

The Use of Gamification (Kahoot!) to Increase Vocabulary Mastery in Elementary School

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ABSTRACT

This study investigates the effectiveness of gamification, specifically through the use of Kahoot!, in enhancing vocabulary mastery among elementary school students. Employing a quasi-experimental design, the research involved 36 learners from SD Negeri 01 Pandian, consisting of 18 students from grade 6A as the experimental group and 18 students from grade 6B as the control group. Data were gathered through pre-test and post-test vocabulary assessments, accompanied by student questionnaires designed to capture levels of engagement and motivation during the learning process. Quantitative data were analyzed using IBM SPSS Statistics 22. Paired sample t-tests were conducted to measure within-group differences, and independent sample t-tests were applied to compare learning outcomes between the two groups. The findings indicate that Kahoot! significantly improved students' vocabulary achievement, as evidenced by a (Sig.) (2-tailed) value of $0.000 < 0.05$. The experimental group's mean score increased markedly from 45.78 (pre-test) to 86.22 (post-test), while the control group showed a smaller improvement from 39.56 to 63.11. These results demonstrate substantial gains in the group exposed to gamified learning, leading to the rejection of the null hypothesis (H_0) and acceptance of the alternative hypothesis (H_a). This confirms that the integration of Kahoot! positively influences vocabulary mastery among sixth-grade students. The study highlights the pedagogical potential of gamification in elementary education, suggesting that Kahoot! can be effectively incorporated into daily instructional activities to boost student engagement and vocabulary development. It contributes to the growing literature on digital learning tools,

highlighting their role in creating interactive and engaging learning environments.

Keywords

Digital Learning
Elementary School
Gamification
Kahoot!
Vocabulary

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Introduction

In the ever-growing digital era, teachers must be able to utilize technology as an effective learning tool. It is contended that technological adaptation has a significant impact on the quality and effectiveness of learning [1]. The use of technology in learning has opened the door for more interactive, fun, and efficient learning methods. In addition, technology also allows access to a wider and more varied learning resources, which can support a more relevant and creative curriculum. Therefore, by continuing to encourage innovation and technological development in learning, Indonesia can better prepare the younger generation to face future challenges and achieve success in various fields. One important aspect of this effort is English language learning.

When learning English as a foreign language, the students must learn four skills: reading, speaking, writing, and listening. In addition, students must learn sub-skills, including vocabulary and grammar. According to Alqahtani [2], vocabulary acquisition plays a crucial role in developing the four language skills.. Before acquiring four language skills, it is very important to understand the vocabulary first, and Thornbury [3] states that if a person lacks a large vocabulary, even having excellent grammar will be meaningless. This emphasizes how important the role of vocabulary is in language learning. Vocabulary is the foundation that enables one to understand and communicate fluently in the language.

Despite its importance, many students still struggle with speaking English. Mastering vocabulary is one of the most challenging aspects for learners. Students often find it difficult to express their thoughts in English due to insufficient vocabulary. Factors contributing to these difficulties include the differences between spoken and written forms of English, the high number of words students need to learn, and limited sources for word information. In Indonesia, this problem is evident, as many elementary students face challenges in the linguistic aspect, including a lack of vocabulary, grammar accuracy, and pronunciation, which are essential for vocabulary comprehension [4], [5]. Yulia [6] also reported that students lose interest when exposed to traditional teaching methods, leading to poor vocabulary

comprehension. In this context, students' disinterest in traditional lecture methods can hinder their vocabulary expansion. Therefore, a more interactive and enjoyable learning approach is necessary to engage students actively in the vocabulary learning process.

One effective tool for enhancing vocabulary learning is Mobile-Assisted Language Learning (MALL), which incorporates mobile technology into educational practices. MALL allows students to access language resources anytime and anywhere, making learning more flexible and personalized [7]. By integrating MALL with other interactive tools like Kahoot! App, teachers can create an engaging learning environment that fosters active participation. According to Mansur and Fadhilawati [8] Kahoot! is a game-based learning tool that enables teachers to create exciting quizzes and surveys. This platform enhances classroom learning by making it interactive and fun. It is also reported that students have shown great enthusiasm for using Kahoot! since its introduction, facilitating both classroom dynamics and student-teacher attitudes [9].

