THE EFFECT OF KAHOOT! ON SIXTH GRADERS' VOCABULARY MASTERY

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Abstract: This research investigates the effect of Kahoot! as a game-based learning media on improving vocabulary mastery among EFL students. This study was conducted with 17 students in one experimental group. Adapting pre-experimental design, with pre-test and post-test data analyzed through paired samples T-test and Wilcoxon signed-rank test. The findings showed a significant improvement in vocabulary scores, with the average increasing from 65.59 in the pre-test to 81.76 in the post-test, indicating Kahoot!s' game-based learning media for vocabulary learning and memorizing. However, limitations such as a small sample size and varied student proficiency levels affected data distribution and highlighted the need for differentiated instruction. Despite these challenges, the findings support Kahoot!s' potential as a game-based learning medium, increasing engagement and motivation. The study recommends further research with larger, diverse samples and longer intervention periods to confirm these findings and assess the long-term effect of Kahoot!. This study highlights the significance of incorporating technology into language education, particularly in the post-pandemic context, where digital literacy has become an essential component of effective teaching and learning

Keywords: Kahoot!, vocabulary mastery, game-based learning, educational technology.

Given the importance of vocabulary mastery for EFL learners, teachers should be innovative in helping their students develop their vocabulary. Schmitt & McCarthy (1997) propose three approaches to studying vocabulary and those are connecting words from context, using word parts and mnemonic techniques to memorize words, and using vocabulary cards to memorize foreign language-first vocabulary pairs. Nowadays, one such strategy that implements one of those strategies is the use of powerful instructional media. Utilizing powerful instructional media in the classroom is an excellent method for EFL teachers to help their students develop their vocabulary. In the school context, vocabulary is the base knowledge that students need to acquire in order to learn language skills. Without sufficient vocabulary, communication becomes less effective because the students will face difficulty understanding others, and they also would have a hard time being able to express their ideas (Clouston, 2013). Because it is important, many teachers experiment and do research to find the best way to teach vocabulary to their students. The shifting of students' profiles forces teachers to reexamine the portrayals of their job and find more innovative teaching methods (Korkmaz and Öz 2021). Nowadays, there are plenty of teachers who are quite aware of the 21st-century skills that students need to acquire. Technology literacy is a crucial skill in today's fast-paced world, requiring wise technology use. Recently, the focus of study has shifted away from standard vocabulary tests and the evaluation of the interplay between assessments and learning toward additional useful strategies that may provide formative aid to students (Hamedi, 2022). This advancement in learning nevertheless is the result of the pandemic that happened from 2019 until now. In this condition, teachers insist on finding or creating new learning methods using technology to improve students' vocabulary mastery.

Game-based learning (GBL) has shown promising results in helping students acquire vocabulary in English as a Foreign Language (EFL) contexts. Digital GBL methods can improve both short-term and long-term vocabulary retention, as well as enhance reading and listening comprehension. Additionally, they can increase learner motivation and engagement (Zou et al., 2019).

Different media formats, such as paper, digital, and augmented reality (AR), have been tested for GBL, with AR-GBL showing better immediate vocabulary learning effects compared to digital-based GBL (Wen Jia et al., 2023). Mobile game-based systems for practicing vocabulary have also been effective in improving learning outcomes and motivation (Wu, 2018). The effectiveness of digital GBL for vocabulary acquisition may vary based on game design features, with adventure-oriented games potentially offering greater challenges compared to non-adventure-based games (Chen et al., 2018). An excellent example of a game-based learning media that is effectively able to improve student's vocabulary mastery is Kahoot!. According to Ahmed et al. (2022), Kahoot! is a game-based learning media that schools and other educational institutions utilize in their learning activity as an instrument to help their students achieve their learning goals.

