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ENHANCING YOUNG LEARNERS' VOCABULARY MASTERY THROUGH STUDYCAT :A QUASI-EXPERIMENTAL STUDY AT SDN KESATRIAN

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Abstract

Vocabulary mastery plays a crucial role in English as a Foreign Language (EFL) learning, particularly for young learners who are developing their foundational language skills. However, many elementary school students still face difficulties in acquiring and retaining English vocabulary due to limited exposure and less engaging instructional strategies. This study aims to examine the effectiveness of the Studycat application in improving vocabulary mastery among third grade students. The research employed a quantitative approach using a quasi-experimental design with a nonequivalent control group design. The population of the study consisted of third grade students at SDN Kesatrian, and the sample was selected using purposive sampling based on class availability and school recommendation. A total of 70 students participated in the study, consisting of 36 students in the experimental group and 34 students in the control group. Data were collected through a vocabulary test administered as a pre-test and post-test to measure students' vocabulary improvement. The collected data were analyzed using descriptive statistics and inferential statistics, including an independent samples t-test. The findings revealed that the experimental group showed a greater improvement in vocabulary mastery compared with the control group. The experimental group's mean score increased from 62.78 in the pre-test to 81.53 in the post-test, while the control group's mean score increased from 63.09 to 75.29. The statistical analysis indicated a significant difference between the two groups with a significance value of 0.006, which is lower than the significance level of 0.05. These results suggest that the Studycat application significantly enhances students' vocabulary mastery. The findings highlight the importance of integrating digital game-based learning into vocabulary instruction for young learners in EFL classrooms.

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INTRODUCTION

Vocabulary is widely recognized as one of the most essential components in second and foreign language learning because it enables learners to understand and express meaning effectively. Without adequate vocabulary knowledge, learners may experience difficulties in comprehending spoken and written texts and in producing meaningful communication. Scholars emphasize that vocabulary plays a fundamental role in supporting all language skills, including listening, speaking, reading, and writing (Richards & Renandya, 2022). Vocabulary knowledge allows learners to interpret linguistic input and construct meaningful messages, making it a crucial element in language proficiency development. It is the talent or knowledge

that needs to be continuously developed throughout one's lifetime. Recent empirical research in Indonesia confirms the centrality of vocabulary, showing a positive correlation between Indonesian EFL learners' vocabulary knowledge and their English competencies (Hartini & Suri Ardini, 2024). In the context of English as a Foreign Language (EFL), vocabulary mastery becomes even more important because learners are often exposed to limited English input outside the classroom environment.

For young learners, vocabulary learning is particularly important because early language development provides the foundation for future language proficiency. Children who develop strong vocabulary knowledge at an early stage tend to demonstrate better reading comprehension, language fluency, and academic performance. According to recent studies, vocabulary acquisition among young learners is closely related to their exposure to meaningful and engaging learning experiences (Syafrizal et al., 2021) However, teaching vocabulary to young learners comes with its challenges. Children at this age have varying levels of attention and retention, requiring teachers to employ creative and engaging methods to sustain interest and facilitate learning (Syahabuddin et al., 2024). Many elementary school students still struggle with vocabulary acquisition due to limited exposure to English and the use of traditional teaching methods that emphasize memorization rather than interactive learning.

In many classrooms, vocabulary instruction still relies heavily on teacher-centered approaches in which students are asked to memorize word lists or repeat vocabulary items without meaningful context. Such practices often lead to passive learning and low student engagement. Recent research suggests that young learners benefit more from interactive learning strategies that involve games, visual stimuli, and multimedia resources (Juliani & Handayani, 2023; Mulyanti et al., 2024). Game-based learning, in particular, has gained increasing attention in language education because it combines educational content with elements of play, which can enhance motivation and participation among young learners.

The integration of digital learning applications has also become an important innovation in language teaching. The importance of educational media lies in its ability to help teachers save time when presenting topics while simultaneously increasing students' enthusiasm for learning. Learning media are designed to support teaching and learning activities and make classroom instruction more effective (Smaldino et al., 2019). Digital platforms provide interactive features such as visual images, audio pronunciation, and immediate feedback that support language acquisition. One example of such technology is the Studycat application, which is specifically designed to support English learning for children through interactive games and activities. The application incorporates visual representations, pronunciation models, and reward-based learning systems that encourage repeated exposure to vocabulary items.