While several studies have explored the use of Kahoot! in educational contexts, most have focused on higher education levels such as high school and college. For instance, research conducted at SMA Negeri 8 Palu, Indonesia found that students who engaged with Kahoot! exhibited notable increases in vocabulary mastery compared to those taught through traditional methods [10]. Furthermore, a study by Chaiyo and Nokham [11] indicated that Kahoot! enhances student concentration, engagement, and motivation in college classrooms. However, research on the use of Kahoot! at the primary level remains limited. This lack of empirical evidence at the elementary level highlights a crucial research gap, as younger learners may respond differently to gamified learning than older students due to cognitive and motivational differences.

Therefore, this study aims to fill this knowledge gap by evaluating the effectiveness of using Kahoot! in improving English vocabulary comprehension among elementary school students. By analyzing these aspects, the study seeks to provide insights into the effectiveness and acceptance of Kahoot! in vocabulary learning at the elementary school level. Ultimately, this research will contribute valuable information toward developing more innovative and effective teaching methods within educational environments. This study is expected to contribute to the field of English Language Teaching (ELT) by offering empirical evidence of how gamified digital tools can enhance young learners' vocabulary acquisition, engagement, and learning motivation. Furthermore, this research provides practical guidance for teachers in integrating Kahoot! into classroom instruction as a sustainable digital pedagogy. Nevertheless, this study acknowledges its limitation in focusing only on a small sample within one school context, which may affect the generalizability of the findings. Future studies are

encouraged to involve larger populations and longitudinal designs to examine long-term effects.

Literature Review

A. ICT in English Classroom

Information and Communication Technology (ICT) plays a vital role in modern education, particularly in the English language classroom. ICT encompasses various tools and systems used to process, store, and transfer information, including interactive whiteboards, language learning software, and online resources. The integration of these technologies has transformed traditional teaching methods, providing innovative ways to enhance language acquisition and proficiency. For instance, ICT tools facilitate interactive learning experiences that engage students more effectively than conventional methods. This engagement not only improves students' vocabulary and grammar skills but also fosters greater motivation and enthusiasm for learning English [12].

One of the main advantages of ICT in the English language classroom is its ability to significantly increase student engagement. According to Wahyudin et al. [13], the use of digital tools in language learning can create a more interactive and engaging learning environment, which can increase student motivation and participation. Interactive platforms and multimedia content allow for a more dynamic and immersive learning experience, making the process of learning English more interesting and less monotonous.

ICT also plays an important role in improving the four main language skills: listening, speaking, reading, and writing. Gündüz [14] point out that computer-assisted language learning (CALL) can provide students with many opportunities to practice and get immediate feedback, which is crucial for language development. For example, listening comprehension can be improved through the use of authentic audio materials available online, while speaking skills can be practiced through language learning applications that offer pronunciation exercises and speech recognition technology [15].

B. Mobile Assisted Language Learning

According to Hsieh [16], Mobile Assisted Language Learning (MALL) refers to the use of mobile devices, such as smartphones and tablets, to support and enhance language learning. MALL integrates mobile technology into educational settings to provide learners with flexible, interactive, and contextually relevant opportunities for practicing language skills, offering features like instant access to learning materials, communication tools, and language practice apps.

MALL has emerged as a significant educational approach in the context of language acquisition, integrating mobile technologies to enhance the learning experience. Over the past decade, the rapid advancement of ICT has further changed the landscape of language

education, providing innovative tools and methodologies that cater to diverse learning needs and preferences.

MALL utilizes mobile devices such as smartphones and tablets to facilitate language learning outside the traditional classroom. According to Stockwell [17], MALL has shown great potential in making language learning more accessible and flexible, as learners can practice language skills anytime and anywhere. The portability and connectivity of mobile devices allow learners to engage with multimedia content, interactive exercises, and real-time communication with peers and instructors.