Originally, the development of Kahoot! started in 2006 at the Norwegian University of Science and the first function as a technology from the Lecture Quiz research project. Over several years, this research project involved the development and experimentation of various learning media prototypes. In the fall of 2012, a new startup called Kahoot! was created to build a new game-based learning platform built on Lecture quizzes from the bottom up (Wang & Tahir, 2020). Kahoot! In September 2013, the game-based learning media was unveiled. Through a web browser, Kahoot! mainly provides multiple-choice quizzes and word puzzles that require registration on their web browser on a computer. Meanwhile, the participant who was tested using Kahoot! has to follow the instructions through Kahoot! application that they can download from their smartphone. Kahoot! is beneficial for testing students' knowledge and keeping track of their responses and scores in order to gather information for formative evaluation. Also, there is a trivia-questions test, which is designed for interactive learning, where users gather around a shared screen using instruments for displaying images, such as an interactive whiteboard, projector, monitor, or huge smart TV. Considering all the features that Kahoot! has offered, utilizing Kahoot! as a game-based learning platform, especially in elementary schools for EFL students is a highly justifiable and creative strategy. As research indicates that young learners prefer visual and game-oriented learning methods for foreign language acquisition. Digital games have shown great potential in enhancing language learning and motivation among young learners aged 5-15 (Butler, 2018). In Kahoot!, young learners' visual and game-oriented tastes are catered to by its engaging and interactive features, encouraging a positive and fun vocabulary learning experience. The development of students' language abilities can be greatly aided by using game-based learning media like Kahoot!, as vocabulary mastery is crucial for successful language skills and communication. Additionally, incorporating Kahoot! is in line with the demand for technology literacy and 21st-century abilities in the society we live in today.

The game-based learning media, such as Kahoot!, allow teachers to adjust their lessons to each student's needs, promoting rapid vocabulary expansion. Previous research in utilizing Kahoot! as a game-based learning media for English vocabulary classes has shown promising results. Kusumyanthi and Rusmiyati (2021) found Kahoot! to positively influence students' engagement and active participation in vocabulary learning, making it an effective media to promote learner engagement in the educational process. Additionally, Mahbub (2020) emphasized that EFL teachers recognize Kahoot! as a game-based learning media to enhance vocabulary learning in Indonesian contexts. The effectiveness of the platform in supporting vocabulary acquisition was further confirmed by an analysis by Kusumaningrum, Sumardiyani, and Ambarini (2022), which provided positive feedback from students regarding its use in vocabulary lessons. Moreover, Ahmed et al. (2022) conducted an empirical study showing that Kahoot! positively affects vocabulary recall and retention skills in EFL learners, increasing its potential as an efficient learning media. However, despite these promising results, there still needs to be more existing research as many studies have focused on specific learner groups and situations, such as lower learning groups. To address this issue, this research aims to utilize Kahoot! as a game-based learning media to study vocabulary mastery in elementary school. Furthermore, comparative studies with other game-based and conventional vocabulary teaching approaches would provide valuable insight into the relative effectiveness of Kahoot!. By exploring these possibilities, educators can further optimize the use of Kahoot!, enhance vocabulary instruction, and contribute to richer teaching practices.

Kahoot! is a beneficial game-based learning media for vocabulary instruction in both in-person and remote settings due to its adaptability to various learning environments and the pandemic's impact on education. Overall, using Kahoot! in the classroom gives teachers the media they need to

encourage students' vocabulary acquisition while making learning engaging and entertaining. That is why this study aimed to increase 6th-grade students' vocabulary mastery from one of public elementary school in Bojonegoro by utilizing Kahoot! as a game-based learning media with the following research question: Is there a statistically significant difference between the pre-test and the post-test result of 6th-grade students after the treatment?

The contribution of this study to the field of language education is by examining how Kahoot!, a game-based learning platform can enhance the skills of 6th-grade students. It builds upon research. Provides additional evidence supporting the effectiveness of Kahoot!, in teaching vocabulary. By focusing on a context, this study addresses gaps in existing research and enhances our understanding of how Kahoot! can be applied. This research also offers advantages, such as improved proficiency, for 6th-grade students. The interactive and engaging nature of Kahoot! promotes student motivation and inclusivity catering to learning styles. Integrating technology in classrooms aligns with the skills needed in the era. The formative assessment media provided by Kahoot! allow for instruction benefiting both teachers and students. The findings can inform curriculum development and teacher training enabling language teaching practices.