Several previous studies have reported positive impacts of digital learning applications on vocabulary learning. Research conducted by Amran & Muryanti (2024) found that the Studycat application improved vocabulary mastery and increased students' motivation to learn English. Similar findings were reported in studies examining other digital language learning platforms such as Lingokids and Duolingo, which demonstrated significant improvements in students' vocabulary acquisition and engagement (Dermawan, 2025; Julianti et al., 2024). Furthermore, recent research in educational technology suggests that digital game-based learning can provide a more meaningful and enjoyable learning experience for young learners because it integrates visual, auditory, and interactive elements simultaneously. This finding aligns with Wahyuni (2025), who also found that animated video-based media positively affected students' vocabulary acquisition.

Despite the growing number of studies investigating digital learning applications, research focusing specifically on the use of the Studycat application in Indonesian primary schools remains limited. Many previous studies have been conducted in different educational

contexts or have focused on other digital platforms. Moreover, there is still limited empirical evidence examining the effectiveness of Studycat in improving vocabulary mastery among third grade students, who are at a crucial stage of vocabulary development.

Based on these considerations, this study aims to investigate the effectiveness of the Studycat application in improving vocabulary mastery among third grade students at SDN Kesatrian. The study focuses on vocabulary related to foods and drinks, which is part of the third grade English curriculum. By comparing students who learn vocabulary through the Studycat application with those who receive conventional instruction, this study seeks to provide empirical evidence regarding the effectiveness of digital game-based learning in vocabulary instruction.

The research is guided by the following research question: whether the use of the Studycat application significantly improves students' vocabulary mastery compared with conventional teaching methods. Based on this research question, the study proposes the following hypothesis. The alternative hypothesis states that the use of the Studycat application significantly improves students' vocabulary mastery, while the null hypothesis states that there is no significant difference in vocabulary mastery between students who learn using the Studycat application and those who learn through conventional teaching methods.

RESEARCH METHOD

Research Design

This study employed a quantitative research approach because the objective of the study was to measure the effectiveness of a specific instructional intervention using numerical data and statistical analysis. Quantitative research is considered appropriate when researchers aim to test hypotheses and examine relationships between variables through statistical procedures (Creswell, 2009). In the context of this study, the quantitative approach enabled the researcher to compare vocabulary learning outcomes between students who used the Studycat application and those who received conventional instruction.

The research design used in this study was a quasi-experimental design with a nonequivalent control group design. This design was selected because it allows researchers to examine the effectiveness of an educational intervention in real classroom settings where random assignment of participants may not be feasible. In this design, two groups were involved: an experimental group that received the treatment using the Studycat application and a control group that received conventional vocabulary instruction. Both groups were administered a pre-test before the treatment and a post-test after the treatment to measure changes in vocabulary mastery.

Table 1. Research Design

Group	Pre-Test	Treatment	Post-Test
Experiment	Y_E	X (Studycat App)	Y_E
Control	Y_K	-	Y_K

Research Participants and Sampling Technique

The population of this study consisted of third-grade students at SDN Kesatrian. The sample was selected using purposive sampling, a sampling technique in which participants are selected based on specific criteria relevant to the research objectives (Fraenkel et al., 2012). The selection of the sample was based on class availability and the recommendation of the school administration to ensure that the selected classes represented typical third-grade students. A total of seventy students participated in the study. The experimental group consisted of thirty-six students, while the control group consisted of thirty-four students.

Both groups were taught the same vocabulary materials related to foods and drinks, and the duration of the learning sessions was kept consistent to ensure comparability between the groups. To ensure that both groups had relatively similar levels of vocabulary knowledge before the treatment, a pre-test was administered at the beginning of the study. The results of the pre-test were analyzed to examine whether the experimental and control groups were comparable at baseline. Establishing baseline equivalence is an important step in quasi-experimental research because it helps ensure that any observed differences in learning outcomes can be attributed to the treatment rather than to pre-existing differences between the groups.

Research Instruments

The main instrument used in this study was a vocabulary test designed to measure students' mastery of English vocabulary related to foods and drinks. The test consisted of multiple-choice and matching items that assessed students' ability to recognize and understand vocabulary items in context. The test items were developed based on the third grade English curriculum and were reviewed to ensure content relevance and clarity.

