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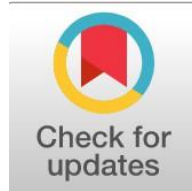
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Kahoot Gamification Facilitates Narrative Text Comprehension In Secondary Foreign Language Education

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Abstract

General Background: Reading proficiency constitutes a complex cognitive process and a critical challenge for students learning English worldwide. **Specific Background:** Mastering story structures proves particularly demanding due to the required ability to decode unfamiliar vocabulary, deduce implicit meanings, and recognize sequential plot events. **Knowledge Gap:** Although interactive quiz platforms demonstrate broad pedagogical utility, empirical evaluations specifically investigating their application on tenth-grade literary mastery within Indonesian contexts remain remarkably scarce. **Aims:** This pre-experimental research investigates the application of digital game-based instruction on the reading proficiency of tenth-grade learners at a public senior high school in Sidoarjo. **Results:** Utilizing a one-group pretest-posttest design with 36 participants, statistical analysis via the Wilcoxon Signed Rank Test revealed a significant mean score progression from 55.69 to 78.11, accompanied by a large practical effect size of 0.805. **Novelty:** The intervention distinctly operationalizes competitive game mechanics as a direct reading instruction technique, transforming passive story decoding into a highly interactive, feedback-driven cognitive exercise. **Implications:** Integrating this digital pedagogical framework provides educators with a practical strategy to mitigate reading anxiety and actively engage students during complex literary analyses.

Highlights:

- Digital quiz platforms significantly increase mean assessment scores regarding narrative text comprehension among high school learners.
- Game-based instructional interventions successfully facilitate active learner engagement and immediate corrective feedback during reading activities.
- Non-parametric statistical analysis confirms a large practical effect size associated with interactive vocabulary and inference exercises.

Keywords: Game Based Learning, Reading Proficiency, Literary Analysis, Digital Pedagogy, Wilcoxon Signed Rank Test

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I. Introduction

Reading is a vital ability that EFL learners must master since it offers access to knowledge, helps academic performance, and builds language competence. In book entitled "Reading in a second language: Moving from theory to practice" notes that reading is the primary source of language exposure in EFL environments, making it vital for vocabulary increase, grammatical development, and critical thinking[1]. For Indonesian students, however, reading remains one of the hardest skills to acquire. According to recent studies, many Indonesian EFL learners have trouble with reading comprehension because of their restricted vocabulary, lack of background knowledge, and inability to draw conclusions from English texts [2], [3], [4]. This implies that teaching reading effectively remains an essential challenge in Indonesian EFL classrooms.

Reading comprehension is a complicated cognitive process requiring decoding, vocabulary knowledge, syntactic processing, inferential reasoning, and background information [5], [6]. In these areas, Indonesian students frequently encounter difficulties. The results from PISA (2018) demonstrate that Indonesian students' reading literacy remains below the average as reported by the Organization for Economic Co-operation and Development, indicating widespread difficulty in understanding written texts [7]. Reading performance is hampered by a number of affective and linguistic issues in addition to cognitive limitations. The ability of EFL learners to comprehend texts, especially those requiring deeper interpretation and inferencing, is severely hampered by foreign language reading anxiety, according to recent research, since learners with higher anxiety levels typically perform worse on comprehension tests [8], [9]. Reading performance is hampered by a number of affective and linguistic issues in addition to cognitive limitations. Recent studies confirm that EFL learners' overall reading performance is lowered by poor motivation and significant reading anxiety [10].

Additionally, limited language skills and unfamiliar textual matter severely hinder students' English reading comprehension, according to recent large-scale and empirical studies. According to the Organization for Economic Co-operation and Development, students with lower language proficiency find it more difficult to process texts that contain unfamiliar vocabulary, topics, and contextual information. This directly lowers comprehension performance in EFL contexts [11]. Initial observations in the 10th grade English class at one of public senior high schools in Sidoarjo, East Java, Indonesia revealed that several students seemed to struggle to recognize narrative structures, identify primary themes, and deduce suggested meanings in the given narrative texts. During informal pre-observation interviews, English teachers also revealed that many students still significantly rely on translated words and frequently misunderstand important story points. These results show that students at one of the public senior high schools in Sidoarjo still struggle with reading comprehension while reading linguistically and cognitively demanding text genres, including narrative texts.