METHOD

A pre-experimental one-group pre-test and post-test design is adopted in this research. This research design has no control group and determines the effectiveness of the intervention based on the pre-test and the post-test results (Thyer, 2012). According to Neumann (2017), group sequential designs in pre-experimental research, are able to improve efficiency even with a small sample size population in experimental studies (Neumann, 2017). Relying on one experimental group, the researcher collects pre-test and post-test scores from a single group to determine any potential changes or effects of Kahoot! on vocabulary learning. The positive outcome of having single-group pre- and post-test designs in research is the ability to evaluate the effectiveness of the treatment by comparing the results before and after the treatment.

This research took place at one of the public elementary schools in Bojonegoro in the selected 6th-grade classroom and consisted of 6 periods of meetings. The first meeting was intended to be a pre-test and in the last meeting, the researcher conducted the post-test. The treatment section where students are expected to master 56 vocabularies was from the 2nd until the 5th meeting.

This research utilized two categories of instruments: instruments of data collection and treatment materials. The instrument of data collection comprises an unidentical pre-test and a post-test. Each vocabulary test consists of 20 multiple-choice questions based on 4 topics that have been given at the treatment meetings. These topics consist of the vocabulary of the profession, the vocabulary of professions' activities, the vocabulary of feelings, and the vocabulary of items inside a workplace based on 6th-grade coursebooks that follow the Merdeka curriculum guideline. The questions consist of how to use selected vocabulary in real life, the translation of the chosen vocabulary (Indonesia - English & English - Indonesia), antonyms, and the synonyms of the selected vocabulary. To ensure they are unidentical but still cover the same basic competence and core competence, the researchers constructed the post-test using the content outline of the pre-test. Both the pre-test and post-test follow the same content outline. The researcher developed 40 questions upon developing the pre-test and post-test questions. The students are expected to master 56 different vocabularies (17 verbs, 10 adjectives, and 29 nouns), from the 4 topics that have been given.

Data from the try-out test, pre-test, and post-test were then analyzed to gain the in-depth result of the research. In the try-out test analysis, the researchers first analyze the try-out result in the Google form summary where the try-out was conducted. In this summary, the researchers were able to examine the Insights of the average, median, range, and frequently missed questions of the test. In order to develop the 20 questions for the pre-test, the researchers also assessed the reliability test on the result of the try-out test using SPSS. After that, the researchers collected the pre-test and the post-test results from the experimental group. By accumulating all pre-test scores and answers of the experimental class, the researchers analyzed the student's answers and then calculated the scoring average and the most incorrect questions. After collecting this data, the treatment section of utilizing Kahoot! to improve students' vocabulary mastery was conducted in 4 meetings. After that, the students are assigned to do the post-test, which also consists of 20 multiple-choice questions of A1

vocabulary level that are unidentical with the pre-test. After assigning the post-test, the researchers calculated the scoring average and the most incorrect question. After both data from the pre-test and the post-test had been collected, the researchers used a paired samples t-test in SPSS to compare a pre-test and post-test within a single group. In order to compare two related groups (in this instance, the same group taking the pre-test and post-test), the paired samples t-test is used. It assesses whether there has been a substantial change or improvement over time by determining whether the P-value is less than 0,05.

Furthermore, in order to provide additional support for the hypothesis (H) that a statistically significant difference exists, the researchers conducted the normality test using the Shapiro-Wilk test, which can assess the internal consistency reliability of the test items in both the pre-test and post-test. A Cronbach's alpha value greater than 0.5 ($a>0.5$) indicates acceptable reliability and bolsters the validity of our results. Conversely, if Cronbach's alpha value is less than 0.5 ($a<0.5$), the null hypothesis is true.