Table 2. Indicator Test Items

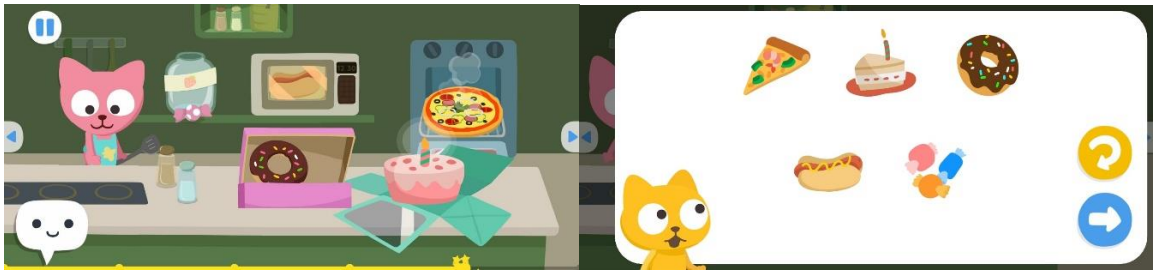
INDICATOR TEST ITEMS			
Indicator	**Pre-Test Items**	**Post-Test Items**	**Total Items**
Foods	1-15	1-15	15
Drinks	16-20	16-20	5
Total			**20**

Before the main study was conducted, the test instrument was piloted to evaluate its clarity and reliability. Several test items were revised based on the results of the pilot testing to ensure that the instrument accurately measured students' vocabulary knowledge. The same test format was used for both the pre-test and post-test to maintain consistency in data collection procedures.

Data Collection Procedure

Data collection was conducted in several stages. The first stage involved administering the pre-test to both the experimental and control groups to measure students' initial vocabulary mastery. After the pre-test, the experimental group received vocabulary instruction using the Studycat application, while the control group received instruction using conventional teaching methods such as teacher explanations and textbook exercises.

During the treatment sessions, the Studycat application was used as the main instructional media to introduce and practice vocabulary items. The application provided interactive learning activities that included visual images, audio pronunciation, and gamified exercises designed to reinforce vocabulary learning. The following figures present the interface of the game used in the learning process.



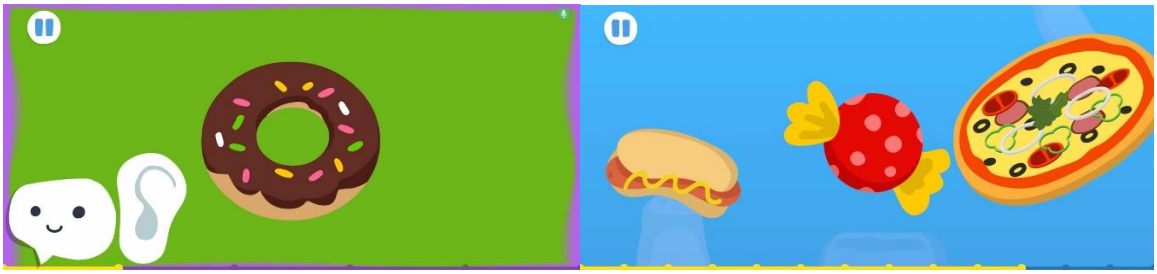


Figure 1. Vocabulary Learning Game Interface

Meanwhile, the control group received vocabulary instruction through conventional teaching methods such as teacher explanation, repetition, and textbook exercises. After the treatment sessions were completed, a post-test was administered to both groups to measure students' vocabulary mastery after the instructional intervention.

Data Analysis Technique

The data collected in this study were analyzed using both descriptive and inferential statistical techniques in order to examine the effectiveness of the Studycat application in improving students' vocabulary mastery. The analysis aimed to address the research question regarding whether the use of the Studycat application significantly improves students' vocabulary mastery compared with conventional teaching methods.

Descriptive statistics were first employed to summarize and describe the students' performance in both the experimental and control groups. The analysis included the calculation of mean scores, minimum and maximum scores, and standard deviations for the pre-test and post-test results. These descriptive statistics provided an overview of the students' vocabulary mastery before and after the instructional intervention. In addition, gain scores were calculated to identify the extent of improvement in vocabulary mastery experienced by students in each group.

Before conducting inferential statistical analysis, several assumption tests were carried out to ensure that the data met the requirements for parametric statistical testing. A normality test was conducted to determine whether the distribution of the data followed a normal distribution. The normality test is essential because parametric statistical tests require normally distributed data in order to produce reliable results. In addition, a homogeneity test was performed to examine whether the variance of the data from the experimental and control groups was statistically equal. Establishing homogeneity between the groups ensures that the comparison between the two groups is statistically valid.

