

## Wordwall-Based Gamified Learning and Vocabulary Acquisition among Indonesian EFL Learners: Evidence from a Quasi-Experimental Study

**Deny Silvia<sup>1</sup>, Wiwid Hadi Sumitro<sup>2</sup>, Asmariani<sup>3</sup>, Yusnimar Yusri<sup>4</sup>**

<sup>1</sup> STAI Hubbulwathan Duri, Bengkalis, Indonesia

<sup>2</sup> Institut Agama Islam Tafaqquh Fiddin, Dumai, Indonesia

<sup>3</sup> Universitas Islam Indragiri, Tembilahan, Indonesia  
STAI Al-Azhar Pekanbaru, Indonesia

Corresponding Email: [denysilvia07@gmail.com](mailto:denysilvia07@gmail.com)

### To cite this article:

Deny Silvia, Sumitro, W. H., Asmariani, A., & Yusri, Y. (2026). Wordwall-Based Gamified Learning and Vocabulary Acquisition among Indonesian EFL Learners: Evidence from a Quasi-Experiment Study. *ENGLISH FRANCA : Academic Journal of English Language and Education*, 10(1 May), 175–186. <https://doi.org/10.29240/ef.v10i1.May.17724>

**Abstract.** Despite all developments in educational practices, many English as a Foreign Language (EFL) students continue to face difficulties in acquiring vocabulary. In such contexts where instruction is characterized by traditional teaching approaches and low levels of student involvement, the use of gamified learning seems to be one possible way out. Gamified learning is learning that includes features typical of video games, i.e., engagement, interactivity, and motivation. It can be implemented in various ways, e.g., by means of Wordwall. The present study examined the influence of Wordwall-based gamified learning on EFL students' vocabulary acquisition. A quasi-experimental study using a non-equivalent pretest-posttest control group design was conducted with 72 eighth-graders from SMP Negeri 1 Pinggir, Indonesia. For the experimental group, the vocabulary instructions were delivered using activities based on Wordwall, whereas the control group received their vocabulary instruction using traditional methods. Vocabulary tests were utilized to collect the data for analysis using descriptive statistics and t-tests such as paired-samples and independent-samples. It was observed that there was a statistically significant improvement in the vocabulary performance of the students when vocabulary instruction was provided through Wordwall. The mean scores of the experimental group in the pretest and posttest were 63.94 and 80.33, respectively, while those of the control group were 56.64 and 71.61. An independent-samples t-test demonstrated a statistically significant difference between the groups ( $p < .001$ ).

**Keywords:** Gamification, Wordwall, Vocabulary Acquisition, EFL Learners, Digital Learning, Quasi-Experimental Study

## Introduction

Vocabulary knowledge is considered to be one of the key elements of second language acquisition. If learners have not acquired sufficient vocabulary, they will face problems with comprehension of spoken and written texts, as well as conveying their ideas. Vocabulary is one of the important aspects of language proficiency since no language proficiency can be achieved without vocabulary knowledge, as Nation (2022) notes. In English as a Foreign Language (EFL) settings, vocabulary acquisition is often recognized as one of the strongest predictors of academic success and communicative competence. Consequently, improving learners' vocabulary knowledge remains a central objective of English language instruction worldwide.

Article info:

<http://journal.iaincurup.ac.id/index.php/english>

Received 09 October 2025; Received in revised form 28 May 2026; Accepted 30 May 2026, Available Online 30 May 2026

Published by Institut Agama Islam Negeri (IAIN) Curup on behalf of ENGLISH FRANCA: Academic Journal of English Language and Education. This is an open-access article under the CC BY-SA license. Copyright

Despite its importance, vocabulary learning continues to present considerable challenges for EFL learners in many educational contexts. A range of research papers has documented that students struggle with keeping new words in memory, retrieving vocabulary when communicating, and using their lexical knowledge appropriately (Webb & Nation, 2017). This challenge is especially prevalent in the case of Indonesian EFL learners who have very little exposure to the English language beyond the classroom and whose vocabulary instruction is conducted through rote learning techniques. Traditional methods of learning vocabularies are mainly based on wordlists, translation activities, and drills; hence, they bring about fast forgetting (Alharbi, 2021).

In view of technological development within education, there are now many ways that teachers can make teaching more exciting. Out of these different ways of doing things, gamification is one method that has proven to be effective in increasing engagement and performance levels of students. Gamification can be described as the use of such game elements like points, awards, challenges, competition, and feedback outside the context of a game (Deterding et al., 2019). As for language education, it has become an interesting area of research because of creating engaging and meaningful experiences for students that involve their cognitive engagement and participation (Hamari et al., 2020).

