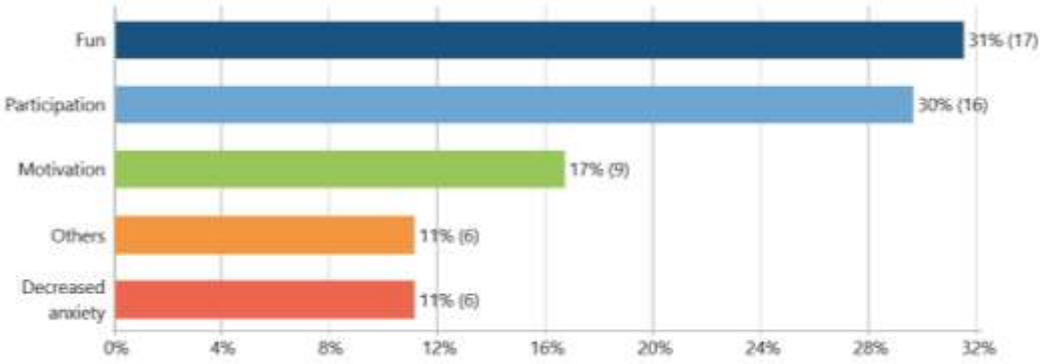

Table 3- *Benefit themes with codes*

Themes		Codes
Fun		enjoyed
		enjoyable
		happy
		adventure
		joy
Participation		enthusiasm
		more enthusiastic
		willingness
		more willing
		raise hands
		participate
		active participation
		interactive
		involved in the game
Motivation		motivated
Decreased Anxiety		less anxious
Others	Learning environment	classroom
		colourful
	Permanent learning	never forget their mistakes

	learn better
	remember better
	ease of learning
Environmental issues	care
	not pollute
	not cut trees

Sample expressions of the teachers related to these benefits are also presented below.

T1- "*You can present this in a very colourful environment. Moreover, the kids are having a lot of fun in this environment. It is important that they have fun while learning*."

T2- "*They first experience motivation within themselves."*

T3- "*I observed that students who do not want to show themselves too much in the spotlight were more active in the lesson."*

T4- "*It has started to turn from an exam into more of an adventure and they became more and more enjoyable in the lesson."*

All teachers noted that students enjoyed the implementation and eagerly anticipated future unit revisions. Unlike PBA, which often led to boredom, students remained engaged and enthusiastic. This increased their motivation, which teachers attributed to a decrease in anxiety. Even among the lower-level students, teachers noted that DGA helped diminish test-related anxiety. Some teachers also mentioned DGA tools' attribution to learning by saying "*They said that with this method, they remembered the subject more and that they would never forget their mistakes*" (T2).

In addition to its benefits, teachers identified several challenges associated with DGA implementation. The main themes emerging from this analysis include 'technical problems', 'anxiety', 'displaying scores', and 'chaos.' The figure below shows the themes as challenges emerged from the teacher interview and the table below presents the specific codes corresponding to each theme.

Figure 2- *Repetitions of challenge themes*

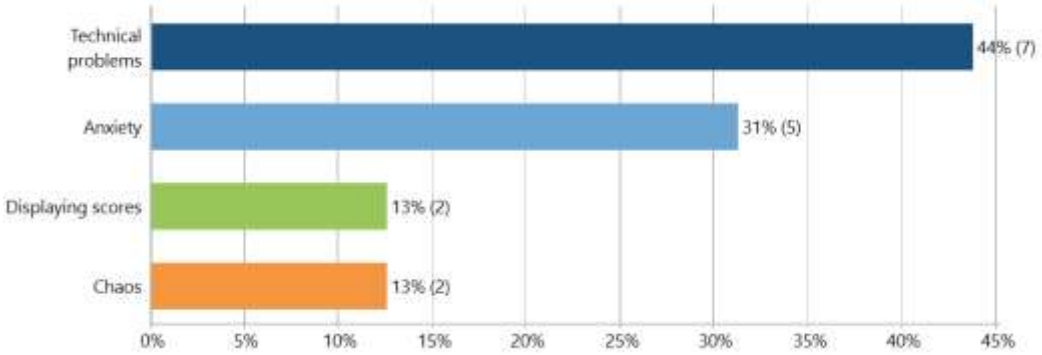

Table 4. *Challenge themes with codes*

Themes	Codes
Technical Problems	internet connection / no internet
	disconnection / disconnected
	lack of devices /lack vehicles
	technical difficulties
Anxiety	stress
	limited time / time limit
	time consuming
	time anxiety
Displaying Scores	seeing other (friends') answers
	having wrong answers on board
Chaos	more speaking students
	more loud

Sample expressions of the teachers related to these challenges are presented below.

T1- *"We have not experienced this, but this is an issue that should be taken into consideration. All technical problems are actually a very serious part of this job."*

T2- *"There were some students who experienced anxiety because children are given a certain amount of time in this game, which is mostly a limited time for slow learners."*

T4- *"…We observed that when the student fell behind and their scores started to be lower than others, they felt despair."*

Although no technical issues occurred during the test, teachers expressed concerns based on their general expectations of potential challenges in the future. Anxiety, however, can influence students in both positive and

negative ways. Teachers identified competitiveness and time limits as primary sources of anxiety. They also mentioned that displaying scores could increase anxiety. While the fun environment promotes engagement, it can also lead to chaos in the classroom. Besides, the excitement generated by the game often results in a noisy atmosphere.