After confirming that the data met the assumptions of normality and homogeneity, an independent samples t-test was conducted to examine whether there was a statistically significant difference in vocabulary mastery between students in the experimental group and those in the control group. The independent samples t-test was chosen because this statistical method is appropriate for comparing the mean scores of two independent groups. In this study, the experimental group consisted of students who received vocabulary instruction using the Studycat application, while the control group consisted of students who received vocabulary instruction through conventional teaching methods.

The statistical analysis was designed to directly address the research question and to test the research hypotheses proposed in this study. The comparison of post-test scores between the experimental and control groups allowed the researcher to determine whether the Studycat application had a significant effect on students' vocabulary mastery. The null hypothesis stated that there was no significant difference in vocabulary mastery between students who learned using the Studycat application and those who learned through conventional teaching methods.

Meanwhile, the alternative hypothesis stated that the use of the Studycat application significantly improved students' vocabulary mastery.

The decision to accept or reject the hypotheses was based on the significance value obtained from the independent samples t-test. If the significance value (p-value) was lower than the predetermined significance level of 0.05, the null hypothesis would be rejected and the alternative hypothesis would be accepted. This result would indicate that the use of the Studycat application had a statistically significant effect on students' vocabulary mastery. Conversely, if the significance value was greater than 0.05, the null hypothesis would not be rejected, indicating that the instructional intervention did not produce a statistically significant difference in vocabulary learning outcomes.

Through this statistical analysis procedure, the study was able to determine whether the implementation of the Studycat application contributed significantly to improving students' vocabulary mastery compared with conventional teaching methods.

RESEARCH FINDINGS AND DISCUSSION

Pre-test Results and Baseline Equivalence

Before examining the effectiveness of the instructional treatment, it was necessary to analyze the initial vocabulary mastery of students in both the experimental and control groups. The pre-test was administered at the beginning of the study to determine whether the two groups had comparable levels of vocabulary knowledge before the implementation of the treatment.

The descriptive statistics of the pre-test results indicate that the experimental class obtained a mean score of 62.78, with scores ranging from 50 to 83. Meanwhile, the control class achieved a mean score of 63.09, with scores ranging from 50 to 80. The similarity of these mean scores suggests that both groups started the study with relatively comparable vocabulary mastery levels.

Table 3. Descriptive Statistics of Pre-Test and Post-Test Scores

Descriptive Statistics						
	N	Range	Min	Max	Mean	Std. Deviation
Pre-Test of Experimental Class	36	30	50	80	62.78	8.146
Post-Test of Experimental Class	36	40	60	100	81.53	10.199
Pre-Test of Control Class	34	30	50	80	63.09	8.529
Post-Test of Control Class	34	35	55	90	75.29	7.779
Valid N (listwise)	34					

The similarity between the pre-test means indicates that the experimental and control groups had comparable vocabulary knowledge before the treatment was implemented. Establishing this baseline equivalence is important in quasi-experimental research because it ensures that any differences observed in the post-test results can reasonably be attributed to the treatment rather than to pre-existing differences between the groups (Creswell, 2009).

Normality Test

Before conducting hypothesis testing, a normality test was carried out to determine whether the distribution of the data met the assumptions required for parametric statistical analysis. The normality test was conducted using the Shapiro–Wilk test through IBM SPSS Statistics.

The results of the normality test indicated that the significance value for the experimental class pre-test was 0.105, while the significance value for the experimental class post-test was 0.193. Meanwhile, the control class also showed significance values greater than 0.05.

Because all significance values were greater than 0.05, it can be concluded that the data were normally distributed. This result indicates that the data met the assumption of normality and could therefore be analyzed using parametric statistical tests.

Table 4. Normality Test Results

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Group	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	Control	.141	34	.083	.943	34	.078
	Experiment	.133	36	.105	.948	36	.093
Posttest	Control	.133	34	.136	.958	34	.207
	Experiment	.122	36	.193	.960	36	.222

Normal distribution of the data ensures that the statistical tests used in this study produce reliable results, allowing further inferential statistical analysis to be conducted.

Homogeneity Test

After confirming the normal distribution of the data, a homogeneity test was conducted to examine whether the variance between the experimental and control groups was statistically equal. Homogeneity of variance is another important assumption in parametric statistical testing because it ensures that the two groups can be compared fairly.

The homogeneity test results showed that the significance value obtained was greater than 0.05. Therefore, it can be concluded that the variance of the two groups was homogeneous

Table 5. Homogeneity Test Result

Tests of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Score	Based on Mean	2.606	1	68	.111
	Based on Median	2.147	1	68	.147
	Based on Median and with adjusted df	2.147	1	63.934	.148
	Based on the trimmed mean	2.627	1	68	.110

The result indicates that the experimental and control groups had equal variance, meaning that the groups were statistically comparable. Therefore, the independent samples t-test could be applied to examine the difference between the two groups.