The integration of ICT with MALLs has revolutionized language learning by providing various digital tools that enhance the learning process. According to Godwin-Jones [18], the synergy between mobile technology and ICT has led to the development of sophisticated language learning applications that incorporate augmented reality and virtual classrooms. These technologies offer immersive and interactive learning experiences that can significantly improve language acquisition.

For example, language learning apps such as Duolingo and Babbel use ICT to provide instant feedback, game-coupled learning experiences, and social interaction features, which foster motivation and engagement among learners [19]. The use of ICT in MALLs also facilitates the integration of authentic language resources, such as videos, podcasts, and articles, which expose learners to real-world language use and cultural contexts [20].

C. Gamification

According to Kiryakova et al. [21], gamification is one of the educational approaches and techniques that increase motivation and engagement of learners. The current work aims to study and present the nature and benefits of gamification and to provide some ideas on how to implement it in education. In addition, AlZuhair and Alkhuzaim [22] said that gamification is one interactive and student-centered educational strategy that has arisen because of academic efforts to meet the needs of the current period. It is because gamification has become an increasingly popular technique in education to make learning more fun and effective. Thus, teachers can create a more interesting and motivating environment for students. This approach not only increases student participation but also encourages the amount of knowledge and skills through active learning. In addition, gamification can foster a sense of accomplishment and progress, which is essential for maintaining student interest.

Cavus et al. [23] initiated that gamification in e-learning has improved all over time, and it gives various advantages to students. In addition, Caponetto, et al. [24] reports that gamification is one of the educational approaches and techniques that increase motivation and

engagement of learners. The implementation of gamification in English learning can have a positive impact on increasing students' enthusiasm for learning.

Kaya and Ercag [25] noted that gamification in English language learning has an important effect on students' enthusiasm for the learning process. Using game components like points, levels, and prizes can increase students' engagement and motivation in learning activities. Students are more motivated to finish assignments and achieve learning objectives when they experience gamification's sense of challenge and fun. In addition, Hews et al. [26] said that high enthusiasm leads to increased attendance and participation in class discussions and group activities. Enthusiastic students often inspire their peers to get more involved, thus creating a livelier and more interactive classroom atmosphere. This is particularly important as active engagement in discussions and group activities can improve students' understanding of the material being taught, deepen their horizons, and develop communication and cooperation skills.

Furthermore, gamification increases engagement. Gamification of English education also boosts students' interest in both teaching and learning. By incorporating game aspects, kids are more motivated to pay attention in class and finish their homework. They are motivated to focus on reaching their goals since they have specific objectives in the form of points or levels [27]. In addition, Fitria et al. [28] explained that students are encouraged to use critical thinking and creativity when completing homework through gamification challenges and missions. The challenges presented often require in-depth analysis and creative solutions, which motivates students to think more analytically and innovatively in completing their tasks. This not only helps students develop complex problem-solving skills but also encourages them to learn in a more in-depth and applied manner.

In addition, gamification increases competitive spirit. Gamification in English education can help boost students' competitive spirit [29]. Students are motivated to work harder at learning English when there are competitive elements present, like leaderboards or rewards for the top scorers [30]. This competitive element creates a more dynamic and challenging learning atmosphere, encouraging students to put in more effort to achieve better results. In addition, the presence of a leaderboard provides an opportunity for students to compare their progress with their classmates, which can be an additional impetus to improve their performance. Prizes for top scorers not only serve as an attractive incentive but also foster a spirit of healthy competition and intrinsic motivation to continue learning and improving.

While gamification offers many benefits in an educational context, it is not without its drawbacks. One of the downsides of gamification in a learning environment is that it overemphasizes competition and rewards. Gamification often incorporates elements such as leaderboards and rewards to motivate learners. However, this approach can sometimes lead

to an overemphasis on competition, which may not be conducive to all learning environments. For example, some students may feel unmotivated or anxious when they are constantly comparing their performance with peers [31]. In addition, an excessive focus on extrinsic rewards can undermine intrinsic motivation, leading students to learn for the sake of rewards rather than genuine interest in the subject [32].

