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The Use of Web-Based Vocabulary Games to Improve **Junior High School Students' Vocabulary Mastery in** Reading

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ABSTRACT

Web-based games can be an alternative learning media for students to improve their vocabulary mastery in reading. Nevertheless, few studies look at how web-based games can be used as a teaching tool to help junior high school students improve their vocabulary, especially in the context of reading. The main objective of this research is to know the differences between the improvement of vocabulary mastery of 7th grade students at a junior high school in Indonesia who use the web-based vocabulary game "WordWall" compared to those who do not. The study employed a quasi-experimental design by administering both pre-test and post-test as instruments for data collection. Furthermore, as research participants, there were two classes from one of the junior high schools in Surabaya: 7E as the experimental group (N=31), and 7F as the control group (N= 31). The findings of this research showed that the significance value <0.05 was achieved (0.00), which indicates that there is a significant difference in the results of learning vocabulary between the experimental group and the control group. It can be concluded that using web-based games has a significant impact on students' improvement in vocabulary mastery in reading than those who do not.

INTRODUCTION

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Vocabulary plays a crucial role in acquiring linguistic and language skills, especially in reading (Sakhi & Fitria, 2019; Dong et al. 2020). Vocabulary is defined as a person's skill in understanding and producing words (Nation, 2013). The Cambridge Advanced Learner's Dictionary defines vocabulary as a full collection of words that a person possesses and uses, as well as all the terms within a particular language or field (Nushi 2016). Vocabulary, according to the definition provided by Webster's worldwide English language, refers to the collection of words that a person or a group uses. Additionally, vocabulary can include the creative methods used in art (Harahap, Rangkuty, and Nasution 2022). Thus, we can assume that vocabulary refers to a set of words or phrases that are employed to facilitate effective communication and understanding of the intended message, whether it is conveyed orally or in written form.

Moreover, proficiency in vocabulary is essential for individuals learning English as a foreign language (EFL) (Yuan 2023). Prior studies have demonstrated that vocabulary has a strong predictive influence on writing (Haryadi 2022), listening (Masrai 2022), speaking (Uchihara 2020a), and reading (Dong et al. 2020). Focusing on reading as one of those important skills, previous researchers agree that vocabulary plays a great role as a predictor of overall reading ability (Hyso and Tabaku 2011). To be able to have a good understanding, having a lot of vocabulary knowledge is becoming the essential key element. (Hudson 2008). Moreover, providing vocabulary education can enhance students' reading comprehension skills by addressing the challenges of word recognition and lexical access that sometimes hinder comprehension.

Nevertheless, certain challenges are associated with enhancing students' proficiency in vocabulary, especially in reading. The primary issue identified is the poor vocabulary resulting from students' indolence in acquiring knowledge (Rosyada-AS and Apoko 2023). Insufficient vocabulary knowledge in EFL learning can hinder learners from achieving targeted outcomes in the language acquisition process and their overall competency (Khan et al. 2018). In addition, students struggle to select appropriate vocabulary to articulate their ideas or thoughts in English (Rosyada-AS and Apoko 2023).

Consequently, the resources from which teachers obtain vocabulary will play important things in the instructional process, particularly in enhancing students' proficiency in vocabulary. Hence, students find traditional media, such as books, unengaging (Liando et al. 2022). Thus, teachers can enhance the enjoyment of their instruction by offering high-quality media resources such as visual media (Snae, 2023)

Moreover, Hung asserted that vocabulary acquisition through gaming has gained significant popularity in recent years (Lai and Chen 2023). Due to their ability to engage and motivate students, teachers and researchers have increasingly focused on digital game-based vocabulary acquisition to enhance interest and motivation in education (Zou, Huang, and Xie 2021). Digital game-based learning, or mobile game-based learning, refers to a certain form of game that is specifically created to be played using digital devices (Wati and Yuniawatika 2020).