Paired Sample T-Test Results

To examine whether there was an improvement in vocabulary mastery within each group, a paired samples t-test was conducted. This analysis compared the pre-test and post-test

scores within the same group to determine whether there was a significant increase in vocabulary mastery after the treatment.

The results of the paired sample t-test indicated that both groups experienced improvements in vocabulary scores. However, the improvement observed in the experimental group was substantially greater than that of the control group.

Table 6. Paired Sample T-Test Result

Paired Samples Test										
		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Pretest – Posttest Experimental	-18.750	7.780	1.297	-21.383	-16.117	-14.459	35	<.001	<.001
Pair 2	Pretest – Posttest Control	-12.206	9.309	1.596	-15.454	-8.958	-7.646	33	<.001	<.001

The experimental group demonstrated a mean improvement of 18.75 points between the pre-test and post-test scores. This substantial improvement indicates that the use of the Studycat application contributed significantly to students' vocabulary learning.

Independent Samples T-Test Results

To determine whether the improvement in the experimental group was significantly different from that of the control group, an independent samples t-test was conducted. This test compared the post-test mean scores of the two groups.

Table 7. Independent Samples T-Test Result

Independent Samples Test									
		t-test for Equality of Means							
				Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		t	df	One-Sided p	Two-Sided p			Lower	Upper
Score	Equal variances assumed	2.863	68	.003	.006	6.234	2.178	1.888	10.579
	Equal variances not assumed	2.885	65.171	.003	.005	6.234	2.161	1.918	10.549

The significance value obtained from the independent samples t-test was 0.006, which is lower than the significance level of 0.05. This result indicates that there was a statistically significant difference between the experimental group and the control group. Therefore, the null hypothesis stating that there is no significant effect of the Studycat application on students' vocabulary mastery is rejected. Meanwhile, the alternative hypothesis stating that the Studycat application significantly improves students' vocabulary mastery is accepted.

Effect Size Analysis

In addition to statistical significance, the effect size of the treatment was also calculated to determine the practical impact of the Studycat application on students' vocabulary mastery. The effect size was measured using Cohen's d.

The analysis showed that the effect size value was 0.685. According to Cohen's (1988) interpretation guidelines, an effect size of approximately 0.5 indicates a medium effect, while an effect size of 0.8 or higher indicates a large effect.

Table 8. Effect Size

Independent Samples Effect Sizes					
				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Score	Cohen's d	9.106	.685	.200	1.165
	Hedges' correction	9.208	.677	.197	1.152
	Glass's delta	7.779	.801	.289	1.303

The calculation of effect size provides additional evidence regarding the magnitude of the treatment effect. The Cohen d value of 0.685 indicates a medium to large effect size, suggesting that the Studycat application produced a meaningful and practical impact on students' vocabulary mastery. This result demonstrates that the improvement was not only statistically significant but also educationally significant, reinforcing the effectiveness of digital game based learning in vocabulary instruction.

Score Comparison Between Groups

The comparison of students' mean scores between the experimental and control groups is illustrated in Figure 2. The figure shows that both groups experienced improvement from the pre-test to the post-test. However, the increase in the experimental group was considerably higher than that in the control group.

The experimental group's mean score improved from 62.78 in the pre-test to 81.53 in the post-test, indicating a substantial increase after the implementation of the Studycat application. In contrast, the control group showed a smaller improvement, with the mean score increasing from 63.09 to 75.29.

This difference suggests that students who learned vocabulary using the Studycat application achieved greater improvement compared to those who were taught using conventional teaching methods. The graphical trend clearly illustrates the effectiveness of the treatment applied in the experimental group.