According to the Indonesian English curriculum, one of the fundamental genres taught in Grade 10 is narrative text Kemdikbud (2016). Narrative texts are intended to amuse readers while creating significant experiences through a series of events including characters, conflicts, and resolutions. Narrative texts have a traditional structure that includes orientation, intricacy, and resolution, according to genre-based theory [12]. Narrative texts need learners to understand temporal sequencing, character motives, and causal links, making them cognitively demanding for EFL learners [13]. Additionally, stress that tales incorporate sophisticated linguistic elements like evaluative language, descriptive vocabulary, and past tense verbs [14], [15], [16]. For Indonesian pupils who could have a little vocabulary and poor inferential abilities, these components make narrative texts difficult.

Narrative texts require learners to identify story structure, recognize character development, deduce unspoken information, and interpret thematic meaning. According to studies, Indonesian students often struggle to recognize key concepts, comprehend implicit meaning, and analyses pivotal moments in narrative passages. Furthermore, current empirical research shows that Indonesian EFL learners' capacity to understand narrative texts and analyze descriptive language is severely hampered by their low vocabulary [17], [18]. For example, studies conducted in Indonesia have shown a strong positive correlation between vocabulary knowledge and overall reading comprehension performance [20], [21]. Ridwan found that vocabulary mastery has a significant influence on students' reading comprehension of narrative texts. These challenges emphasize how crucial it is to implement teaching techniques that improve students' comprehension of narrative literature [22].

Vocabulary knowledge plays a central role in reading comprehension because readers must understand the meaning of words in order to construct meaning from a text. Students with limited vocabulary often experience difficulties in identifying main ideas, understanding details, making inferences, and interpreting narrative events. Therefore, improving vocabulary knowledge can contribute directly to better reading comprehension achievement [20], [21], [22]. Previous studies also emphasize that reading comprehension achievement can be improved through the implementation of appropriate instructional strategies that actively engage learners in the reading process [23]. In the context of Kahoot based learning, vocabulary practice can be integrated into reading activities through contextualized quiz questions, immediate feedback, and repeated exposure to key lexical items. These features may help students strengthen their vocabulary knowledge while simultaneously improving their comprehension of narrative texts.

Gamification is a pedagogical process that incorporates game elements such as points, challenges, leaderboards, rewards, and immediate feedback into learning activities to enhance students' motivation, engagement, and participation [8], [24]. Through these elements, learners are encouraged to participate actively, monitor their progress, and interact more deeply with instructional content. The gamification process generally begins with identifying learning objectives, followed by integrating game mechanics into learning tasks, providing immediate feedback, and reinforcing achievement through reward or recognition. Previous studies have shown that gamification can create more engaging learning environments and positively influence students' learning experiences [8], [24], [25].

Game-based learning is an instruction approach that integrates educational content into structured game activities to enhance students' engagement, motivation, and learning achievement. Rather than merely adding game elements, game-based learning uses games as the primary instructional strategy to facilitate meaningful learning experiences. One widely uses game-based learning platforms is Kahoot!, which enables teachers to deliver interactive quizzes, real-time competition, immediate feedback, and collaborative classroom interaction. Previous studies have consistently demonstrated that Kahoot! based game learning improves learners' motivation, classroom participation, engagement and academic achievement across various educational contexts, including English language learning [25], [26], [27]. Therefore, Kahoot! based game learning provides an effective instructional strategy for supporting reading comprehension instruction in EFL classrooms.

The Kahoot! based game learning procedure generally consists of several instructional stages. First, the teacher identifies the learning objectives and prepares Kahoot! quizzes that align with the reading materials. Second, students receive an introduction to the narrative text and are guided to activate their prior knowledge. Third, students participate in Kahoot! quizzes individually or collaboratively while answering reading comprehension questions related to the text. During the activity, Kahoot! provides immediate feedback that helps students recognize errors and reinforces their understanding. Finally, the teacher discusses the correct answers, clarifies misconceptions, and concludes the lesson through reflection on students' learning outcomes [25], [28].

