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The Effect of Wordwall Digital Games on Students' Vocabulary Achievement at Grade V of SD Negeri 4 Padangkerta

Ni Ketut Paula Lita[1], Luh Gd Rahayu Budiarta[1*], Putu Eka Dambayana[1]
[1]Universitas Pendidikan Ganesha, Bali, Indonesia
rahayu.budiarta@undiksha.ac.id*

ABSTRACT

The purpose of this study was to see whether the use of the Wordwall digital games as a learning medium had a significant effect on the vocabulary achievement of V-grade students at SD Negeri 4 Padangkerta. This study employed a quantitative approach using a quasi-experimental with a post-test only design. The participants of this study were fifth-grade students from the experimental and control groups with a total sample of 68 students. Data was collected through a post-test and analyzed using the SPSS 26.0 program. Based on the descriptive statistical analysis, the results showed that the experimental group achieved a higher mean score (M = 88.82) than the control group (M = 52.56). Furthermore, the results of the Mann–Whitney U test showed a significant difference between the experimental group and the control group (Sig. (2-tailed) = 0.000, $p < 0.05$), with a large effect size ($r = 0.87$), indicating that the treatment had a meaningful effect on students' vocabulary achievement. Therefore, the alternative hypothesis (H_a) was accepted, and the null hypothesis (H_0) was rejected. These findings imply that the use of Wordwall digital games as a technology-based learning can be an effective learning medium to support vocabulary development and enhance student engagement in English learning at the elementary school level.

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INTRODUCTION

The rapid development of digital technology has significantly transformed educational practices, particularly in the way teaching and learning processes. In the context of 21st-century education, digital-based learning is no longer considered an optional component but a fundamental necessity to prepare students for future academic and professional challenges. Digital-based learning in 21st-century

education can create a more interactive classroom atmosphere and help students understand the material (Widiastari & Ryan, 2024). Ritonga et al. (2024) stated that the use of digital media in education, such as interactive digital media and online learning platforms, creates new opportunities to improve the quality of learning, and teachers can create a more inclusive and adaptive learning environment. Digital technology enables teachers to create interactive learning environments that encourage active student participation, foster engagement, and support deeper understanding of learning materials. Kholid and Darmawan (2023) also stated that digital media presents material through games, quizzes, or simulations that relate to real-life situations, which can help students increase their learning motivation.

In language education, English occupies a central position as a global lingua franca that plays a crucial role in international communication, education, and economic development. English is not only an academic subject but also an essential life skill that enables individuals to participate in global interactions and access information from various fields (Crystal, 2003). In the context of education in Indonesia, learning English at the elementary school level can be a key factor influencing individual progress and their contribution to national growth and innovation in the future (Kurniati et al., 2021). Oktaviani et al. (2019) stated that teaching English to young learners in elementary schools is important because it will help them gain social and economic benefits in the future. Lesia and Petrus (2021) also stated that starting English education for young learners can make the foundation for future language skills and open opportunities to communicate with people in another country. One of the essential things to learn when starting to study a new language is understanding the vocabulary used in that language.

Alqahtani (2015) stated that vocabulary is one of the important things in language learning as an essential part of foreign language learning. It helps students to understand what they hear, read, and speak. Without knowing the basic vocabulary, it is hard for students to express their ideas or understand what other people are saying. Similarly, Renandya (2010) stated that vocabulary knowledge plays a fundamental role in the development of the four language skills: listening, speaking, reading, and writing. Without sufficient vocabulary, learners may experience difficulties in understanding instructional materials, participating in classroom activities, and producing accurate language. Rasouli (2016) stated that vocabulary learning should receive particular attention in the early stages of second or foreign language acquisition. Therefore, without enough words, students can struggle to communicate or understand the material being taught when learning a new language, which can make it difficult for them to use the four skills in the English language. To apply the four skills in the English language components, we must understand the vocabulary in that language.

Despite its importance, vocabulary learning remains a major challenge for many elementary school students in Indonesia. Several studies have reported that students

often struggle with vocabulary due to limited exposure to English outside the classroom and the use of conventional teaching methods that do not sufficiently engage learners (Amalia, 2023). In many classrooms, English instruction still relies heavily on textbooks and teacher-centered approaches, which may lead to passive learning and reduced student motivation. Preliminary observations conducted at SD Negeri 4 Padangkerta revealed similar conditions among fifth-grade students. During English lessons, many students showed low levels of attention and interest, particularly when only using a schoolbook as a medium. As a result, students faced difficulties in understanding new vocabulary, remembering word meanings, and applying vocabulary in simple sentences. Another issue identified in the learning context is the underutilization of available digital technology. Although digital devices such as Chromebooks have been provided to support learning activities, they have not been optimally integrated into English language instruction. This situation limits students' opportunities to engage with interactive and enjoyable digital learning tools. As young learners tend to become easily bored when learning activities fail to attract their interest, the lack of engaging learning media can negatively affect their motivation and learning outcomes.