Nevertheless, students may face certain challenges when utilizing this educational medium, such as the inability to download the game due to insufficient device storage or the game being incompatible with their devices (Anissa, Castellar, and Van Looy 2021). In response to this issue, several researchers have sought out new forms of game-based

learning media, including web-based games. Web-based games are software applications hosted on internet servers, enabling players to access them via an internet connection and a web browser (Hanafie, Bakhtiar, and Darmawati 2022). Web-based games eliminate the requirement for students to download the game or consider the storage capacity of their devices to access the content. Multiple research projects have been carried out to investigate the utilization of web-based games as an educational medium. Wahyudi's study mostly involved creating educational resources for web-based games aimed at elementary school students (Wahyudi, Ambarwati, and Indarini 2019). Safitri conducted a study on enhancing student learning motivation using word-wall-based digital gaming media (Safitri et al. 2022). Subsequently, Seaborn and Fels investigated using game-based learning through online technology to augment the educational process (Seaborn and Fels 2015)

Moreover, few studies look at how web-based games can be used as a teaching tool to help junior high school students improve their vocabulary and discuss the differences with the students who only use books. Hanny et al (2018) research found that students' vocabulary improved during their discussions and performance in implementing each phase of the word wall. She conducted a classroom action research study with eight-grade pupils at Pontianak Junior High School (Hanny, Rosnija, and Supardi 2018). Then, Agustina conducts research to help the students handle their vocabulary problems with meaning and spelling in descriptive writing. In her research, the enhancement of the student's vocabulary was evidenced by their vocabulary test scores and their behavior during vocabulary learning activities. Her research is undertaken in one seventh-grade class at Rasau Jaya (Agustina, Sada, and Rezeki 2019). However, Hanny and Agustina's study did not examine the differences between students who use WordWall and students who utilize traditional methods, such as books. As a result, readers know how much the students have improved, but they do not recognize the contrasts between web-based game media and traditional media.

Therefore, in this study, the author will concentrate on using a web-based vocabulary game as an educational tool to enhance junior high school students' vocabulary in the context of reading skills and find out the differences with the students who only use traditional media like books. In this study, the researcher also employed descriptive texts to investigate the impact of employing WordWall as a learning tool. Descriptive texts are chosen because they allow students to locate numerous adjectives, adverbs, and specific phrases that provide a clear explanation and elaborate on the features of individuals and locations. Having a lot of easy-to-understand material keeps readers interested and allows them to learn a lot of new languages understandably. Moreover, the selected web-based game is *WordWall*. The author selected this online game due to its inclusion of visuals, audio, and hierarchical levels, which effectively mitigate student boredom throughout the process of vocabulary acquisition on this platform. According to Desi in her study, this kind of game can create an enjoyable environment, prevent classroom monotony, enhance students' drive, and facilitate the development of their cognitive and physical abilities (Desi Purnama 2023). The researcher chose junior high school students as the group for this study because they are between the ages of 12 and 15, which is a transitional period with a lot of different wants and needs (Mugiyati, Febriana, and Artanti 2022). Therefore, using web-based games as an interactive learning medium would be ideal for junior high school

students to gain more vocabulary and enhance their reading skills, particularly in comprehending descriptive texts.

LITERATURE REVIEW

Vocabulary in EFL Context

Several experts have provided several definitions of vocabulary. Based on Schmitt in Zou's research, vocabulary is a crucial element of a language, covering all the words an individual possesses or employs and the entirety of words inside a specific language (Zou et al. 2021). Linse in Hidayati, in agreement with Schmitt, argues that vocabulary refers to the entirety of words an individual knows (Hidayati 2016). According to certain definitions, vocabulary is considered the fundamental component of language that individuals require to learn a language and communicate with others effectively. Furthermore, drawing upon the previously mentioned definitions, the researcher claims that vocabulary contains all the words and phrases within a specific language that a person possesses and employs for efficient communication.

There are two main methods for acquiring vocabulary: purposeful and unintentional vocabulary learning. Incidental vocabulary learning occurs when one acquires knowledge without consciously intending to do so, while intentional learning entails a deliberate and organized approach to acquiring knowledge. Both tactics have been asserted to enhance the expansion of learners' vocabulary proficiency (Uchihara, 2020). Nation argues that several essential parts of vocabulary must be understood, including word meaning, word spelling, word pronunciation, word classes, and word usage (Nation, 2013). In this study, the researcher focused on the word meaning and the word used as the aspect of the vocabulary.