Numerous empirical studies have attested to Kahoot!' efficacy in teaching reading. According to Aprilia, Kahoot! enhanced secondary students' comprehension of narrative texts. Similarly, new research shows that using Kahoot! helps kids expand their vocabulary, which is important for understanding narrative literature [29]. Learners can more efficiently understand story events, characters, and meanings thanks to vocabulary gains facilitated by gamified quizzes. Additionally, Kahoot! offers interactive learning opportunities with instant feedback, which greatly improves student engagement and fosters the growth of reading comprehension in EFL situations [25], [30]. In this study, Kahoot! is viewed as a game-based instructional technique used to facilitate reading comprehension activities rather than merely a digital application. The study confirms that Kahoot! continuously enhances learning results and motivation across a variety of language skills, including reading. There hasn't been much study on Kahoot!' efficacy for narrative text comprehension at the senior high school level, though, as the majority of previous studies have been done at junior high school or general reading levels.

Previous studies have reported positive outcomes from the use of game-based techniques in reading instruction. Aprilia found that Kahoot! improved students' comprehension of narrative texts by increasing participation and engagement during reading activities [29]. Similarly, Rochmawati reported that game-based learning activities helped students identify main ideas, understand contextual vocabulary, and interpret information from narrative passages more effectively [30]. These findings suggest that games can function as instructional techniques that support reading comprehension development by providing interactive learning experiences and immediate feedback [31].

While studies indicate that Kahoot! has beneficial benefits on motivation and comprehension, however empirical studies specifically examining the effectiveness of Kahoot! on tenth graders' comprehension of narrative texts remain limited, particularly within Indonesian senior high school contexts. Few studies focus on narrative-text comprehension at the Senior High School level, while the majority are carried out at universities or junior high schools. This disparity emphasizes the necessity of determining if Kahoot! can successfully improve tenth graders one of public senior high schools in Sidoarjo, East Java, Indonesia comprehension of narrative texts. To guide this aim, the study addresses the following research questions:

1. Is there any significant difference between students' pre-test and post-test reading comprehension scores before and after being taught using Kahoot!?

This study also seeks to contribute theoretical insights into technology-enhanced language learning and provide practical recommendations for teachers wishing to integrate Kahoot! based game learning into reading instruction.

II. Method

A. Research Design

This study employed a quantitative approach using a pre-experimental one-group pretest-post-test design. A quantitative approach was selected because the study aimed to empirically examine the effect of Kahoot! based instruction on students' reading comprehension achievement through objective measurement and statistical analysis. Quantitative research is grounded in the positivist paradigm, which assumes that educational phenomena can be measured through observable and quantifiable indicators [32]. The study was conducted in only one class, namely class X-E12 at one of public senior high schools in Sidoarjo, East Java, Indonesia without a control group. The selection of only one class was based on the problem identified during preliminary observation. The English teacher reported that students in class X-E12 experienced difficulties in comprehending narrative texts, particularly in identifying main ideas, understanding contextual vocabulary, recognizing narrative structures, and making inferences. Because the study aimed to examine the preliminary effectiveness of Kahoot! in addressing these specific reading difficulties, class X-E12 was selected as the research participant group.

In this design, students were given a pre-test to determine their initial reading comprehension ability before the treatment. Then, the students engaged in Kahoot! based reading instruction as the treatment intervention. After the treatment, a post-test was administered to measure students' reading comprehension after the intervention and to find out whether significant improvement occurred. The independent variable of this study was the use of Kahoot! in teaching reading comprehension,

while the dependent variable was students' reading comprehension ability, which included identifying main ideas, understanding supporting details, analysing narrative text structure, making inferences, and interpreting vocabulary in context. The one-group pretest–post-test design was considered appropriate because it allows researchers to evaluate changes in participants' performance before and after the intervention within the same group [32]. In addition, the use of Kahoot! as a game-based learning platform has been widely reported to enhance students' engagement, motivation, and learning outcomes in language learning contexts [25]. The design can be described as follows:

Table 1. Research Design of One-Group Pretest–Posttest			
Class	Pre-Test	Intervention	Post-Test
X-E12	O ₁	X	O ₂

Description:

- X-E12: The class that receives the intervention using Kahoot! for teaching reading comprehension.
- O₁ (Pre-test): An initial assessment administered before treatment to measure students' baseline reading comprehension.
- X (Intervention): Reading comprehension instruction using Kahoot! -based activities.
- O₂ (Post-test): A final assessment administered after treatment to measure students' reading comprehension improvement.