Furthermore, implementing gamification often requires access to digital platforms and technological devices, which may not be equally available to all students. This digital divide can exacerbate educational inequality, as students who do not have adequate access to technology cannot fully participate in gamified learning experiences [33]. In addition, Huang and Hew [34] state that high reliance on technology can also be problematic if technical issues occur that disrupt the learning.

In addition, gamification increased pressure and stress. The introduction of gamification elements, such as time-based challenges and point systems, can increase pressure and stress among students. Burke [35] argues that such pressure can undermine the learning experience, especially for students who are already anxious about their academic performance. The constant pursuit of rewards and high grades can create a stressful environment, thus reducing the benefits of a supportive and relaxed learning atmosphere.

D. Gamification for Vocabulary Learning

Gamification has gained substantial attention as an innovative pedagogical approach for improving vocabulary learning across diverse educational contexts. It integrates game design elements (such as points, badges, leaderboards, and challenges) into non-game learning environments to increase student engagement and motivation. In language education, particularly in vocabulary instruction, gamification has demonstrated significant potential to transform traditional learning experiences into interactive, meaningful, and enjoyable ones.

A major advantage of gamification lies in its ability to increase student engagement and motivation. Gamified activities incorporate quests, challenges, and reward systems that encourage students to participate actively in the learning process [36], [37], [38], [39]. The competitive yet collaborative nature of gamified learning fosters excitement and positive attitudes toward vocabulary acquisition. Moreover, gamified environments promote improved vocabulary retention as learners repeatedly encounter and apply new words in interactive contexts. Research suggests that the repetitive, feedback-rich structure of games facilitates long-term memorization and recall compared to traditional rote learning [40], [41].

Gamification also leads to enhanced learning outcomes. Students exposed to gamified vocabulary instruction often achieve significantly higher scores on vocabulary tests and demonstrate greater overall language proficiency than those using conventional teaching

methods [42], [43]. Additionally, gamified tools promote autonomous learning, enabling learners to control their pace and path of vocabulary practice. This self-directed approach encourages consistent engagement—an essential factor in vocabulary mastery [43], [44].

Despite its benefits, gamification must be carefully designed to maintain a balance between game elements and learning objectives. Overemphasizing competitive features may distract from the core educational goals [45]. Effective gamification should integrate pedagogically meaningful activities that reinforce vocabulary learning rather than merely entertaining learners. Another important aspect is addressing diverse learner needs. Since students vary in learning preferences, technological familiarity, and motivation, gamified tools should provide adaptable features and personalized learning paths [46]. This ensures inclusivity and maximizes the learning potential for all students.

In summary, gamification offers a dynamic and effective approach to vocabulary learning by transforming it into an engaging, interactive, and learner-centered experience. Research has consistently shown that gamified instruction enhances vocabulary retention, supports learner autonomy, and improves overall language competence. However, successful implementation requires thoughtful design that aligns game mechanics with pedagogical goals while accommodating learner diversity. When properly integrated, gamification can serve as a powerful instructional strategy to promote meaningful and sustainable vocabulary learning.

E. Kahoot!

Kahoot! is defined as an online platform that facilitates the creation and implementation of game-based learning activities. Kahoot! is a game-based learning platform, designed to assess student knowledge, conduct formative assessments, or as an alternative to fill time between more traditional classroom activities. The platform allows educators to design multiple-choice quizzes that are projected onto a larger screen, while students respond in real-time using their personal devices, thus encouraging active participation and instant feedback [47].