There are a number of scholarly articles that have confirmed the impact of gamified learning experiences on the improvement of vocabulary knowledge. Some researchers noted that (Bai et al., 2021) there was a significant increase in vocabulary retention in EFL students when using game-based vocabulary instruction as compared with the traditional approach to teaching vocabulary. Digital gamification is one method that may help learners to develop their vocabulary, according to another research conducted by Zou et al. (2022), owing to the repetition of vocabulary and learner engagement.

Wordwall is one fascinating web-based program that has been gaining popularity amongst language instructors. It is a free online application for creating interactive activities for students. These activities include quizzes, matching activities, word searches, random wheels, and other games for teaching vocabulary. The use of such an online application may allow students to get more engaged in the process of learning vocabulary with the help of different types of activities and to get instant feedback on their performance.

The increased utilization of Wordwall in language education has been subject to several empirical investigations. For instance, in accordance with Kohnke & Moorhouse (2022), digital game-based platforms such as Wordwall were helpful in facilitating interactions and fostering positive attitudes towards language learning. Wang & Tahir (2020) also found that the use of game-based learning applications resulted in the enhancement of vocabulary retention and motivation among students in EFL classes.

Even though most of the studies show positive results of using Wordwall, there are several limitations related to the existing literature. First, the majority of the research is dedicated to the investigation of perceptions, motivation, or engagement of learners without any experimental measurement of vocabulary acquisition. Second, in some previous research, different digital platforms have been examined at once, which makes it impossible to evaluate Wordwall separately as an educational tool. Third, empirical data from Indonesian secondary schools is lacking due to the rapid implementation of digital learning technologies in the country. Fourth, quasi-experimental studies investigating the causal effect of Wordwall-based learning on vocabulary acquisition are not abundant.

This study attempts to bridge the research gap by exploring the effectiveness of Wordwall-based gamified learning in improving vocabulary acquisition in Indonesian EFL learners through an experimental research approach. Although there is empirical evidence on the pedagogical benefits of gamification and the use of technology for teaching and learning, research on Wordwall among Indonesian EFL learners is scanty. The research is anchored on Gamification Theory, which suggests that game elements motivate learners intrinsically and extrinsically by providing them immediate feedback, rewarding them, and setting attainable goals for them (Hamari et al., 2020), and Constructivist Learning Theory, where the

emphasis is made on knowledge construction through active participation and experiential learning (Kapp, 2021). In other words, Wordwall is a gamified learning tool that promotes active participation, repetition, and engagement of learners in their learning process with vocabulary items. Thus, in this research, the concept of Wordwall-based gamified learning is taken as an independent variable while the concept of vocabulary acquisition is considered a dependent variable, based on the assumption that learners' engagement will improve their vocabulary acquisition, as shown in the previous research on the positive correlation between gamification and vocabulary acquisition (Bai et al., 2021).

From the above discussion, this study endeavors to explore the effectiveness of Wordwall-based gamified learning in improving vocabulary acquisition among Indonesian EFL learners at SMP Negeri 1 Pinggir. More precisely, this research aims to answer the following research questions:

1. What are the vocabulary achievement levels of students before and after participating in Wordwall-based gamified learning?
2. Is there a significant difference in vocabulary acquisition between students taught through Wordwall-based gamified learning and those taught through conventional instruction?
3. To what extent does Wordwall-based gamified learning contribute to vocabulary acquisition among Indonesian EFL learners?

## **Theoretical Framework**

### **Vocabulary Acquisition**

Indeed, vocabulary acquisition has always been acknowledged as one of the key aspects of second and foreign language acquisition. In an English as a Foreign Language (EFL) setting, vocabulary is a skill from which learners build their listening, speaking, reading, and writing abilities. As Nation (2022) claims, vocabulary acquisition does not imply only the skill to identify lexical units but also the ability of learners to understand their meanings, apply them correctly, and memorize this information. Therefore, vocabulary instruction should imply providing learning settings that promote repeated exposure, engagement, and participation of learners in the learning process. In this particular study, vocabulary acquisition will be understood as the improvement in students' vocabulary skills revealed through pretest and posttest results.