WordWall as Learning Media in Teaching Vocabulary

The suitable media that can be applied in teaching reading, especially for descriptive text, is visual media (Kartikasari, Ningsih, and Pinandhita 2018). Visual media are highly used to promote learning (Smalgiono, Chávez Arcega 2010). They include games, diagrams on posters, drawings on chalkboards, photographs or pictures, graphics in books, cartoons, and so on. This means that visual media can help to increase the learning process and make it easy for students to follow the teaching and learning process. One of them, digital game-based learning, has garnered considerable attention in recent decades among the academic community. Some research suggests incorporating learning material into electronic games increases student motivation, involvement, and achievement (Yang et al. 2020). In this study, the researcher utilized a web-based game as the selected interactive audio-visual medium.

A web-based game refers to a software application hosted on internet servers, which enables players to access it solely through an internet connection and a web browser (Hanafie et al. 2022). Browser games can be played conveniently on any standard web browser and can be enjoyed during short intervals in a player's daily routine. In contrast to games that require hours to complete, a few movements in a browser game can be completed in only a few minutes.v

WordWall is an internet-based platform that enhances the process of developing personalized educational resources, such as flashcards, games, assessments, and various other tools. WordWall has the potential to strengthen the educational process by incorporating components that promote engagement and pleasure for both instructors and learners, and it will be suitable for learning adjectives to understand descriptive text (Hidayati 2016). The three primary components comprising the user experience of WordWall online games are the activity, the toolbar, and the scoreboard. The activity comprises most of the screen, presenting the questions and responses. Depending on the activity, user responses may be required to be dragged and dropped, typed, tapped, or drawn (Swari 2023). To proceed with assessment activities, for instance, the user must select the right answer by tapping it. Following this, the user experience appears at the bottom of the screen and consists of a variety of game controls. It is possible to halt, resume, restart, or finish the game. It is possible to modify the configurations, including the timing, actions, and languages. In addition, support is available, and the game can be shared with colleagues. The scoreboard, located in the upper right corner of the screen, will eventually display your results and scores. Users can check the number of questions they responded to accurately, the remaining time, and the points they have collected. When participating in an online game, it is possible to observe your position in relation to other players.

METHOD

This quantitative research employed a quasi-experimental design to determine the effectiveness of WordWall as a learning media and to answer the study questions. A quasi-experimental method is a type of experiment where the researcher does not randomly assign subjects (Kim 2015). The writer utilized two classes, one as a control class and the other as an experimental one. Both groups did the same pre-test and post-test. After the pre-test, the experimental group received treatment using WordWall as the learning media, while the control group did not receive any treatment using WordWall. Instead, the control group uses the handbook during the teaching-learning process. The results of this study are based on the post-test scores acquired from both the experimental and control groups.

Participants

The researcher analyzed a group of 7th-grade students at a Junior High School in Surabaya as the subject for this investigation. As the population, there were nine classes for 7th-grade students, with a total of 279 students. Moreover, as the sample, two classes consisting of 31 students each were selected using purposive sampling to select the sample based on the specific characteristic or criteria: the sample was determined at the teacher's discretion. Both classes possess equivalent proficiency in the English language.

Instruments

The researcher has developed an instrument that aligns with the curriculum employed by the institution. The researcher also looked for the guidebook utilized at that location to give more sources for the instrument. This investigation uses specific instruments, namely Pre-test and Post-test, to collect data and address the research inquiries of this study. Those

were paper-based tests, and each type of question came in the form of a descriptive paragraph. The Pre-test and Post-test contain five types of questions: Multiple questions (six questions), Fill in the blank with provided words (ten questions), sequencing (one text), and filling-in-the-blank without provided words (ten questions). Thus, there was a total of 27 questions.

Procedures

A paper-based pre-test was held at the first meeting in 30 minutes and was given to each group. After the Pre-test, the researcher began providing treatments for the experimental group using a web-based vocabulary game, *WordWall*. Meanwhile, the control group did not use WordWall; the teaching-learning process mainly used books as the learning media. The students learned and did exercises from the book. After completing all stages, an instant recall exam (Post-test) was also given in the third meeting. The Post-test includes the same questions as the Pre-test, allowing the researcher to assess the students' vocabulary mastery before and after the process. There were 27 questions, and the duration was also the same as the pre-test, which was 30 minutes. The control group received the same post-test as the experimental group. Students did the post-test on paper given by the researcher

FINDINGS AND DISCUSSION

To process the data for the pre-test, the researcher used Descriptive Statistical Analysis, a technique employed to examine and explain acquired data. This analysis aims to present a summary of the research about the average, highest, and lowest values, as well as the standard deviation. The result of research obtained using the SPSS 16.0 software application is as follows:

Table 1. *Descriptive Statistical Analysis Test Pretest Control and Experimental Group*

		Pretest_Experiment	Pretest_Control
N	Valid	31	31
	Missing	0	0
Mean		54.58	54.58
Std. Error of Mean		2.117	2.963
Std. Deviation		11.786	16.500
Variance		138.918	272.252
Range		47	63
Minimum		33	20
Maximum		80	83

Table 1 shows that the average values obtained for both the control and experimental groups were 54.58. The pretest results for both classes are identical. The results of this data, the mean and the variance from both groups, were used to analyze the Independent T-test for the pre-test.

Then, the independent t-test is conducted using the result from the pre-test of the experimental and control group to investigate and compare whether the pre-test scores of

each group were equivalent in terms of their English ability. Based on the results of this research test, the criterion for acceptance is that the lower value is negative the higher value is positive, and the significance (2-tailed) is greater than a = 0.05.

Table 2. Independent Sample Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
The result	Equal variances assumed	3.536	.065	4.218	60	.000	15.484	3.671	8.141	22.827
	Equal variances not assumed			4.218	54.359	.000	15.484	3.671	8.125	22.843

Table 2 shows that the Test for Equality of Variances revealed a significance value of 0.065, which exceeds the threshold of 0.05. Thus, we can infer that the variance in the data between the experimental and control groups is homogeneous, meaning it is consistent or equal. It can be deduced that there are no noticeable differences in the English language skills of the students; they are regarded as being equal. Consequently, the interpretation of the Independent Sample Test results relies on the values presented in the "Equal variances assumed" section of the output table.

Moreover, in order to provide data such as standard deviation and others for further tests, a post-test was also analyzed using descriptive statistical analysis. The outcome of the analysis conducted using SPSS software is as follows:

Table 3. Post-Test Control and Experimental Group

Statistics

		Posttest_Experimental Group	Posttess_Control Group
N	Valid	31	31
	Missing	0	0
Mean		73.00	57.52
Std. Error of Mean		2.137	2.985
Std. Deviation		11.900	16.619
Variance		141.600	276.191
Range		46	60
Minimum		50	30
Maximum		96	90

Based on data obtained from the results of students' vocabulary in reading skills using WordWall media, there was an increase after the treatment, the mean was 54.58 and has improved to 73.00. Meanwhile, previously the mean score for the control group was also 54.58 and it has a slight improvement to 57.52. Thus, it can be seen that there was an increase in post-test scores after implementing WordWall-based learning in the experimental class, as shown in the data processing results above.

Then, the researcher conducted an Independent T-test as a fundamental statistic tool to assess the disparities in the final learning results (post-test) between the experimental and control groups to determine the extent of the observed impact. The independent sample T test was conducted on the control and experimental class post-tests, as shown below:

Table 4. Independent T-Test Post-Test Results

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
The Result	Equal variances assumed	3.536	.065	4.218	60	.000	15.484	3.671	8.141	22.827
	Equal variances are not assumed.			4.218	54.359	.000	15.484	3.671	8.125	22.843

Table 4 reveals that there are differences in the post-test results for vocabulary outcomes between the control and experimental class. The difference between the experimental and control groups is demonstrated by comparing the Mean values in Table 4.1.6 with the Mean Difference in Table 5, revealing a data variation of 15.48. The experimental group of students, with an average score of 73.00, demonstrated a higher level of comprehension in terminology about adjectives, nouns, and verbs within the context of descriptive text. Students know some names of places at school, how to describe those places using correct adjectives, and how to give directions to those places. Students could also implement that vocabulary through the post-test conducted in the last meeting after three days of treatment. In contrast, the control group could not memorize some of the vocabularies they had learned. Additionally, they could not describe some names of places at school using the correct adjective.

Table 5. The Result of Group Statistic Independent T-Test for Post-test

Group Statistics

	Class	N	Mean	Std. Deviation	Std. Error Mean
The Result	Pos_experimental	31	73.00	11.900	2.137
	Pos_control	31	57.52	16.619	2.985

Furthermore, based on the conclusive outcome of the hypothesis test utilizing the Independent sample test post table in the Equal variances assumed section, it is apparent that the sig (2-tailed) value is 0.00, indicating a significance level below 0.05. Thus, according to the decision-making criteria for the independent sample t-test, we can infer that the null hypothesis (H0) is rejected and the alternative hypothesis (Ha) is accepted. Thus, it may be deduced that there is a significant difference in the final vocabulary of the experimental and post-test courses in the reading context.