Hashemi & Azizinezhad (2011) explain that young learners differ from adult learners in that they require varied and interesting learning activities to maintain their attention. Therefore, the selection of appropriate learning media is crucial in supporting vocabulary learning at the elementary school level. In response to these challenges, Sari et al. (2023) stated that digital media can be effectively used to improve student vocabulary in the learning process in the classroom; the use of digital game-based learning media has gained increasing attention as an effective instructional approach. One digital platform that has been widely used in educational settings is Wordwall. Wordwall is a web-based digital application that allows teachers to create interactive learning activities using various game templates.

Several empirical studies have investigated the effectiveness of Wordwall in English language learning. Ilahiyati et al. (2023) found that using Wordwall games as a learning tool effectively improved students' pronunciation, memorization, and sentence construction skills. Another study conducted by Widyaningsih et al. (2023) found that the use of Wordwall significantly improved elementary school students' vocabulary mastery. Similarly, Pradini and Adnyayanti (2022) reported that Wordwall not only enhanced students' vocabulary achievement but also increased their motivation to learn English. Studies conducted at higher educational levels also demonstrated positive outcomes. Minh and Nguyên (2024) revealed improvements in vocabulary learning among senior high school students, while Amaliyah and Rahayu (2023) reported a substantial increase in students' vocabulary scores across multiple post-tests. Furthermore, Adnyana and Dewi (2022) found that the Wordwall application can help students enhance their writing skills during the learning process,

and students become more active and confident as a result of being able to study while playing games, and they are more motivated to learn English. However, this study suggests that future researchers conduct the study on a wider and more diverse population across different grade levels.

Although previous studies have provided evidence of the effectiveness of Wordwall, there is still a need for further research that focuses on elementary school students in different instructional settings. Most of the studies used pre-experimental or developmental designs and were limited in involving a comparison between experimental and control groups, especially for younger learners in elementary school grade fifth. And there has been limited exploration of how this tool can be used across different grade levels and its specific effects on students' vocabulary achievement. These studies often focus on different skills or contexts. Furthermore, the specific use of farm animal vocabulary for fifth graders has not been deeply explored. Therefore, this study adapts and refines previous findings by developing a vocabulary achievement instrument that assesses several key aspects of vocabulary closely aligned with the indicators proposed in a previous theoretical review. Therefore, this study seeks to fill the gap by implementing a quasi-experimental post-test only design to see the significant effect of Wordwall digital games on students' vocabulary achievement among fifth-grade students at SD Negeri 4 Padangkerta. By comparing students taught with Wordwall games to those taught using schoolbook media, which has not been used in previous studies, this research aims to investigate whether or not there was any significant effect on vocabulary achievement outcomes between the group of students using the Wordwall digital games and the group using the conventional media. The findings of this study are expected to contribute to the theoretical understanding of digital game-based learning in vocabulary instruction and provide practical implications for English teachers in elementary schools.

METHOD

This study employed a quantitative research approach using a quasi-experimental design with a post-test only. Quantitative research is an approach for testing objective theories by examining the relationship among variables or comparing groups (Creswell, 2023). Quasi-experimental research is research in which the placement of samples is carried out without randomization (Hastjarjo, 2019). The research design used is a posttest-only design. Payadnya and Jayantika (2018) stated that a post-test only design is a design that only uses the final test to be analyzed to find out the research results that have been done. The quantitative research method with a quasi-experimental design that applied a post-test-only design is used to evaluate the effectiveness of the Wordwall on vocabulary achievement among fifth-grade students. In this design, two groups are selected, namely the experimental group using the Wordwall and a control group using schoolbook media. Both groups will receive a post-test after the treatment to measure vocabulary achievement, and also for a comparison of results.

The research was conducted at SD Negeri 4 Padangkerta, located in Karangasem District, Karangasem Regency. This school was selected based on preliminary observation, which indicated that English vocabulary instruction mainly relied on the use of textbooks. In addition, the school allows students to use mobile phones or Chromebooks on certain days, and adequate internet access is available, making it suitable for technology-based learning implementation. The population of this study consisted of all fifth-grade students at SD Negeri 4 Padangkerta. Fifth-grade students were chosen because they are at a stage of cognitive development that allows mastering new vocabulary presented in a concrete or real way with direct and visual teaching strategies (Piaget, 1947). This research used simple random sampling, which belongs to probability sampling. Sugiyono (2013) stated that simple random sampling can be applied when the population is relatively homogeneous and when the researcher intends to give equal probability for each member of the population to be selected. The researcher used simple random sampling because the population in this research consisted of students who were relatively homogeneous in terms of grade level, learning environment, curriculum used, and subject matter taught. Therefore, each class had the same opportunity to be selected as the research sample. The randomization process was carried out using a spin wheel application as a tool to ensure fairness and randomness in determining the research groups. Therefore, in this study, class 5B was the experimental group (using the Wordwall) with a sample size of 34 students, and class 5A was the control group (using a schoolbook) with a sample size of 34 students, and the total sample of this study was 68 respondents.