FINDINGS AND DISCUSSION

After conducting the data collection, this research pointed out several results based on the treatment using Kahoot! to improve students' vocabulary mastery. Furthermore, the result of data analysis from pre-test, post-test, normality test, paired sample t-test, and Wilcoxon test is revealed in this section.

The Pre-test and Post-test Result

The next section provides the results of the pre-test and the post-test that the 17 students from 6B have done. The pre-test questions are from the 40 try-out multiple-choice questions that have been selected and revised so there are only 20 questions left. The pre-test section is conducted in the first meeting of the research. As the treatment section was held for 4 meetings with the experimental group, the researcher conducted the post-test on the 6th meeting of the research. The post-test questions are the pre-test questions that are being randomized using Google's randomized questions feature. In the table below, we can see the result and the average score of both tests

Table 1 Pre-test and post-test results

NO.	Pre-test	Post-test
1.	60	45
2.	80	85
3.	100	100
4.	25	85
5.	100	100
6.	85	90
7.	20	30
8.	65	90
9.	95	95
10.	95	95
11.	65	80

12.	20	65
13.	90	90
14.	80	100
15.	85	100
16.	30	60
17.	20	80
AVG.	65	81

Based on the pre-test result in Table 1, even though the average pre-test score is considerably low according to the Standard of minimum completeness (KKM) from the school, the pretest questions were still too easy for several students. To be exact, 7 students get above 80 on their pretest score. This is beyond the researcher's expectation because the pretest questions are based on the try-out questions that have been selected and increase the level. The main concern that the researcher found is the gap between the students with high scores (80-100) and the students with low scores (>70).

The Descriptive Statistic Result

The next data analysis was descriptive statistical results. In this part, by showing the Minimum value, maximum value, average value (Mean), and standard deviation in the descriptive statistical analysis, the whole image of the research is determined. The descriptive statistical results of this research's pre-test and post-test can be shown in the table below.

Table 2 Descriptive statistic result

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	17	20	100	65.59	30.664
Post-test	17	30	100	81.76	20.459
Valid N (listwise)	17				

As we can observe from the data in Table 2, the minimum value of the post-test is increased by 10 points. While the maximum value of the pre-test and post-test stay in the same score. The difference between the pre-test and post-test minimum followed by the increased average value (mean) on the post-test. In the pre-test section, the average score that the students have accomplished is 65.59. It is16,17 less than the post-test average value where it increases to 81.76.

Normality Test Result

The researcher conducted a normality test using the Kolmogorov-Smirnov and Shapiro-Wilk test in SPSS to determine whether a dataset follows a normal distribution or not. In Table 3, the result of the normality test using the Kolmogorov-Smirnov and Shapiro-Wilk test.

Table 3 Test of normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test	.210	17	.044	.846	17	.009
Post-test	.230	17	.017	.826	17	.005

According to this test result in Table 3, neither the pre-test nor the post-test data follow a normal distribution because both post-test and pre-test p-values are less than the common significance level of 0.05. Furthermore, the researchers decided to use the Wilcoxon test as a non-parametric test which can be used when the data is not normally distributed.

The Wilcoxon Test Result

The normality test shows that neither the pre-test nor the post-test data follows a normal distribution. Regarding that normality test result, the researcher decided to conduct a Wilcoxon signed-rank test. This is a non-parametric statistical test which useful to assess whether the population mean ranks differ by comparing two related samples or repeated measurements on a single sample.