This design was selected because the study aimed to identify changes in students' reading comprehension ability after the intervention was implemented in a real classroom context. Although this design has limitations in controlling external variables compared to a true experimental design, it remains appropriate for evaluating the preliminary effectiveness of a learning medium in a school setting. Conceptually, this study can be classified as explanatory because it seeks to explain the effect of Kahoot! on students' reading comprehension achievement. It also reflects a simple experimental approach since the study involves the manipulation of the independent variable through the implementation of Kahoot! -based learning activities to observe changes in the dependent variable.

B. Population and Sample

This study was conducted at SMAN 3 Sidoarjo involving tenth-grade students in the 2025/2026 academic year. The selection of the research site was based on preliminary classroom observations indicating that many students still experienced difficulties in comprehending English narrative texts, similar reading comprehension difficulties have also been reported by Yusnitasari and Novita in their study on reading achievement among Indonesian EFL learners [33]. Particularly in identifying main ideas, making inferences, and interpreting contextual vocabulary [34]. The research was carried out through two treatment meetings following the administration of the pre-test.

The research population was all students of class X of one of public senior high schools in Sidoarjo, East Java, Indonesia in the academic year of 2025/2026. The population was relevant in terms of methodology because students in the tenth-grade study narrative texts as part of the senior high school curriculum in English, so they are appropriate participants to investigate reading comprehension of narrative texts.

The sample of this study was one class, that is class X-E12 with 36 students. The sample was selected using purposive sampling. Purposive sampling was employed because the researcher considered several specific characteristics relevant to the objectives of the study: (1) the class had already received basic instruction on narrative texts, (2) the English teacher recommended the class due to its heterogeneous reading proficiency, and (3) the class had adequate digital facilities to support the implementation of Kahoot! -based learning activities. According to [32], purposive sampling is appropriate when researchers intentionally select participants who possess characteristics relevant to the research objectives. Furthermore, the sample size of 36 students met the minimum requirement for basic parametric and non-parametric statistical analysis in educational research. A sample size above 30 is also generally considered sufficient for approximating normal distribution based on the Central Limit Theorem [32]. In addition to meeting statistical size of 36 students represented the total number of students enrolled in class X-E12. Since the study employed a one-group pre-test and post-test design, all students in the selected class were involved to obtain a comprehensive picture of the intervention's effectiveness and to minimize sampling bias within the classroom context.

C. Research Instrument

The research instrument used in this study was a reading comprehension test administered in the form of a pre-test and a post-test. Each test consisted of ten multiple-choice questions and five true-or-false items designed to measure students' comprehension of narrative texts. The instrument assessed several aspects of reading comprehension, including identifying main ideas, understanding supporting details, recognizing text structure, making inferences, and interpreting contextual vocabulary. Although the pre-test and post-test employed the same assessment indicators, different reading texts were used in each test to minimize testing and memorization effects, thereby ensuring that any improvement in students' scores reflected actual development in reading comprehension rather than recall of previous answers.

D. Data Collection Procedure

1. Pre-test

Before the treatment was administered, the students were given a pre-test to identify their initial reading comprehension ability. The pre-test was designed to assess several aspects of reading comprehension, including understanding the content of the text, interpreting contextual vocabulary, making inferences, and recognizing the structure of narrative texts. The results of the pre-test served as baseline data to determine students' reading comprehension ability prior to the implementation of Kahoot! -based learning activities.

2. Treatment

The treatment was conducted in two meetings using Kahoot! as a game-based instructional technique for teaching reading comprehension.

a) Treatment 1 (18 April 2026)

- 1) The teacher introduced the narrative text and activated students' prior knowledge.
- 2) Students read the narrative text individually.
- 3) The teacher guided a discussion on the text structure, including orientation, complication and resolution.
- 4) Students participated in a Kahoot! quiz on the narrative text.
- 5) Interactive reading activities were conducted to reinforce students' understanding of the content and structure of the text.
- 6) Feedback and clarification were provided after each activity.

b) Treatment 2 (20 April 2026)

- 1) Students reviewed the previously learned narrative text concepts.
- 2) A second Kahoot! session was conducted.
- 3) The activities focused on inference making and vocabulary in context.
- 4) Students discussed their answers with peers.
- 5) Immediate feedback was provided after each question.
- 6) The teacher concluded the lesson by reviewing key reading comprehension strategies.