Before the treatment was administered, the researcher also conducted normality and homogeneity tests for both the control and experimental groups to ensure that each group conforms to a normal distribution. The data used were students' English scores from the odd semester final exam, which were then analyzed using SPSS 26. Data will be considered normal if the significant value generated in the normality and homogeneity test is more than 0.05 (Sig. > 0.05). The result of the normality test shows that the summative score data of students in both the experimental and control groups are normally distributed, where the data results of the Shapiro–Wilk test show that the experimental group obtained a significance value of 0.553, while the control group obtained a significance value of 0.169. After the normality test, a homogeneity test was conducted to ensure that the data met the assumptions required for further statistical analysis, and the result shows that the Levene's test indicates significance values of 0.129 based on the mean, 0.129 based on the median, 0.129 based on the median with adjusted degrees of freedom, and 0.134 based on the trimmed mean; it can be concluded that the summative score data are homogeneous and meet the assumption of homogeneity, and the data are appropriate for further analysis using parametric statistical procedures. Based on the output of the Independent Samples Test in the Equal Variances Assumed section, the Sig. (2-tailed) value is 0.509, which is greater than 0.05.

Referring to the decision criteria of the independent samples t-test, it can be concluded that the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. This result indicates that there is no statistically significant difference between the experimental group and the control group, and the results presented in the table indicate that the control and experimental groups possessed comparable levels of prior knowledge.

Research instruments play a crucial role in collecting valid and reliable data. Sugiyono (2013) stated that a research instrument is a tool used to measure natural or social phenomena that are observed, while Arikunto (2010) stated that a research instrument is a tool or facility used by researchers to collect data more efficiently and more easily, and provide better results that can produce accurate, complete, and systematic data. The main instrument used in this study was a vocabulary achievement test (post-test) designed to measure students' vocabulary after the treatment. In addition, another supporting instrument, a lesson plan for each group, was used. Wordwall and PowerPoint were used in the experimental group's lesson plan. Book Grow with English, PowerPoint, and a worksheet were used in the control group. The vocabulary test (post-test) was developed based on the learning objectives and materials taught during the treatment. Before its use, the instrument testing was carried out before the experiment to check the quality of the test. Instrument analysis was done using the validity test and the reliability test. The result of content validity is 0.95. This is in the range of 0.80–1.00, so it can be accepted that the questions used in this study meet the very high validity criteria. The construct validity results show the Pearson correlation value for all variables is greater than 0.3809, meaning all questionnaire items are valid. After empirical validity qualifications were done, the reliability test was conducted to check if the test is truly reliable. The result shows the Cronbach's Alpha of the post-test is 0.924, which is $\geqslant$ 0.60; therefore, it can be concluded that this instrument is reliable.

The data collection process began with a pre-observation to identify the learning conditions and determine the suitability of the research setting. Two fifth-grade classes were then selected and assigned as the experimental group and the control group. Next, the research instruments, including lesson plans and a vocabulary test, were prepared and tested for validity and reliability. Normality and homogeneity tests were conducted using students' English summative scores to ensure that the data met the assumptions for statistical analysis. Afterward, the researcher implemented the treatment in both groups. The experimental group received vocabulary instruction using Wordwall digital games, while the control group was taught using conventional teaching techniques. After the treatment, a post-test was administered to both groups, and the results were analyzed using descriptive and inferential statistics to determine whether there was a significant difference in students' vocabulary achievement.

Data analysis in this study was conducted to determine whether the use of Wordwall digital games had a significant effect on students' vocabulary achievement.

The analysis consisted of descriptive and inferential statistical procedures, supported by assumption testing and effect size calculation. Descriptive statistics were used to summarize the post-test data from both the experimental and control groups, including the mean, median, mode, standard deviation, minimum, and maximum scores, in order to provide an overview of students' vocabulary achievement. Inferential statistical analysis was then performed. Prior to hypothesis testing, normality tests were conducted to examine whether the data met the assumptions for parametric testing. The Shapiro–Wilk test was used to assess data normality, while the homogeneity test was applied to examine the equality of variances between groups. Based on the results of these assumption tests, hypothesis testing was carried out. If the data were normally distributed and homogeneous, an Independent Samples t-test was used to compare the mean scores of the two groups. If the assumptions were not met, the Mann–Whitney U test was employed as a non-parametric alternative. The decision to accept or reject the null hypothesis was determined by a significance level of 0.05. In addition, an effect size analysis was also conducted to determine the magnitude of the effect of Wordwall digital games on students' vocabulary achievement. The effect size was calculated to measure the strength of the treatment effect and to support the interpretation of the statistical findings. Ethical considerations were taken into account throughout the research process. Permission to conduct the study was obtained from the school authorities. Students participated in the study as part of regular classroom activities, and the data collected were used solely for research purposes. The confidentiality of participants' identities and test results was maintained.