Table 4 Wilcoxon test result

Ranks				
		N	Mean Rank	Sum of Ranks
Post-test – pre-test	Negative Ranks	1a	5.00	5.00
	Positive Ranks	11b	6.64	73.00
	Ties	5c		
	Total	17		

Here is an interpretation from Table 4:

1. **Negative Ranks:** There was one condition where the post-test score was lower than the pre-test score, with a mean rank of 5.00. This happens to Participant 1 where his score in pre-test is 60 and decreases to 45 in his post-test. This indicates that for this particular circumstance, the treatment utilizing Kahoot! to improve students' vocabulary mastery may not have had the expected effect, or perhaps the participant's performance dropped for other external reasons.
2. **Positive Ranks:** Contrarily, the researcher observed that in eleven cases, participants' post-test scores improved compared to their pre-test scores, with a mean rank of 6.64. This indicates a positive shift, which could lead to the effectiveness of the treatment Utilizing Kahoot! that implemented between the two tests.
3. **Ties:** In this state, there were five examples where the pre-test and post-test scores remained unchanged, indicating no effect from the treatment utilizing Kahoot! or there are any external factors that made the participants' performance remain consistent even after the treatment.

The total of 17 cases that were analyzed using the Wilcoxon non-parametric test revealed results in which there was a statistically significant improvement from the pre-test to the post-test scores, as indicated by the predominance of positive ranks. This finding supports the hypothesis that there are statistically significant differences between the pre-test and the post-test results after the treatment

The Paired Sample T-test Result

The paired samples t-test results in Table 5 suggest a significant improvement in performance following the intervention. The negative mean difference (-16.176) indicates higher post-test scores over pre-test scores. This improvement is significant considering the standard deviation (21.689), which reveals variability in score changes among students. The standard error mean (5.260) further measures the accuracy of the mean difference estimation, supporting the reliability of the observed change.

The confidence interval (-27.328 to -5.025) portrays a range in which the true mean difference decreases, with 95% confidence. This interval does not cross zero, which further supports the conclusion that the difference is statistically significant. The t-value (-3.075) and degrees of freedom (16) help the researcher to understand the test statistic's distribution under the null hypothesis. The degrees of freedom correspond to the number of paired observations minus one, indicating the sample size used in the analysis.

The p-value (.007) being less than the alpha level (0.05) confirms that the observed difference is unlikely due to chance, thus providing strong evidence for the effectiveness of the intervention. This significant improvement from pre-test to post-test scores emphasizes the positive effect of Kahoot! and the instructional approach utilized. These findings gained the indication that the students experienced benefits from the treatment utilizing Kahoot! to improve their vocabulary mastery, as shown by their improved performance in the post-test compared to the pre-test.

Table 5 Paired sample t-test result

Paired samples Test									
Paired differences									
					95% Confidence Interval of the Difference				
		Mean	**Std. Deviation**	**Std. Error Mean**	**Lower**	**upper**	**t**	**df**	**Sig. (2-tailed)**
Pair 1	Pre-test – Post-test	-16.176	21.689	5.260	-27.328	-5.025	-3.075	16	.007

DISCUSSION

This study investigated the impact of using Kahoot! as a game-based learning platform on the vocabulary acquisition of English as a Foreign Language (EFL) students. The findings reinforce the theoretical perspective of Schmitt and McCarthy (1997), who emphasized the importance of employing innovative strategies to enhance vocabulary learning. The results of this study suggest that Kahoot! can serve as an effective tool for facilitating vocabulary development, although its implementation is not without certain challenges and limitations.

Quantitative analysis revealed a marked improvement in students' vocabulary performance following the intervention. Specifically, the average score increased from 65.59 on the pre-test to 81.76 on the post-test, indicating a significant enhancement in students' ability to learn and retain new vocabulary. This finding suggests that the interactive and engaging nature of Kahoot! supports vocabulary acquisition by fostering active participation and sustained attention. These results are consistent with previous research by Ahmed et al. (2022) and Dimyati and Purwananti (2022), who also reported that game-based learning media positively affect vocabulary learning outcomes and long-term retention.

Furthermore, the present study corroborates Putri's (2019) findings, which demonstrated that the incorporation of Kahoot! into EFL instruction not only reduced classroom disruptions but also enhanced the overall quality of the teaching and learning process. Putri observed that Kahoot!'s interactive format encouraged students to participate more actively in classroom activities, thereby creating a more dynamic and effective learning environment. Similarly, observations from the current study indicated a high level of

enthusiasm among students during Kahoot! sessions, suggesting that the gamified approach significantly increased student engagement.