To understand the mechanisms of vocabulary learning in digital settings, the current study uses three interconnected theoretical perspectives – Constructivist Learning Theory, Gamification Theory, and Cognitive Theory of Multimedia Learning. Theoretical frameworks help in gaining a holistic view of the effects of learning through Wordwall-based gamification on vocabulary acquisition in an EFL setting.

### **Constructivist Learning Theory**

The Constructivist Learning Theory argues that students create their knowledge through interactions with the environment rather than passively acquiring it from their instructors. According to the theory, the quality of the learning process improves with increased engagement of the learners in relevant actions, which include manipulating information, solving problems, and connecting new knowledge to experience (Jonassen, 2017). Concerning vocabulary learning, constructivist theories highlight the importance of engagement of the learners in activities involving words. The Wordwall application is rooted in the constructivist theory of learning since it allows the learners to engage actively in different vocabulary activities.

### **Gamification Theory**

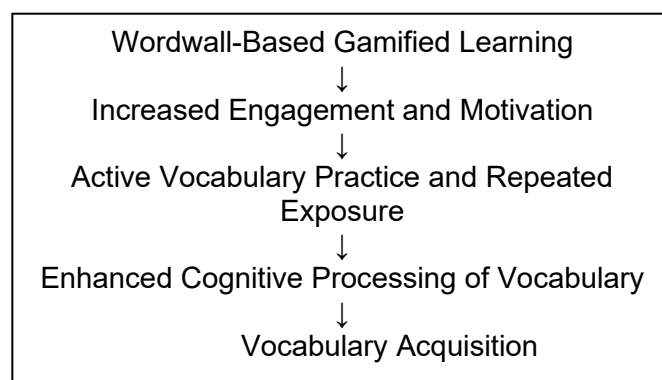
The second theoretical background is Gamification Theory. Gamification implies the use of game design principles outside of games with the aim of improving user involvement, motivation, and performance (Deterding et al., 2019). Educational gamification uses principles

such as scores, leaderboards, rewards, challenges, feedback, and competition in educational activities. It has been found that all these principles motivate learners intrinsically since they help create engaging and goal-directed learning processes (Hamari et al., 2020). In the process of vocabulary learning, gamification makes the learner return again and again to vocabulary practice while being engaged and interested in it. Such gamification features as a scoring system, feedback, time-related challenges, and other principles are used by Wordwall. This makes the process of vocabulary learning more engaging than a memorization process.

### The Cognitive Theory of Multimedia Learning (CTML)

Apart from the principles of gamification, one may use the Cognitive Theory of Multimedia Learning developed by Mayer (2021) in order to comprehend why the use of Wordwall is beneficial for vocabulary acquisition. The theory states that people are more likely to acquire new information if it is delivered via various channels including visual and verbal. Knowledge acquisition occurs when learners select information, structure it, and integrate it in their mental representation. In the case of Wordwall, learners are exposed to vocabulary in text form, via images, animations, and activities; thus, it becomes possible to process the information via various channels. The processing of the information may aid in vocabulary acquisition as a result of the creation of cognitive links between various lexical elements and meanings. Previous research has shown that vocabulary acquisition via multimedia is more efficient in comparison to vocabulary acquisition via texts (Lin & Chen, 2023).

Based on the theories mentioned above, Wordwall-based gamified learning is an independent variable in the current research; meanwhile, vocabulary acquisition is a dependent variable. The relationship between these two variables may be understood based on various cognitive and motivational factors. The gamified nature of activities increases motivation and engagement of the learners, whereas the multimedia aspect facilitates cognitive processing of the lexical items. In turn, motivation and cognitive processing help improve vocabulary acquisition. The connection is shown in Figure 1.



**Figure 1.**  
Conceptual Framework of the Study

This framework restricts the study to a narrower area in that it is concerned with the impact of the gamified learning technique based on Wordwall on vocabulary learning by Indonesian EFL learners. There are other factors that can affect vocabulary learning, like learning styles, language aptitude, self-efficacy, and socioeconomic status, but these factors will not be considered within the context of this study.

The purpose of the study is to establish the validity of the theoretical assumptions that have been developed from the constructivist learning theory, gamification, and multimedia learning perspective. This framework acts as the basis for the analysis of the findings of the study. If the results show significantly greater vocabulary improvement for students subjected to Wordwall than those taught using traditional techniques, then this will validate the theoretical assumptions that have been made. Thus, the framework not only guides data collection and

analysis but also contributes to the validation and refinement of existing theoretical understandings of technology-enhanced language learning.