RESULTS AND DISCUSSION

Results

This study employed a quantitative approach using a quasi-experimental design with a post-test only design. The samples were selected using purposive sampling. The total sample of this study is 68 students. The participants of this study were fifth-grade students who were divided into two groups, namely the experimental group and the control group. In this study, both of the group recived treatment from the researcher in the classroom. The experimental group was taught using Wordwall digital games as the learning media, while the control group used schoolbooks and worksheets during the learning process in the classroom.

The learning treatment was conducted in three meetings to provide sufficient exposure to the learning material while considering the time allocation and classroom conditions. Three treatments were considered adequate to introduce, practice, and reinforce students' vocabulary through the learning activities. Each meeting focused on different vocabulary topics, allowing students to gradually build their understanding without causing cognitive overload. In addition, the three-meeting treatment was adjusted to the school schedule and the limited duration of

the research implementation. This number of treatments also ensured that students received consistent instruction using the same learning media in each group, enabling the researcher to observe the effect of Wordwall digital games on students' vocabulary achievement more objectively.

During the first meeting at the experimental group, students learned vocabulary related various types of farm animals. The researcher as a teacher, began the lesson with pre-activities and then continued to the main activities introduced to farm animal vocabulary through presented using PowerPoint, followed by interactive learning through Wordwall in the form of a match-up game. In the second meeting students learn about identifying the body parts and sounds of farm animals. In this meeting, students were asked to identify body parts and animal sounds through Wordwall games, Labelled Diagram and find the match game. And the third meeting students learn on classifying the foods of farm animals and make simple sentences related to the topic. Students learned new vocabulary through wordwall using a group sort game and making sentences using the unjumble game. And at this last meeting, the researcher also conducted a post-test for the experimental group.

Moving to the control group, the learning process used schoolbooks (Grow With English 5), worksheets, PowerPoint, and oral drills, without the use of digital games. At the first meeting, students also learn various types of farm animals and practice, the students were given a worksheet to improve their vocabulary. In the second meeting, students learn about body parts and the sounds of farm animals. Same as the previous meeting, the teacher began the lesson with pre-activities and after that explained the material using PowerPoint and textbooks, followed by a worksheet as an exercise. At the trid meeting, students learn material about classifying the foods of farm animals and make simple sentences related to farm animals. And the same as the previous meeting, followed by a worksheet as an exercise. After all learning activities were completed, a post-test was given to the students.

After all post-tests were completed for both groups to measure students' vocabulary achievement among the five grade students at SD Negeri 4 Padangkerta. The results of the post-test were then analyzed descriptively to obtain information about the mean, median, mode, variance, range, standard deviation, minimum and maximum scores, and sum, which provided a general description of students' vocabulary performance in both groups. And here the following the result of the post-test score that has been analysed using SPSS 26.

Table 1. Result of the Descriptive Statistical Analysis Post-test

Statistics			
		Experimental	**Control**
N	Valid	34	34
	Missing	0	0

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Mean	88.82	52.56
`Std. Error of Mean	.870	2.295
Median	91.00	53.00
Mode	91	38
Std. Deviation	5.072	13.383
Variance	25.725	179.102
Range	27	59
Minimum	70	26
Maximum	97	85
Sum	3020	1787

The descriptive statistical results show that the experimental group has mean score of 88.82 with Std. Deviation 5.07, while the control group had a mean score of 52.56 with Std. Deviation 13.38. And the range of the experimental group's is from 70 to 97, while the control group's scores ranged from 26 to 85. This mean score indicates that the experimental group achieved higher post-test scores than the control group.

After descriptive analysis, inferential statistical analysis was performed to examine whether there was a significant difference in vocabulary achievement between the experimental and control groups. Before hypothesis testing, assumption tests of normality and homogeneity were conducted to determine the appropriate statistical procedure. Based on these results, further statistical testing was carried out to compare the post-test scores of the two groups. The results of the inferential statistical analysis are presented in Table 2.

Table 2. Result of the Normality Test Post-Test

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Class	Statistic	df	Sig.	Statistic	df	Sig.
Result	Experimental Group	.372	34	.000	.650	34	.000
	Control Group	.109	34	.200*	.973	34	.564

The Shapiro–Wilk normality test showed that the experimental group data were not normally distributed (Sig. = 0.000 < 0.05), while the control group data were normally distributed (Sig. = 0.564 > 0.05). As the normality assumption was not fully met, a non-parametric test using the Mann-Whitney U test was used in this study to hypothesis testing.