Throughout both treatment sessions, Kahoot! was integrated directly into reading instruction and served as the primary instructional technique used to facilitate reading comprehension activities, including vocabulary practice, inference making tasks and comprehension exercises based on narrative texts.

3. Post-test

After the treatment was completed, the students were administered a post-test to measure their reading comprehension ability after the intervention. The post-test evaluated the same reading comprehension aspects assessed in the pre-test, including comprehension of text content, vocabulary understanding, inference making, and recognition of narrative text structure. The post-test scores were then compared with the pre-test scores to determine whether there was an improvement in students' reading comprehension achievement following the implementation of Kahoot! -based learning activities.

Assessment Rubric

The assessment rubric was designed to measure students' reading comprehension comprehensively through several cognitive and linguistic aspects. The assessment focused on five main components: comprehension, vocabulary mastery, text structure awareness, inference-making ability, and speed and accuracy in responding to questions. Comprehension received the greatest emphasis because it represents the primary objective of reading activities. The same assessment criteria were consistently applied in both the pre-test and post-test to ensure fairness and consistency in measuring students' progress. Five core aspects are assessed:

Table 2: Five core aspect

No.	Aspect	Description of Assessment Focus
1.	Comprehension	Ability to identify main ideas and supporting details.
2.	Vocabulary Mastery	Understanding of contextual vocabulary, synonyms, and antonyms.
3.	Text Structure Awareness	Recognition of narrative organization (orientation, complication, resolution).
4.	Inference Making	Ability to interpret implicit meanings and draw conclusions.
5.	Speed and Accuracy	Efficiency and correctness of responses, measured through Kahoot!'s automated analytics.

These aspects align with well-established theoretical perspectives on reading comprehension, including text processing [6], vocabulary depth [35], structural awareness [36], and inference generation [37] and extensive reading practices that support comprehension development. Together, these frameworks ensure that both cognitive and linguistic components of narrative text comprehension are thoroughly assessed in this study.

The instrument used an interval scale through numerical test scores obtained from students' reading comprehension assessments. Each correct answer in the multiple-choice section was awarded 7 points, each correct true/false answer received 6 points, and incorrect answers received 0 points. The total score was calculated using the following formula:

$$\text{Final Score} = (\text{MC} \times 7) + (\text{TF} \times 6)$$

Where:

- MC = number of correct multiple-choice answers
- TF = number of correct true/false answers

The maximum possible score is 100.

To maintain consistency in interpretation, student performance was categorized into the following levels:

Table 3: Categorized score	
Range	Category
86 – 100	Excellent
75 – 85	Good
60 – 74	Adequate
50 – 59	Poor
< 50	Very Poor

In addition, the study calculated effect size to determine the practical magnitude of the treatment effect. Cohen's d was used for parametric analysis, while the effect size r formula was applied for non-parametric analysis. The use of effect size analysis is recommended in quantitative educational research because it provides information not only about statistical significance but also about the practical impact of an educational intervention [32].

E. Data Analysis

All statistical analyses in this study were conducted using IBM SPSS Statistical Version 25. The results from the pre-test and post-test were analyzed using descriptive and inferential statistics. Descriptive statistics were used to describe students' reading comprehension scores using metrics such as mean, standard deviation, minimum and maximum score. These descriptive measures provide an overview of students' performance before and after using Kahoot! -based learning activities. A normality test was performed prior to hypothesis testing to ensure that the data met the assumptions for parametric statistical analysis. Normality was examined using the Kolmogorov-Smirnov and Shapiro-Wilk tests. To determine if there was a statistically significant difference between students' pre-test and post-test results, assuming the data were normally distributed, a paired-sample t-test was used. However, if the data did not meet the normality assumption, the Wilcoxon Signed Rank Test was used as a non-parametric alternative.

The selection of statistical procedures is directed by the methodological framework presented who emphasize the importance of choosing inferential statistical procedures based on the distributional characteristics of the data [32]. The level significance used in this study was 0.05. If the p-value was less than 0.05 the null hypothesis was rejected meaning a significant difference existed in the students' reading comprehension scores before and after therapy. In addition, effect size analysis was performed to determine the practical magnitude of the treatment effect. Cohen's d was utilized for parametric analysis, whereas effect size r ($r = z/\sqrt{N}$) was computed for non-parametric analysis, following the recommendations of Pallant and field [38], [39]. This technique was designed to provide a more complete understanding of the effectiveness of Kahoot! -based training than statistical significance alone. Students' scores were computed using the assessment rubric's scoring methodology, which was based on the number of right responses in both multiple-choice and true/false exam questions.