Kahoot! a widely used gamification platform, has been increasingly integrated into language education due to its various benefits, especially in English vocabulary learning. Some advantages of using Kahoot! in vocabulary learning are increased engagement and motivation. One of the main advantages of using Kahoot! in vocabulary learning is its ability to significantly increase student engagement and motivation. Plump and LaRosa [47] found that the use of Kahoot! in the classroom can increase students' participation levels and enthusiasm, thus increasing their willingness to engage in vocabulary exercises. This is supported by Gómez-Carrasco et al. [48] who observed that students are more motivated to learn new words when using Kahoot! due to its competitive and entertaining format.

Furthermore, Kahoot! improved vocabulary retention. Another significant advantage of Kahoot! is its effectiveness in improving vocabulary retention. The platform's use of repetitive

questions and instant feedback helps to reinforce new vocabulary, thus aiding long-term memory retention. According to Gressick and Langston [49], students who used Kahoot! to learn vocabulary showed better recall and understanding of new words compared to those who used traditional learning methods. In addition, Emilio and Safitri [50] noted that the immediate feedback provided by Kahoot! helped students quickly identify and correct their mistakes, thus reinforcing their learning and increasing retention rates.

In addition, Kahoot! boosts confidence and reduces anxiety. Using Kahoot! in vocabulary learning can also help boost student confidence and reduce anxiety associated with language learning. Its game-like format and anonymous answering system allow students to participate without fear of embarrassment, which can be especially beneficial for shy or anxious students. According to Wang and Lieberoth [51], students reported that they felt less stressed and more confident in their language skills when using Kahoot!, as the platform's fun and engaging approach made learning new vocabulary less daunting. In addition, Altawalbeh [52] report that the positive reinforcement provided by Kahoot! helped build students' confidence and encouraged them to take more risks in using new vocabulary.

While Kahoot! offers many benefits in an educational context, but it is not without its drawbacks. The disadvantages of using Kahoot! in English language learning, especially for vocabulary acquisition, point to some concerns. For example, Kahoot!'s reliance on quick responses and competitive elements may inadvertently prioritize speed over accuracy in learning. According to Zulfirah et al. [53], "Although Kahoot! increases engagement through competition, this may overshadow the focus on deeper comprehension and vocabulary retention, as students often prioritize speed over comprehension".

In addition, Kahoot!'s format, which often involves simple multiple-choice or word association questions, may not sufficiently facilitate nuanced understanding and contextual use of vocabulary words. Wang and Lieberoth [51] report that the superficial nature of Kahoot! Quizzes may limit students' ability to understand the intricacies of vocabulary meanings and their application in different contexts.

Furthermore, while Kahoot! gamification is initially motivating, but it can lead to a superficial learning experience if not complemented by deeper learning strategies. Thiagarajah et al. [54] explained that Kahoot!'s gamification elements may encourage surface-level engagement rather than fostering sustained cognitive engagement necessary for meaningful vocabulary acquisition.

F. Vocabulary Mastery

According to Nation [55], vocabulary mastery includes not only knowledge of the meaning of words but also an understanding of their use in various situations, including in oral and

written communication. This comprehensive understanding enables students to understand texts better and express themselves more clearly and correctly.

Vocabulary knowledge is fundamental to receptive (listening and reading) and productive (speaking and writing) language skills. According to Nation [56], vocabulary forms the building blocks of language, allowing students to decode and produce meaningful communication. The importance of vocabulary acquisition is underscored by its direct correlation with reading comprehension and overall language proficiency [57].

However, teaching vocabulary effectively in elementary schools presents several challenges. One primary issue is ensuring that students not only memorize new words but also understand their nuances and applications in context. [58] pointed out that simple memorization is insufficient for true vocabulary acquisition; students require opportunities to use new vocabulary in meaningful situations to fully integrate it into their language skills.