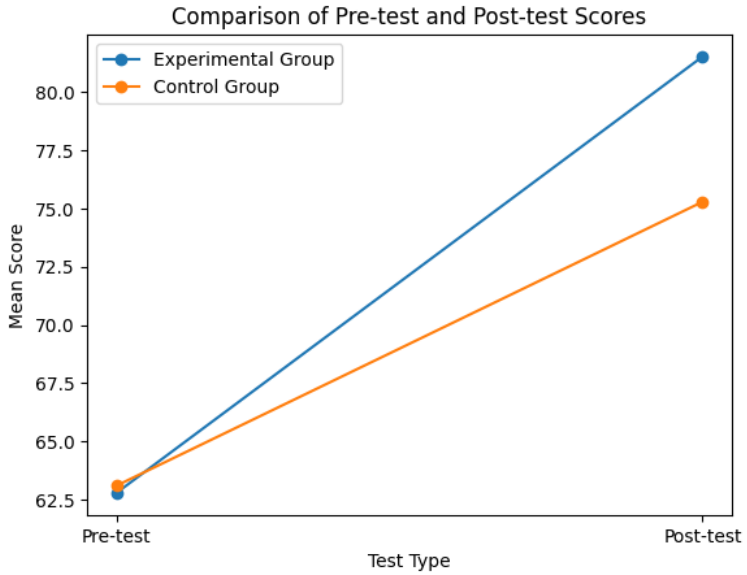


Figure 2. Comparison of Pre-test and Post-test Mean Scores Between Experimental and Control Groups

Discussion

The findings of this study indicate that the use of the Studycat application significantly improved the vocabulary mastery of third-grade students at SDN Kesatrian. Students who learned vocabulary through the Studycat application achieved higher post-test scores compared with those who learned through conventional teaching methods.

The improvement observed in the experimental group can be attributed to the interactive features provided by the Studycat application. The application integrates visual images, audio pronunciation, and game-based activities that help learners associate vocabulary items with meaningful contexts. Such multimodal learning environments have been shown to enhance vocabulary acquisition because they stimulate multiple cognitive processes simultaneously.

These findings are consistent with previous research demonstrating the effectiveness of digital game-based learning in language education. Amran and Muryanti (2024) reported that the Studycat application significantly improved young learners' vocabulary mastery by providing engaging and interactive learning activities. Similarly, Kepirianto (2021) found that digital game-based language learning environments can enhance vocabulary retention and learning motivation among young learners.

Furthermore, classroom observations during the intervention indicated that students in the experimental group showed higher levels of enthusiasm and participation during vocabulary learning activities. Students actively interacted with the application, responded quickly to visual prompts, and demonstrated greater engagement compared with students in the control class. This observation supports the argument that interactive digital learning tools can increase student motivation and attention in language learning environments.

The difference in learning outcomes between the two groups highlights the importance of incorporating innovative learning media into English language teaching for young learners. Traditional vocabulary teaching methods often rely on memorization and repetition, which may

not be sufficiently engaging for elementary school students. In contrast, digital learning applications such as Studycat provide interactive learning experiences that combine entertainment and education, making vocabulary learning more enjoyable and effective.

Overall, the findings of this study confirm that the integration of digital game-based learning applications into English language instruction can significantly enhance vocabulary mastery among young learners.

CONCLUSION

This study concludes that the use of the Studycat application is effective in improving vocabulary mastery among third-grade elementary students. The findings indicate that students who learned through Studycat achieved significantly higher vocabulary gains than those who received conventional instruction. These results confirm that digital game-based learning can enhance students' vocabulary acquisition by providing interactive, engaging, and meaningful learning experiences. The study also highlights the importance of integrating technology into vocabulary instruction for young learners. The use of interactive visuals, audio pronunciation, and repetitive practice supports better engagement, motivation, and retention, making vocabulary learning more effective in the EFL classroom.

Therefore, digital learning applications can serve as valuable tools to complement traditional teaching methods. In terms of implications, this research provides practical insights for teachers to adopt innovative and technology-supported approaches in vocabulary instruction. Schools are encouraged to support the integration of digital learning media to create more engaging learning environments. For future research, it is recommended to investigate the long-term impact of digital applications on vocabulary retention and to explore their effectiveness across different grade levels and language skills.

FUNDING

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INFORMED CONSENT STATEMENT

Participation in this study was voluntary. All participants were informed about the purpose, procedures, and benefits of the research. Students' identities were kept confidential, and the collected data were used only for research purposes. Participants had the right to withdraw from the study at any time without any consequences.

DATA AVAILABILITY STATEMENT

The data utilized in this study cannot be made publicly available due to strict adherence to privacy concerns and ethical obligations that safeguard participant confidentiality. This ensures compliance with ethical research standards and data protection regulations. However, researchers or interested parties who require access to the dataset for validation or further analysis may request it. Such requests will be considered on a case-by-case basis and must be deemed reasonable. Importantly, approval from the appropriate institutional ethics review board is mandatory before any data can be shared, to ensure that the proposed use aligns with ethical guidelines and participant consent terms.

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