III. Result and Discussion

The data are presented systematically, using descriptive statistics, normality testing, hypothesis testing, and effect size analysis. The study included 36 students from Class X-E12 who took part in every stage of the research, including the pre-test, therapy sessions, and post-test.

3.1 Descriptive Statistics

Descriptive statistics were utilized to compare students' reading comprehension performance before and after the adoption of Kahoot! -based learning activities.

Table 4. Descriptive Statistics of Pre-Test and Post-Test Scores

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test	36	25	100	55.69	18.300
Post-Test	36	33	100	78.11	15.932
Valid N (listwise)	36				

Table 4 demonstrates that the mean post-test score ($M = 78.11$) was greater than the mean pre-test score ($M = 55.69$). This represents a 22.42-point improvement following the deployment of Kahoot! -based learning activities. Furthermore, the reduction in standard deviation from 18.300 in the pre-test to 15.932 in the post-test indicates that students' results became more consistent following treatment.

3.2 Normality Test

The pre-test data were normally distributed, as shown in Table 2. However, the post-test data did not fully satisfy the assumption of normality based on the Kolmogorov-Smirnov test result ($p = 0.027 < 0.05$). As a result, the Wilcoxon Signed Rank Test was chosen as a non-parametric alternative for hypothesis testing.

Table 5. Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-Test	.101	36	.200 ⁺	.960	36	.220
Post-Test	.156	36	.027	.036	36	.083

⁺. This is a lower bound of the true significance.

^a. Lilliefors Significance Correction

Table 5 shows that the pre-test data had a normal distribution. The post-test data did not fully meet the assumption of normality based on the Kolmogorov-Smirnov test result ($p = 0.027 < 0.05$). As a result, the data were deemed not completely normal, and the Wilcoxon Signed Rank Test was used as a non-parametric alternative for hypothesis testing.

3.3 Hypothesis Testing

The study's hypotheses were as follows:

H₀: There is no significant difference in students' reading comprehension scores before and after Kahoot! -based learning activities.

H₁: Using Kahoot! -based learning activities significantly improve students' reading comprehension scores.

The Wilcoxon Signed Rank Test was used to compare pre-test and post-test scores.

Table 6. Ranks of Pre-Test and Post-Test Scores

	N	Mean Rank	Sum of Ranks
Post-Test – Pre-Test	Negative Ranks	4 ^a	3.75
	Positive Ranks	30 ^b	19.33
	Ties	2 ^c	
	Total	36	580.00
a. Post-Test < Pre-Test			
b. Post-Test > Pre-Test			
c. Post-Test = Pre-Test			

Table 6 reveals that 30 students scored higher in the post-test than in the pre-test, while only 4 scored lower, and 2 scored the same in both examinations. This suggests that most students improved their reading comprehension after getting Kahoot! -based teaching.

Table 7. Wilcoxon Signed Rank Test Result

	Post-Test – Pre-Test
Z	-4.832 ^b
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks	

As indicated in Table 7, the Wilcoxon Signed Rank Test resulted in a significance value of 0.000, which was less than the 0.05 level. As a result, the null hypothesis was rejected, showing a statistically significant change in students' reading comprehension scores before and after implementing Kahoot! -based learning activities.

3.4 Effect Size Analysis

Effect size analysis was conducted to determine the practical magnitude of the treatment effect. The effect size was calculated using the following formula:

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$$r = Z / \sqrt{N}$$

Based on the obtained statistical values:

$$r = 4.832 / \sqrt{36} = 0.805$$

Table 8. Effect Size Interpretation	
Effect Size (r)	Interpretation
0.805	Large Effect

The effect size study showed a r value of 0.805, suggesting a large effect, implying that the deployment of Kahoot! -based learning activities had a significant practical influence on students' reading comprehension proficiency. This finding demonstrates that using Kahoot! -based learning activities have a significant practical impact on students' reading comprehension proficiency.

Although the effect size value ($r = 0.805$) indicates a large practical effect, this finding should be interpreted with caution. The study employs a pre-experimental one-group pre-test and post-test design without a control group, making it difficult to attribute the improvement solely to the intervention. Other factors such as testing effects, students' familiarity with the assessment format, maturation and additional classroom learning experiences may also have contributed to the observed improvement. Therefore, while the effect size suggests a strong association between Kahoot! based instruction and reading comprehension improvement, it should not be interpreted as conclusive evidence of causality.