G. Teaching English to Young Learners

English language teaching for young learners has been the subject of extensive research and innovation in recent years. Researchers have explored various effective strategies and methodologies to improve language acquisition and proficiency among young learners. For instance, Lawalata et al. [29] emphasized that gamification in English education can help boost students' competitive spirit, thereby increasing their engagement and motivation in learning. Similarly, Johnson et al. [59] argues that incorporating stories into language lessons not only improves vocabulary acquisition but also stimulates creativity and critical thinking skills among young learners. In addition, recent research by Manzoor et al. [60] highlights the importance of integrating technology, such as interactive apps and educational games, into English classrooms to create immersive learning experiences that suit the digital-native generation. Additionally, research by Candra et al. and Ruiz-Rosa et al. [61], [62] explores the effectiveness of game-based learning in fostering collaboration and communication skills when teaching English to young learners. These studies collectively highlight the diverse approaches and innovations in English language teaching for young learners, aiming to make language learning more engaging, effective, and fun for children.

Material and Method

The research methodology for this study adopts a quantitative research design to systematically investigate the impact of gamification on Kahoot! to increase vocabulary mastery in elementary school. This approach allows for the objective measurement and statistical analysis of data, ensuring the reliability and validity of the results [63].

In this research, the researcher applied a quasi-experimental research design because there was no random assignment of participants to the control group and the experimental group [64]. The researcher used a quasi-experimental design with a control group and an

experimental group to measure the effects of gamification on student motivation and learning outcomes. The experimental group was exposed to a gamified learning environment, while the control group continued to use traditional teaching methods. A pre-test and post-test were given to both groups to assess changes in their academic performance and motivation.

In this study, the population consists of students from SD Negeri Pandian 1, specifically targeting those in the sixth grade. The sample selected for this research includes 36 students, with 18 students from grade 6A (experimental class) and 18 students from grade 6B (control class). This setup allows for a comparison of how well Kahoot! helps improve vocabulary understanding among the students. By focusing on sixth graders, the research aims to find out how effective Kahoot! is for this age group, providing clear insights into its impact on learning vocabulary in an elementary school setting.

This study used written tests as the main research technique and instrument to assess and evaluate participants' knowledge and ability. Written tests are well regarded for their ability to provide structured and measurable measures of learning outcomes [65]. The written test instrument used in this study consisted of multiple-choice questions (MCQs), short-answer questions, and essay questions. Each question type was selected to address a specific cognitive domain, ranging from recall, comprehension, and analysis. MCQs are particularly useful for assessing knowledge and understanding, while essay questions provide deeper insights into participants' analytical and critical thinking abilities [66].

The data collection procedure to assess the effectiveness of using Kahoot! app involved administering written tests, specifically the pre-test and post-test. Initially, a pre-test was conducted to evaluate the participants' basic knowledge and skills prior to the delivery of the materials. After the pre-test, participants attended a series of educational sessions or learning activities using Kahoot! app, which served as the treatment phase. After completing these sessions, a post-test was administered to measure the changes in knowledge and skills resulting from the learning treatment from Kahoot! Comparison between pre-test and post-test scores provides quantitative data to assess the impact of Kahoot! app on participants' learning outcomes.

Data from prior experiments will be examined quantitatively using static calculations to test hypotheses. Here is a step-by-step guide to data analysis: classifying the data, tabulating the data, validating the data, and interpreting the results. See Fig. 1.



Fig. 1. Data analysis steps

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- Classifying the data. The researcher categorized each student's test results based on the test after completing the pre-test, treatment, and post-test. See Table 1.

Table 1. Scoring Criteria

No.	Classification	Score
1.	Very Good	86-100
2.	Good	71-85
3.	Fair	56-70
4.	Poor	41-55
5.	Very Poor	≤ 40

- Tabulating the data. After classifying the data, the researcher collects data for each variable and organizes it systematically. Then, the researcher entered the collected data into the relevant table sets.
- Validating the data. The researcher compared the participant data according to the tests that had been conducted after entering the data into the table. The researcher compared the initial data before and after receiving treatment.
- Interpreting the result. The researcher describes their findings clearly and concisely, providing relevant tables or statistical outputs.

Result

A. The use of Kahoot! in increasing students' vocabulary mastery

This study applied a normality test to the pre-test and post-test scores of the experimental and control groups to determine whether the data followed a normal distribution. The results of the normality test are presented below.