The study by Kusumayanthi and Rusmiyati (2021) further supports this research result, as their findings also revealed that Kahoot! contributed to greater student involvement in vocabulary learning tasks. The present study's classroom observations align with theirs, indicating that the competitive and collaborative features of Kahoot! enhanced students' motivation and made the learning experience more enjoyable.

The multifaceted benefits of using Kahoot! in the EFL classroom are further found in the qualitative data collected during the treatment phase. Students were not only more attentive and responsive, but they also exhibited a noticeable increase in motivation and enthusiasm toward learning English vocabulary. This is in line with the conclusions of Reynolds and Taylor (2020) and Kusumaningrum et al. (2022), who emphasized that game-based learning tools can transform the classroom environment by fostering enjoyment and encouraging active student participation.

In short, while this study affirms the effectiveness of Kahoot! as a game-based learning medium for vocabulary development in EFL contexts, it also brings attention to certain considerations for its implementation. These include the need for well-structured instructional design, teacher readiness, and technological accessibility. Nonetheless, the positive impact on student engagement and vocabulary acquisition underscores Kahoot!'s potential as a valuable supplement to traditional language teaching methods.

CONCLUSION

The potential of using Kahoot! as an effective game-based learning media for enhancing vocabulary mastery among EFL learners becomes the highlight of the findings in this study. The study confirmed the hypothesis that the use of Kahoot! can positively impact students' vocabulary acquisition, aligning with Schmitt and McCarthy's (1997) strategies for effective vocabulary learning. Specifically, the use of engaging, interactive platforms like Kahoot! facilitates guessing from context and helpful techniques, which are essential for long-term vocabulary retention.

The analysis of the data showed that there were significant improvements in students' vocabulary test scores following the intervention. The paired samples t-test and Wilcoxon signed-rank test results indicated a statistically significant increase in post-test scores compared to pre-test scores, demonstrating the efficacy of Kahoot! in supporting vocabulary learning. Despite some students not meeting the Standard of Minimum Completeness (KKM), the overall trend suggested substantial improvement, with a notable increase in the number of students achieving higher scores post-intervention.

Despite the positive results, the study faced several challenges. The main limitation was the small sample size, which affected the normality of the data distribution. The data did not follow a normal distribution after being tested using the Shapiro-Wilk and Kolmogorov-Smirnov tests and required a non-parametric test using the Wilcoxon signed-rank test in order to gain whether there were any significant improvements after the treatment. Despite these issues, both tests showed significant improvement in vocabulary scores after using Kahoot!. Another challenge was the varying levels of prior knowledge among students, resulting in a wide range of pre-test scores. Some students found the pre-test too easy, while others struggled. This suggests the need for more differentiated instruction to cater to the diverse proficiency levels within the classroom. Future research should consider a larger sample size and a longer intervention period to better assess the long-term effects of using Kahoot! on vocabulary acquisition. Additionally, further studies could explore the use of different vocabulary assessments to ensure a comprehensive evaluation of students' learning outcomes. Also, consideration for conducting more studies with larger sample sizes is needed to confirm the findings. Future research should also explore the long-term effects of using game-based learning media on vocabulary retention and the potential benefits of combining multiple instructional strategies.

The study underscores the importance of incorporating technology in language learning, particularly in the post-pandemic educational landscape where digital literacy is crucial. The positive student response to Kahoot! suggests that integrating technology in classroom activities not only aids learning but also enhances student engagement and motivation.

Educators are encouraged to explore and implement innovative teaching media like Kahoot! to diversify and enrich the learning experience. As a practical recommendation, teachers should carefully select and tailor Kahoot! content to align with curriculum goals and students' proficiency levels. Additionally, continuous evaluation and adaptation of instructional strategies are essential to maximize the benefits of such technologies in the classroom. Further research is warranted to explore the broader applications of game-based learning media in different educational contexts and across various language skill areas.

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