The results show that using Kahoot! -based learning activities greatly enhanced students' reading comprehension abilities. This improvement is seen in the increase in mean scores, the prevalence of positive ranks, the statistically significant result of the Wilcoxon Signed Rank Test, and the huge impact size obtained from the effect size analysis. These findings suggest that Kahoot! based education was helpful in improving students' reading comprehension skills [25], [30].

The results of this study show that implementing Kahoot! based training dramatically enhanced tenth-grade students' reading comprehension proficiency, particularly in understanding narrative texts. This improvement was demonstrated by an increase in the mean score from 55.69 in the pre-test to 78.11 in the post-test, as well as a statistically significant result from the Wilcoxon Signed Rank Test. The result revealed that Kahoot! based learning was effective in solving some reading problems faced by Indonesian EFL learners such as problem in recognizing main ideas, reading contextual vocabulary, recognizing narrative structures, and making inferences from texts.

These results also support the theoretical position that reading comprehension is an active cognitive process in which learners decode textual information, interpret meaning and integrate ideas in a text [5], [6]. In the context of narrative texts, this process entails recognizing orientation, intricacy, and resolution, establishing causal links, and deriving implicit meaning from tale events [12], [13]. The usage of Kahoot! appears to promote these processes by encouraging students to engage more deeply with textual content while obtaining rapid corrective feedback [25]. This result also supports the findings of Novita and Setiawan, who reported that interactive and collaborative learning activities can enhance students' engagement with reading materials [40].

Furthermore, the findings address the research gap indicated in the introduction, namely the lack of empirical evidence on the efficiency of Kahoot! for teaching narrative text comprehension at the senior high school level in Indonesian EFL settings [25], [29]. The considerable effect size ($r = 0.805$) implies that the influence of Kahoot! -based education was both statistically significant and practically useful. This shows that Kahoot! could be an effective teaching tool for enhancing tenth-grade students' reading comprehension, especially in situations where students struggle with vocabulary knowledge, inferential reasoning, and text structure recognition [2], [22].

Nonetheless, the results should be interpreted with caution due to the limitations of the pre-experimental one-group pretest-posttest methodology. Because no control group was included, the improvement observed cannot be attributed solely to the intervention. External factors such as frequent testing exposure, maturation, and other classroom learning experiences could possibly have influenced kids' growth. As a result, while the findings strongly show a beneficial link between Kahoot! based training and improved reading comprehension, more rigorous experimental designs are needed to draw broader conclusions. In addition, the study involved only one class consisting of 36 students and was conducted over a relatively short intervention period. Consequently, the findings may not be generalizable to broader educational contexts. The study also focused exclusively on narrative texts, which limits the applicability of the findings to other reading genres.

Due to these limitations, future research is encouraged to employ quasi-experimental or true experimental design to provide stronger evidence regarding the effectiveness of Kahoot! based instruction. Future studies should also involve larger and more diverse samples to improve the generalizability of the findings. In addition, researchers may investigate the long-term impact of Kahoot! based learning and explore its effectiveness across different text genres and other language skills, such as writing, listening, and vocabulary development.

IV. Conclusion

This study concludes that the implementation of Kahoot! based instruction positively contributed to tenth-grade students' reading comprehension of narrative texts at one of public senior high schools in Sidoarjo, East Java, Indonesia. Through interactive reading activities, immediate feedback, and active student participation, Kahoot! supported students in understanding narrative text structures, identifying important information, interpreting contextual vocabulary, and making

inferences from texts.

The findings support the view that reading comprehension can be enhanced through technology-assisted instructional techniques that encourage active learner engagement. In this study, Kahoot! functioned not only as a digital platform but also as a game based instructional technique that facilitated students' interaction with reading materials and comprehension tasks.

This study also contributes to the growing body of research on technology enhanced language learning, particularly in the context of reading instruction for Indonesian EFL learners. The findings indicate that Kahoot! can be utilized as an effective instructional technique to create more interactive, engaging, and students centered reading lessons. Therefore, integrating Kahoot! into reading instruction may provide meaningful support for improving students' reading comprehension and classroom participation.

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