## Material and Method

This study employed a quantitative approach using a quasi-experimental research design. Specifically, the research adopted a non-equivalent pretest–posttest control group design to investigate the effectiveness of Wordwall-based gamified learning on students' vocabulary acquisition. Quasi-experimental designs are frequently used in educational settings where random assignment of individual participants is impractical because existing classroom structures must be maintained (Creswell & Creswell, 2023). In this design, two intact classes were assigned as experimental and control groups. Both groups undertook a pretest prior to the intervention and a post-test following the intervention. The experimental group received vocabulary instruction through Wordwall-based gamified activities, whereas the control group received conventional vocabulary instruction. The design enabled the researcher to compare vocabulary gains between the two groups and determine whether the intervention contributed significantly to students' vocabulary acquisition.

**Table 1.**

| The research design |                |           |                |
|---------------------|----------------|-----------|----------------|
| Group               | Pretest        | Treatment | Posttest       |
| Experimental        | O <sub>1</sub> | X         | O <sub>2</sub> |
| Control             | O <sub>3</sub> | –         | O <sub>4</sub> |

*Note: X = Wordwall-based gamified learning intervention.*

## Research Setting and Context

The study was conducted at SMP Negeri 1 Pinggir, Bengkalis Regency, Riau Province, Indonesia, during the 2024/2025 academic year. The data were collected from March through May 2025. This school was chosen due to its representativeness of an average Indonesian junior secondary school that teaches English as a foreign language and in which learning vocabulary poses a significant problem. The preliminary classroom observations showed that the vocabulary classes used mainly traditional teaching techniques like memorizing, translating, and doing worksheets. Such approaches tended to result in poor student involvement and challenges in remembering new vocabulary. The use of Wordwall was supposed to make the learning process more interesting.

## Population and Sample

All the eighth-grade students studying at SMP Negeri 1 Pinggir for the 2024/2025 academic year formed the study's population. The reason for selecting such a population is that eighth-grade students belong to the developmental period when the development of vocabulary knowledge plays a crucial role in enhancing their abilities to understand texts better, write in English, and communicate verbally. As the target population consists of Indonesian EFL learners, all of them have relatively the same educational background, are taught under the same national curriculum, and receive English education in a similar way, which makes them the right population for this study. Moreover, the majority of the participants had no or little experience with gamified digital learning applications such as Wordwall. The population included seven classes with a total of 241 students.

**Table 2.**

| Population of the Study |        |                    |
|-------------------------|--------|--------------------|
| No                      | Class  | Number of Students |
| 1                       | VIII-1 | 36                 |
| 2                       | VIII-2 | 32                 |
| 3                       | VIII-3 | 34                 |
| 4                       | VIII-4 | 34                 |

|       |        |            |
|-------|--------|------------|
| 5     | VIII-5 | 33         |
| 6     | VIII-6 | 36         |
| 7     | VIII-7 | 36         |
| Total |        | <b>241</b> |

The sample was selected using cluster random sampling. This technique was considered appropriate because the classes had already been formed administratively and could not be randomly reorganized. Following a random drawing procedure, Class VIII-7 was assigned as the experimental group and Class VIII-6 as the control group. Each class consisted of 36 students, resulting in a total sample of 72 participants.

**Table 3.**  
Sample Distribution

| No    | Class | Group        | Students  |
|-------|-------|--------------|-----------|
| 1     | III-7 | Experimental | 36        |
| 2     | III-6 | Control      | 36        |
| Total |       |              | <b>72</b> |

### Data Collection Techniques and Instruments

Data collection was done by conducting vocabulary achievement tests before and after the experiment. The pre-test was aimed at assessing the students' vocabulary knowledge before the intervention. The post-test involved assessing students' vocabulary after the intervention. Both tests comprised 30 questions, which included multiple-choice and matching tasks testing vocabulary knowledge, word meaning and usage, and contextual vocabulary. Both tests were done within 45 minutes.

The vocabulary test was prepared according to the English curriculum for 8th grade students, as well as lexical items related to the instructional materials studied during the intervention period. Vocabulary assessment remains one of the most reliable approaches for measuring lexical development because it provides objective evidence of vocabulary growth resulting from instructional interventions. (Webb & Nation, 2017).

### Instrument Validity and Reliability

Before the main study was conducted, the instrument underwent validity and reliability testing. Content validity was established through expert judgment involving English teachers and language education specialists who evaluated the relevance, clarity, and appropriateness of each test item. Their feedback was used to revise and refine the instrument before administration.