Table 3. Result of the Mann-Whitney U Test Post-test

Ranks				
	Class	**N**	**Mean Rank**	**Sum of Ranks**
Result	Experimental	34	51.31	1744.50
	Control Group	34	17.69	601.50
	Total	68		

The results of the Mann–Whitney U test show a very strong difference between the post-test scores of the experimental group and the control group. Based on the Ranks table, the experimental group (N = 34) obtained a mean rank of 51.31 with a sum of ranks of 1,744.50. Meanwhile, the control group (N = 34) had a much lower mean rank of 17.69 with a sum of ranks of 601.50. This difference in rank values indicates that almost all post-test scores of students in the experimental group were consistently higher than those of the control group.

Table 4. Result of the 2-tailed Mann-Whitney U Test of Post-Test

Test Statistics	
	Result
Mann-Whitney U	6.500
Wilcoxon W	601.500
Z	-7.151
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Class

The Mann–Whitney U value of 6.500 and the Z value of −7.151 indicate that the score distributions of the two groups are substantially different. The significance value, Asymp. Sig. (2-tailed), was 0.000 ($p < 0.05$), which is lower than 0.05. Based on that, the result of the non-parametric Mann–Whitney U test showed that the null hypothesis (H_0) was rejected and the alternative hypothesis (H_a) was accepted. This indicates that there was a statistically significant difference between the two groups. Based on these results, it can be concluded that there is a significant difference in post-test scores between the experimental group and the control group, in which the experimental group shows much higher scores. This output confirms that the difference in learning outcomes between the two groups is statistically significant.

In addition to the hypothesis testing, an effect size analysis was conducted to determine the magnitude of the effect of using Wordwall digital games on students' vocabulary achievement. The effect size was calculated using the r formula for the Mann–Whitney U test. Based on the results of the Mann–Whitney U test, the Z value was −7.151, and the total number of samples was 68 students, consisting of 34 students in the experimental group and 34 students in the control group. The effect size calculation is shown below:

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

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$$r = \frac{7.151}{\sqrt{68}}$$

$$r = \frac{7.151}{8.246}$$

$$r = 0.87$$

According to the effect size interpretation criteria, an r value of 0.87 indicates a large effect. This finding suggests that the use of Wordwall digital games had a substantial and meaningful effect on students' vocabulary achievement

Discussion

This study was conducted to investigate whether or not there was any significant effect on Vocabulary achievement of fifth-grade students at SD Negeri 4 Padangkerta to see that the teaching process observed in this study is systematically organized into three meetings of each group. The experimental and control classes received the same treatment, which consisted of three meetings in each class with Farm animal material. In the first meeting in the experimental group, students learn several materials about various types of farm animals. Before the learning in the class was carried out, students were very enthusiastic to learn with digital games. The first meeting focused on introducing various types of farm animals. The teacher began the lesson with pre-activities such as greeting, praying, checking attendance, and activating students' prior knowledge by asking questions related to farm animals in daily life. During the main activities, students were introduced to farm animal vocabulary through pronunciation repetition drills. Visual aids were presented using PowerPoint, followed by interactive learning through Wordwall digital games in the form of a match-up game.

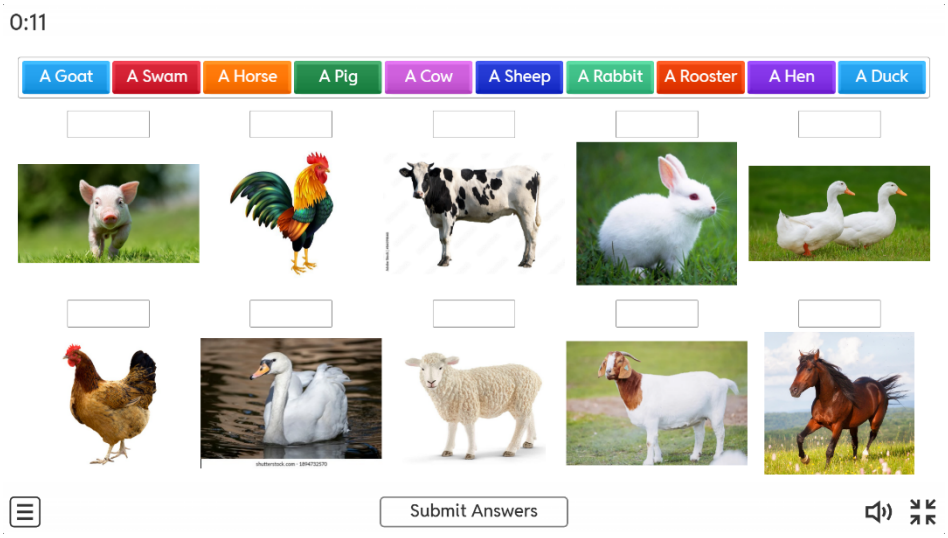

Figure 1. Match-up game

In the second meeting of experimental group students learn about identifying the body parts and sounds of farm animals. The teacher began the lesson with pre-activities such as greeting, praying, checking attendance, and activating students' prior knowledge. In this second meeting, students were asked to identify body parts and animal sounds through Wordwall games, Labelled Diagram and find the match game.