Moreover, the researcher calculated the strength of the effect size once all of the analytic tests had been conducted. The researcher employed Cohen's theory to ascertain the magnitude of the influence in this investigation. According to calculations made using the effect size formula, the number of 0.229 indicates that the treatment received by the experimental group had a modest impact on and enhanced students' vocabulary through WordWall Online Games.

The result shows that there is a significance difference on the improvement of vocabulary mastery of students who use WordWall as learning media compared to those who do not. It is related to some previous studies that also use web-based games as learning media to improve students' vocabulary. Firstly, Hanny's research found that students' vocabulary improved during their discussions and performance in implementing each phase of the word wall (Hanny et al. 2018). In her research, she found that most understood selecting the right words in the text by doing some worksheets and giving a vivid explanation to the students. In this research, the researcher also found the same case with Hany's study, where the students were able to perform well on their last test after they did some worksheets on WordWall and got a short explanation from the teacher. Another study from Agustina seeks to help the students handle their vocabulary problems with meaning and spelling in descriptive writing. In her study, the student's vocabulary improvement was demonstrated by their vocabulary exam scores and behaviour while studying vocabulary (Agustina et al. 2019). The students can understand the meaning and spelling of words because the students follow all WordWall activities. Thus, this is in line with this research where the students also exceeded a good improvement after they followed all WordWall activities since the first day of the treatment.

Additionally, as Mushfi has mentioned in his study, the utilization of specific media is essential for the efficient and seamless execution of every teaching and learning activity, especially in learning vocabulary (Mushfi 2021). Similarly, widodo also mentioned that media, as a tool or equipment, can facilitate the implementation of learning processes for educators and learners to engage in learning activities (Widodo 2018). Not only that, but another previous researcher also stated that utilizing media in language learning and teaching is a very effective educational method that enhances engagement and promotes

achievement (Kurnia, 2021). Thus, using media as supplementary instructional resources can provide students with strategies to improve their memory retention and activate their right brain hemisphere (Liando et al. 2022). This research also tried to implement media to make teaching and learning more engaging for the students.

Moreover, WordWall was chosen as a learning media for learning vocabulary in a reading context, and the researcher chose descriptive text as the primary material for conducting this research. WordWall, as one of the media, can help students enrich their vocabulary easily because the teachers can use pictures and colorful text. WordWall also has many interactive features that make learning more engaging for the students, thus enabling them to enhance their memory retention (Rahmat, Ismail, and Nursin 2024). WordWall facilitates students' continuous exploration of the mechanics of language and should be designed to encourage active participation, rather than serving as a static word presentation. Furthermore, it promotes active engagement in learning vocabulary among students. Thus, it is evident that the integration of media, specifically WordWall, can support both students and educators in teaching and learning process, as reflected in the outcomes obtained through the use of WordWall as an instructional tool.

In addition, students need to understand some essential parts of vocabulary including word meaning, word spelling, word pronunciation, word classes, and word usage (Susanto 2021). This research also shows that students can achieve some fundamental aspects of vocabulary, such as word meaning and word use. To begin, understanding meaning is an important aspect for students to achieve since it helps students to understand the context of the texts better. In this research, students were able to comprehend the meanings of the vocabulary they had learned through descriptive paragraphs, as evidenced by the post-test results of the experimental group. With the help of WordWall as the learning media during the treatments, students could fill in some vocabulary in the correct places because they could understand the meaning of each word. This is also related to word use, where the students need to be able to use the words that they know.

CONCLUSION

Based on the results, it can be concluded that using digital games to teach English vocabulary to learners was much more successful than using traditional methods such as books as the learning media. The experimental group's vocabulary test score improved significantly on the post-test after receiving some treatments using WordWall. WordWall activities made the experimental group understand the materials better than the control group, who only used the handbook. WordWall also improved students' memory retention because of its features. It was also proven that WordWall could help students gain some fundamental aspects of vocabulary, such as understanding the meaning of the words (word meaning) and using the words in the proper context (word use). The hypothesis of this research was accepted because WordWall media can improve students' vocabulary when learning descriptive texts in the context of reading.

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