Table 2. Test of Normality

	Shapiro-wilk		
	Statistics	df	Sig.
Pre-test experiment class	.918	18	.121
Post-test experiment class	.952	18	.450
Pre-test control class	.920	18	.130
Post-test control class	.958	18	.565

The results of the normality test indicated that the data for both the experimental and control groups were normally distributed, as the significance values (p-values) for all tests are ≥ 0.05 . Specifically, the pre-test and post-test scores for the experimental class had p-values of 0.121 and 0.450, respectively, while the pre-test and post-test scores for the control class had p-values of 0.130 and 0.565, respectively.

To further examine the differences in vocabulary mastery before and after the treatment, a paired sample t-test was conducted on both the experimental and control groups. The results of the test revealed significant improvements in both groups. For the experimental class, the mean difference between the pre-test and post-test scores was -40.444, with a p-value of 0.000, indicating a statistically significant increase in vocabulary mastery. Similarly, for the

control class, the mean difference was -23.556, also with a p-value of 0.000, which shows a significant improvement.

Table 3. Paired Samples Test

		Paired differences	
		Mean	Sig. (2-tailed)
Pair 1	Pre-test experimental class	-40.444	.000
	Post-test experimental class		
Pair 2	Pre-test control class	-23.556	.000
	Post-test control class		

These findings suggest that both groups showed progress, but the experimental group demonstrated a greater improvement compared to the control group.

Table 4. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test experiment	45.78	18	11.740	2.767
	Post-test experiment	86.22	18	8.143	1.919
Pair 2	Pre-test control	39.56	18	13.080	3.083
	Post-test control	63.11	18	13.620	3.210

For the experimental group, the pre-test had a mean score of 45.78, while the post-test mean score increased to 86.22, showing a significant improvement in vocabulary mastery. In comparison, the control group had a pre-test mean of 39.56 and a post-test mean of 63.11, also indicating an improvement, but not as substantial as the experimental group. Based on these findings, the null hypothesis (H_0) is rejected, and the hypothesis (H_a) is accepted, indicating that the use of Kahoot! has a significant positive impact on students' vocabulary mastery.

Discussion

The findings of this study showed that the use of Kahoot! The app significantly improved vocabulary mastery among grade 6 elementary school students. After analyzing the data with SPSS, it was found that the scores for both the experimental and control groups were normally distributed during both the pre-test and post-test.

This finding is important because it confirms that the study's data is reliable and helps to evaluate the effectiveness of using Kahoot! app to improve vocabulary. The pre-test results showed that students had limited vocabulary knowledge at the start. However, after using Kahoot! in their learning, the experimental group showed a significant improvement in their post-test scores, indicating that the app helped them learn better.

Some previous studies support these findings. For example, a study conducted at an elementary school found that the use of Kahoot! based learning media significantly improved students' learning outcomes on specific themes. The study showed that the group that used Kahoot! obtained higher mean scores compared to the group that did not use the media, with

significant differences in learning outcomes [67]. Furthermore, Abdillah et al. [68] also highlighted the positive impact of integrating Kahoot! in English language learning in elementary school. The evaluation results showed that the learners' response to the use of Kahoot! was very good, and they felt happier learning through this method. This research confirms that the use of technology in education not only improves learning outcomes but also makes the learning process more interesting for students.

In addition, Widiasih [69] said that the use of Kahoot! allows students to receive immediate feedback on their understanding of the vocabulary. By viewing the quiz results in real-time, students can know which areas they need to improve and focus on certain aspects of the vocabulary that are still poorly understood. This process not only improves vocabulary acquisition but also builds students' confidence in using English. The use of gamification in learning can increase students' confidence when speaking in English. They found that students who engaged in game-based activities felt more comfortable and braver to communicate, as the fun learning atmosphere reduced anxiety [70].