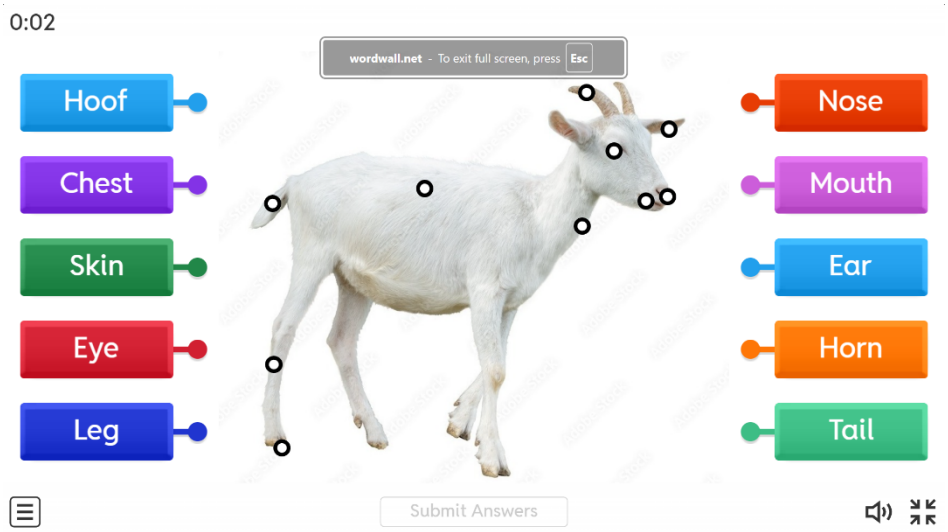

Figure 2. Labelled Diagram game

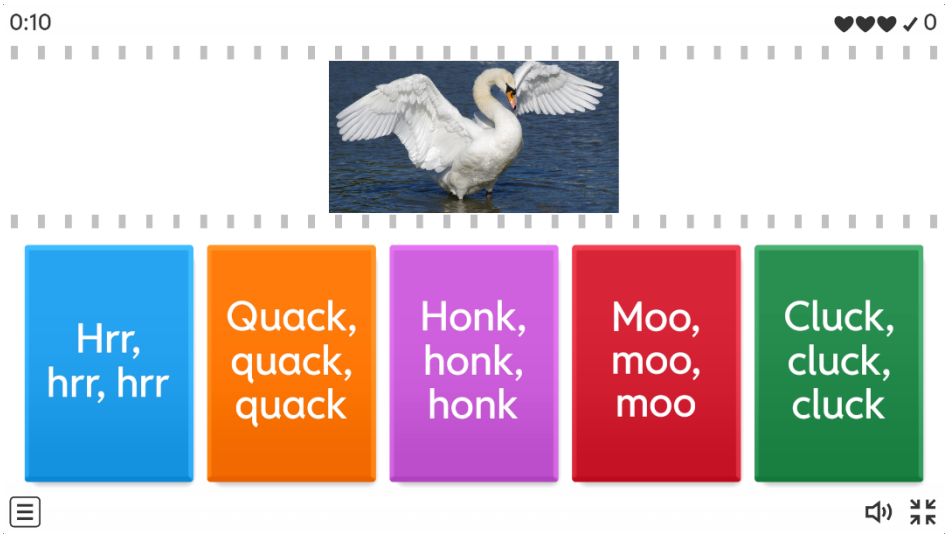

Figure 3. Find the match game

In the third meeting, students focused on learning to classify the foods of farm animals and construct simple sentences related to the topic. Students learned new vocabulary through PowerPoint and practiced categorizing animal food using a

group sort game in Wordwall. Furthermore, students were trained to arrange jumbled words into meaningful sentences using the unjumble game.

From all the treatments in the experimental class focused on the use of Wordwall digital games as the learning media. The experimental class students accessed Wordwall through personal devices or personal phones that students brought from their homes. Wordwall offers various interactive features such as images, text, game-based activities, and repetition exercises that support learning vocabulary and increase student engagement during the learning process. As explained before at the previous stage, in the first meeting, the learning activities began with an introduction to Wordwall, including its features and how to use the platform. The learning materials in Wordwall were organized into several activities related to farm animals, such as types of animals, body parts, sounds, and food and making sentence. In each meeting, students were consistently involved in Wordwall activities with several games such as Match up game, Labelled Diagram, Find the match game, and Arrange jumbled words into meaningful sentences using the unjumble game. After completing the Wordwall activities, students were asked to practice using the vocabulary by making simple sentences and presenting their answers orally in front of the class. This activity improved students' vocabulary understanding, speaking ability, and pronunciation.