Despite these challenges, teachers adapted DGA by utilizing computers, ensuring stable internet connections, clarifying instructions, and assigning student nicknames in advance. Fortunately, most anticipated problems did not occur during implementation. Thematic analysis revealed that benefits (*N*=54) outweighed challenges (*N*=16), even though some classroom chaos was observed. Overall, the majority of teachers viewed Kahoot as a valuable assessment tool and expressed interest in incorporating it into their teaching and assessment practices.

Discussion and Conclusion

The study replaced traditional PBA with the DGA tool Kahoot, forming control and experimental groups to evaluate its impact on fifth-grade EFL students' formative assessments. The unit tests aimed to determine whether there was a significant difference in performance between the control group and the experimental group. The results indicated no significant difference in success between the two groups, despite the experimental group's scores being slightly higher. If success is measured solely by test scores, it can be concluded that DGA does not provide a clear advantage over PBA. Regardless of these results, the implementation process stands out as a unique aspect of this study, as many other studies have focused separately on student motivation or teacher perceptions, with limited data to support the experimental findings. However, some studies have successfully incorporated Kahoot into classroom practice.

Subsequent research by Kapsalis et al. (2020) corroborated the study's findings, revealing an absence of statistically significant disparities between the experimental and control groups. However, other studies have reported contrasting results. For instance, Şad and Özer (2020) found that Kahoot significantly increased learners' scores. Furthermore, Çetin Köroğlu (2021) conducted a comparative study, which evidenced the superiority of digital assessment methods over their traditional counterparts. Notably, Yürük

(2019) corroborated these findings, positing that Kahoot has a substantial impact on students' academic achievements.

The response paper aimed to gather students' test preferences. The majority of students (*N*=25) preferred digital tests, while only a few (*N*=5) opted for paper-based tests. Kahoot was particularly appealing due to its fun elements, which students felt aided in their retention of the material. Environmental concerns, such as the reduction of paper waste, were also mentioned by students. The findings of this study's response paper are consistent with other Kahoot-based studies (Alharthi, 2020; Çetin Köroğlu, 2021; Ebadi et al., 2023; Mada & Anharudin, 2019; Şad & Özer, 2020; Yürük, 2019). Kahoot's enjoyable and colourful environment is effective in enhancing the retention of learning, especially in an EFL classroom (Wang & Tahir, 2020).

Teacher interviews revealed a preference for traditional assessment methods, as the unit tests used in this study were familiar to the participants. However, the implementation of Kahoot appeared to influence their preferences. Many teachers now prefer digital assessments, or a combination of both digital and paper tests, due to the motivating factors associated with Kahoot. Teachers appreciated observing students enjoy the assessment process rather than feeling stressed, as reported by Çetin (2018). Additionally, the use of digital tests reduces the need for paper, aligning with environmental concerns expressed by students. Digital assessments also facilitate easy scoring and result storage, which is consistent with findings from earlier studies (Çetin, 2018; Çetin & Bakla, 2021; Yürük, 2019). While pre-service ELT teachers initially favoured paper-based tests, their perspectives shifted following the implementation in Cirit's study (2015). Kahoot also increased teachers' motivation, as found by Çetin Köroğlu (2021). In conclusion, Kahoot positively influenced teachers' perceptions, aligning with findings from Wang and Tahir (2020). The factors shaping teachers' views reflect those found in previous studies.

Kahoot was used as an alternative assessment method to traditional paper-based assessments, with a primary focus on the students' motivational change during its implementation. Previous research on alternative assessments has predominantly concentrated on teachers' perceptions, both pre-service and in-service. Cirit (2015) found that many pre-service ELT teachers considered technology to be more motivating than traditional

paper assessments. Similarly, a review study by Çekiç and Bakla demonstrated that digital formative assessments, such as Kahoot, positively influenced students' academic performance due to high motivation. Wang and Tahir (2020) also highlighted various motivational factors associated with Kahoot and its beneficial impact on learning.

The most significant finding from the qualitative data in this study is that Kahoot has a discernible and favourable impact on students' motivation. This aligns with the findings of Şad and Özer (2020), who suggested that success cannot not only be measured by scores, but also by motivation, which plays a crucial role in student success. The qualitative data in this study revealed that, unlike the quantitative data, Kahoot offered several benefits that contributed to student success, including active student engagement, a more learner-centred and enjoyable lesson, immediate feedback, increased willingness to participate, and improved retention of learning.

In conclusion, while unit tests did not reveal a significant difference, the researcher regards games as effective assessment tools due to their positive impact on motivation. The study demonstrated that Kahoot significantly enhanced student motivation, leading to greater participation. Both student responses and teacher interviews supported this finding, indicating that digital gamified assessments have the potential to improve future scores and contribute valuable empirical data to the existing literature.

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