A. Implementation for theory and practice

Theoretically, these findings provide empirical support for applying MALL and gamification frameworks in primary ELT classrooms: gamified mobile quizzes can be integrated with vocabulary learning theories (retrieval practice, multimodal encoding) to produce measurable learning gains. Practically, the study suggests that teachers can use Kahoot! as an effective formative teaching tool to provide immediate diagnostic feedback, increase student engagement in short practice cycles, and create opportunities for peer comparison and collaborative review after quizzes. For school leaders and curriculum designers, the evidence supports incorporating low-cost gamified activities into regular lesson plans to complement explicit vocabulary instruction (e.g., pre-teaching, contextualized practice, and post-quiz reflection).

B. Comparison with previous research

The present results are consistent with many prior studies that reported positive effects of Kahoot! and gamified tools on engagement and achievement. For example, studies in secondary and tertiary contexts report increased motivation and higher test scores for gamified groups [71], [72]. Similar to [73], [74], our study found strong student enthusiasm and higher post-test outcomes following Kahoot! Interventions. Where this study adds nuance is in showing a relatively larger gain at the elementary level compared with the control group's improvement, suggesting that younger learners, when provided with playful, immediate-feedback environments, may experience greater proportional benefits than older learners who already have more established study habits.

At the same time, differences in context and design moderate direct comparability. Some previous studies emphasize motivational outcomes rather than measured vocabulary gains; others used different instruments (e.g., delayed retention tests, qualitative measures of speaking confidence). Unlike studies focusing on long-term retention, our research measured post-test gains shortly after intervention; therefore, while consistent with literature showing short-term benefits, it cannot by itself confirm long-term vocabulary retention. Finally, while several studies highlight minimal infrastructure issues in urban schools, our findings reiterate the logistical constraint (internet/hardware) reported in other elementary settings, which can limit scalability.

Furthermore, the findings of Abdillah et al. [68] said that one of the main challenges of using Kahoot! is the dependence on a stable internet connection. Not all schools have sufficient technological infrastructure to support the use of Kahoot! Facilities such as hardware and good internet access are required for Kahoot! to be used effectively [75]. Kahoot! is an online-based platform, so good and fast access is necessary to run the quiz effectively. In conditions where internet access is limited or unstable, students may have difficulty joining the quiz, which may result in frustration and reduce their participation in learning. To solve this problem, schools can consider providing additional devices, such as portable hotspots or modems that can be used in class.

This study has weaknesses in collecting data related to the use of Kahoot! app for learning projects. One of the main weaknesses is the limited number of respondents who only came from one school. This may limit the generalizability of the results, as the characteristics of students in that school may not be representative of the wider student population.

For future research, it is suggested that researchers involve more respondents from various schools to increase the generalization of the research results. By involving students from various backgrounds, researchers can obtain more universal data regarding the effectiveness of Kahoot! in improving vocabulary. Furthermore, researchers are also advised to explore different project variations in the context of gamification. For example, combining Kahoot! with collaborative projects that involve presentations or group discussions. This will not only make learning more engaging but also allow students to practice speaking and interacting directly with their peers.

Conclusion

Based on the results of the study, it is concluded that the application of the gamification method through Kahoot! can improve the vocabulary mastery of grade 6 students at SD Negeri Pandian 01. This can be seen from the significant difference in results between the pre-test and post-test mean scores, where the pre-test mean score was 45.78, while the post-test mean

score reached 86,22. This increase shows that students' confidence in using English vocabulary has also increased after the treatment. Therefore, students in primary schools experienced an increase in vocabulary acquisition, which shows that they have benefited from the application of Kahoot! as a learning method. With this approach, it is expected that students will not only improve their English proficiency but also feel more comfortable and confident in communicating using the language. However, this study has several limitations. The research involved a relatively small sample size limited to one school, which may reduce the generalizability of the findings to broader populations. Additionally, the duration of the intervention was short, focusing only on immediate vocabulary outcomes without evaluating long-term retention. The study also relied mainly on quantitative data from pre- and post-tests, without in-depth qualitative insights from students or teachers that could provide a richer understanding of their experiences.

Conflict of Interest

The authors declare no conflict of interest.

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