Meanwhile, the teaching and learning process in the control class was conducted using schoolbooks (*Grow With English 5*), worksheets, PowerPoint presentations, and oral drills, without using digital games. The first meeting of the control group students learned vocabulary about different types of farm animals and the lesson began with pre-activities, including greeting, praying, checking attendance, and asking simple questions to activate students' prior knowledge about farm animals in daily life. After that, the teacher explained the vocabulary using a PowerPoint presentation, and the students wrote the vocabulary in their notebooks. To practice, students completed worksheets. In the second meeting, students learned about the body parts and sounds of farm animals. Similar to the first meeting, the lesson started with pre-activities. The teacher then explained the material using PowerPoint and schoolbook. After the explanation, students worked on worksheets. They identified animal body parts and sounds by completing written tasks. After the exercises, the teacher discussed the answers and gave clarification to help students understand the material. At the third meeting, students learned about the food of farm animals and practiced making simple sentences related to farm animals. Students learned vocabulary through reading activities and teacher explanations. They completed worksheets to classify animal food and practiced making simple sentences. The lesson ended with a review of the material and a short reflection. After all learning activities were finished, a post-test was given to the

students. The post-test was conducted online using students' mobile phones and aimed to measure students' vocabulary achievement after the learning process.

In the control group, the main learning resources were the schoolbook (*Grow With English 5*) and worksheets as an exercise. The learning materials focused on farm animals, including types of farm animals, body parts, sounds, food, and making simple sentences related to the topic. At each meeting, the teacher explained the vocabulary based on the schoolbook, supported by PowerPoint presentations. Students wrote the vocabulary in their notebooks to help them remember the words. During the learning activities, students completed worksheet exercises, such as identifying farm animals, recognizing body parts and sounds, classifying animal food, and arranging words into simple sentences. Repetition drills, reading aloud, and question-and-answer activities were also used to support students' understanding. In some activities, students presented their answers orally in front of the class to help improve their vocabulary. However, this learning method mainly focused on memorizing words and doing worksheet exercises, which may not make all students actively involved in learning. After three meetings, a post-test with 40 questions was administered online using students' mobile phones. The results of the post-test were used as research data to measure students' vocabulary learning outcomes.

Based on the results of the descriptive and inferential statistical analyses, it was found that students in the experimental group who were taught using Wordwall digital games achieved significantly higher post-test scores than those in the control group who were taught using a schoolbook. The results of the Mann–Whitney U test confirmed that there was a statistically significant difference between the two groups, indicating that the use of Wordwall had a positive effect on students' vocabulary achievement. The higher vocabulary achievement in the experimental group can be attributed to the interactive and game-based nature of Wordwall. Wordwall provides various learning activities such as match up, Labelled Diagram, find the match, group short and unjumble game also help students learn vocabulary in a fun and meaningful way. These features encourage students to actively participate in learning, not only listening to the teacher but also directly practicing vocabulary through games. These findings are in line with previous research, which showed that the use of Wordwall games designed with appropriate templates and interactive features effective in improving English vocabulary acquisition and making learning more engaging and motivating for students (Wedananta et al., 2024). Therefore, the interactive features of Wordwall play an important role in supporting vocabulary learning, as also found in this study.

In addition, the visual and audio features of Wordwall, such as colorful displays, images, and immediate feedback, support students with different learning styles. The use of pictures, colorful displays, and simple instructions makes learning more attractive for fifth-grade students. This condition supports students with

different learning styles and helps them stay focused during the lesson. These findings are also related to the characteristics of young learners. According to (Scott & Ytreberg, 1990), young learners tend to learn more effectively when the learning process involves visual materials, games, and enjoyable activities. In this study, Wordwall created a more engaging and interactive classroom environment that helped students stay motivated during the learning process. The findings of this study are in line with previous research conducted by Ilahiyati et al., (2023), who found that Wordwall helps students memorize and understand vocabulary through game-based activities. Similarly, Widyaningsih et al., (2023) reported that students showed better vocabulary mastery after learning using Wordwall because the activities encouraged active participation. Furthermore, Wordwalls can be used as learning media to learn vocabulary, it was making students more interested in learning new words. This is also supported by research results from previous studies that show implementing Wordwalls as media in teaching English. This finding is supported by Pradini & Adnyayanti, (2022), who found that Wordwall can increase students' vocabulary achievement and motivation to learn new words.