**Table 4.**  
Reliability Statistics

| Measure          | Value |
|------------------|-------|
| Cronbach's Alpha | 0.842 |
| Number of Items  | 30    |

### Data Analysis Procedures

Data analysis was conducted using IBM SPSS Statistics version 27. The analysis consisted of several stages. First, descriptive statistics were computed to summarize students' performance in both groups, including mean scores, standard deviations, minimum scores, and maximum scores. Descriptive analysis provided an overview of vocabulary achievement before and after the intervention.

Second, assumption testing was performed before hypothesis testing. Data normality was examined using both Kolmogorov–Smirnov and Shapiro–Wilk tests. A significance value greater than .05 indicated that the data were normally distributed. Homogeneity of variance

was subsequently assessed through Levene's Test. Variances were considered homogeneous when the significance value exceeded .05.

Third, paired-sample t-tests were conducted to determine whether significant differences existed between pretest and posttest scores within each group. Finally, an independent-samples t-test was performed to compare posttest scores between the experimental and control groups. The level of significance was set at .05. It is generally recommended to use such an approach in quasi-experimental studies in education since it helps analyze the changes within a group and between groups (Field, 2022).

### Ethical Considerations

Ethical practices were followed in the study as per ethical standards for education research. Permission to conduct the research was granted by the school administration prior to beginning the process of collecting the data. The students were informed about the aim of the research and that their participation would not affect their grades. Participation was on a voluntary basis, and personal information was kept confidential during the entire process of the study. All data were used only for academic purposes and were presented anonymously (Association, 2024).

## Results and Discussion

### Results

#### Sample Characteristics

The study was carried out using 72 Grade VIII students of SMP Negeri 1 Pinggir, with an equal distribution of participants in the experimental group and control group. The 36 participants in the experimental group received vocabulary teaching through gamified learning using Wordwall, whereas the other 36 participants in the control group were provided conventional vocabulary teaching. Prior to the intervention, both groups completed a vocabulary pretest to establish baseline equivalence.

**Table 5.**  
Distribution of Research Participants

| No    | Class | Class | Number of Students | Percentage |
|-------|-------|-------|--------------------|------------|
| 1     | III-7 | III-7 | 36                 | 50.0%      |
| 2     | III-6 | III-6 | 36                 | 50.0%      |
| Total |       |       | 72                 | 100%       |

### Research Question 1: What were students' vocabulary achievement levels before and after the implementation of Wordwall-based gamified learning?

Descriptive statistics were calculated to examine students' vocabulary achievement before and after the intervention. The pretest results indicated that the experimental and control groups demonstrated relatively similar levels of vocabulary knowledge before treatment. Following the intervention, both groups showed improvement; however, the gain achieved by the experimental group was substantially greater than that of the control group.

**Table 6.**  
Descriptive Statistics of Pretest and Posttest Scores

| No | Group        | Test     | N  | Mean  | SD   | Minimum | Maximum |
|----|--------------|----------|----|-------|------|---------|---------|
| 1  | Experimental | Pretest  | 36 | 63.94 | 8.72 | 50      | 80      |
| 2  | Experimental | Posttest | 36 | 80.33 | 7.84 | 67      | 93      |
| 3  | Control      | Pretest  | 36 | 56.64 | 9.15 | 43      | 77      |
| 4  | Control      | Posttest | 36 | 71.61 | 8.48 | 57      | 87      |

The results indicate that students exposed to Wordwall-based gamified learning achieved a considerable increase in vocabulary performance. The mean score increased from 63.94 in the pretest to 80.33 in the posttest. Meanwhile, the control group improved from 56.64 to 71.61. Although improvement occurred in both groups, the magnitude of improvement was greater in the experimental group.

To examine learning gains more clearly, the mean score differences were calculated.

**Table 7.**

Vocabulary Gain Scores

| No | Group        | Pretest Mean | Posttest Mean | Gain Score |
|----|--------------|--------------|---------------|------------|
| 1  | Experimental | 63.94        | 80.33         | 16.39      |
| 2  | Control      | 56.64        | 71.61         | 14.97      |

The findings suggest that the implementation of Wordwall facilitated greater vocabulary development than conventional instruction.

**Research Question 2: Is there a significant difference in vocabulary acquisition between students taught through Wordwall-based gamified learning and those taught through conventional instruction?**

Before hypothesis testing, normality and homogeneity assumptions were examined.