The findings of this study are also closely related to vocabulary learning theory. Vocabulary is an essential component in learning a language because it allows learners to understand and communicate ideas effectively. According to Nation (2019), vocabulary knowledge includes several aspects such as meaning, spelling, pronunciation, and the ability to use words appropriately in context. This means that vocabulary learning is not only about memorizing words but also about understanding how words are used in communication. In this study, the use of Wordwall digital games supported several aspects of vocabulary knowledge simultaneously. For example, when students matched words with pictures, they learned the meaning of the words; when arranging sentences or completing games, they practiced using vocabulary in context; and through repeated exposure in the games, students became more familiar with the spelling of the words. Therefore, the use of Wordwall digital games helped strengthen students' vocabulary knowledge in a more meaningful and engaging way.

Moreover, the findings of this study showed that students in the experimental class achieved higher vocabulary achievement than students in the control class who were taught using schoolbook. The result of this study shows that the non-parametric statistical analysis test using the Mann-Whitney U test showed that the null hypothesis (H_0) was rejected and the alternative hypothesis (H_a) was accepted. This finding indicates that Wordwall is more effective in supporting vocabulary learning than using schoolbook. Students showed higher motivation, were more active, and enjoyed the learning process more when vocabulary was taught using Wordwall digital games. The use of Wordwall in vocabulary learning helps create an interactive learning environment and supports students' vocabulary achievement.

Therefore, it can be concluded that Wordwall has a significant effect on the vocabulary achievement of fifth-grade students at SD Negeri 4 Padangkerta.

Another important finding in this study is the large effect size obtained from the statistical analysis (r = 0.87). This value indicates a very strong effect of Wordwall on students' vocabulary achievement. The large effect size may occur because Wordwall provides interactive and engaging learning activities that encourage students to actively participate in the learning process. The visual elements, game-based tasks, and repeated practice provided by Wordwall help students understand and remember vocabulary more effectively. In addition, the game-based learning format is suitable for young learners who generally prefer fun and interactive learning activities. As a result, students become more focused and motivated during the lesson, which contributes to the improvement of their vocabulary achievement.

This study conducted empirical testing and showed that the use of Wordwall as a learning medium has a significant effect on the vocabulary achievement of fifth-grade students at SD Negeri 4 Padangkerta. Based on the findings, several conclusions can be drawn. First, Wordwall helps teachers teach vocabulary more easily and makes the learning process more enjoyable for students. Therefore, teachers are encouraged to use Wordwall as an effective learning medium, especially for introducing and practicing new vocabulary. Furthermore, the use of Wordwall digital games creates a more engaging and active learning environment. Students become more enthusiastic and motivated during the learning process, which positively affects their vocabulary achievement. Learning through games also helps students understand and remember vocabulary better.

CONCLUSIONS

This study investigated the effect of Wordwall digital games on the vocabulary achievement of fifth-grade students at SD Negeri 4 Padangkerta. The research used a quasi-experimental design with a post-test only control group. Two classes were selected using purposive sampling, with one class assigned as the experimental group and the other as the control group. The experimental group was taught using Wordwall digital games, while the control group was taught using schoolbook media that provide from school.

Both groups received three meetings, followed by a post-test to measure students' vocabulary achievement. The post-test data were analyzed using SPSS version 26.0. Because the data were not normally distributed, the Mann–Whitney U Test was applied to test the research hypothesis. The results showed a significant difference between the experimental and control groups, with students in the experimental group achieving higher vocabulary scores. The effect size analysis indicated a large effect, showing that Wordwall digital games had a strong impact on students' vocabulary achievement. This study aimed to see the effect of Wordwall

digital games on the vocabulary achievement of fifth-grade students at SD Negeri 4 Padangkerta. The results demonstrate that Wordwall digital games provide an effective and meaningful learning experience by creating an engaging and interactive learning environment. The use of Wordwall helps students become more active and enjoy learning vocabulary. Therefore, this study confirms that Wordwall digital games are an effective instructional medium for enhancing vocabulary achievement at the elementary school level. These findings contribute to the field of English language teaching by highlighting the importance of integrating digital game-based learning media to support vocabulary development in classroom settings.

The results of this study provide clear evidence that Wordwall digital games have a significant effect on students' vocabulary achievement. Students who were taught using Wordwall digital games achieved higher vocabulary scores than those who learned using a schoolbook as a medium. However, this study also has several limitations. Although the findings are positive, future research is expected to consider factors that may influence the implementation of Wordwall. During the implementation at SD Negeri 4 Padangkerta, the researcher faced several challenges, such as limited internet access due to the availability of only one Wi-Fi network at the school, limited projector facilities, and a less conducive classroom situation when students were learning how to use Wordwall and asked many questions. Another limitation of this study is the small number of participants. Therefore, future studies are recommended to involve more students and be conducted at higher levels of education to obtain more accurate and comprehensive results.

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