**Table 8.**

Results of Normality Tests

| No | Group        | Test     | Shapiro–Wilk Sig. |
|----|--------------|----------|-------------------|
| 1  | Experimental | Pretest  | 0.200             |
| 2  | Experimental | Posttest | 0.145             |
| 3  | Control      | Pretest  | 0.167             |
| 4  | Control      | Posttest | 0.109             |

All significance values exceeded .05, indicating that the data were normally distributed.

**Table 9.**

Homogeneity of Variance Test

| Levene Statistic | Sig.  |
|------------------|-------|
| 0.642            | 0.426 |

Because the significance value was greater than .05, the variance between groups was considered homogeneous.

A paired-sample t-test was subsequently conducted to determine whether vocabulary achievement improved significantly within each group.

**Table 10.**

Paired-Sample t-Test Results

| No | Group        | Mean Difference | t     | Sig. (2-tailed) |
|----|--------------|-----------------|-------|-----------------|
| 1  | Experimental | 16.39           | 1.427 | .000            |
| 2  | Control      | 14.97           | 8.934 | .000            |

It can be seen that there is statistical evidence of increased vocabulary achievement among both groups. Yet, the experimental group achieved higher scores after using Wordwall-based learning methods.

An independent-samples t-test was then conducted to compare posttest scores between groups.

**Table 11.**

Independent-Samples t-Test Results

| Comparison | Mean Difference | t | Sig. (2-tailed) |
|------------|-----------------|---|-----------------|
|------------|-----------------|---|-----------------|

|                                 |             |              |             |
|---------------------------------|-------------|--------------|-------------|
| <b>Experimental vs. Control</b> | <b>8.72</b> | <b>4.563</b> | <b>.000</b> |
|---------------------------------|-------------|--------------|-------------|

Since the significance value was below .05, the null hypothesis was rejected. Therefore, a statistically significant difference existed between students taught through Wordwall-based gamified learning and those taught through conventional instruction.

### **Research Question 3: To what extent does Wordwall-based gamified learning contribute to vocabulary acquisition?**

To determine the practical significance of the intervention, effect size analysis was conducted using Cohen's *d*.

**Table 12.**  
Effect Size Analysis

| <b>Statistic</b>        | <b>Value</b>        |
|-------------------------|---------------------|
| <b>Cohen's <i>d</i></b> | <b>1.03</b>         |
| <b>Interpretation</b>   | <b>Large Effect</b> |

According to Cohen's (1988) criteria, an effect size above 0.80 indicates a large educational impact. Therefore, Wordwall-based gamified learning exerted a substantial influence on students' vocabulary acquisition.

## **Discussion**

The present study investigated whether Wordwall-based gamified learning could improve vocabulary acquisition among Indonesian EFL learners. The findings demonstrate that students who learned through Wordwall achieved substantially greater vocabulary gains than those receiving conventional instruction, indicating that Wordwall is an effective instructional tool for enhancing vocabulary acquisition in secondary EFL classrooms. These findings directly answer the research question by confirming the positive impact of Wordwall-based gamified learning on students' vocabulary development.

This result could be explained in the framework of Constructivist Learning Theory. According to constructivists, the process of learning is most effective when learners actively interact with content rather than just receiving information passively (Jonassen, 2017). In this regard, Wordwall turned the process of vocabulary learning into a highly interactive process in which learners continuously worked with lexical items through various activities such as matching games, quizzes, classification, and problem-solving. As a result of active interaction with content, learners could build strong lexical representations and link the new vocabulary with their cognitive structures. Thus, the results of the current study empirically confirm the assumptions of constructivism about active learning and vocabulary acquisition.

The findings indicate that gamification based on Wordwall had a strong impact on vocabulary acquisition of Indonesian EFL learners. Learners engaged in Wordwall-based vocabulary learning were better at acquiring new words than those learners who used traditional ways of vocabulary learning. Moreover, the analysis of the results showed that the intervention had a strong educational effect, which implies that Wordwall was more than just effective; it was an actual instrument of teaching.

The results also reinforce the explanatory power of Gamification Theory. According to Hamari et al. (2020), game-based components like competition, feedback, rewards, and challenges increase learners' intrinsic motivation and engagement. These elements were introduced into the learning process during the intervention through the use of Wordwall as an interactive tool. Feedback helped learners to recognize mistakes and clear up any confusion immediately, while the challenging nature of the activities kept students engaged and motivated to participate multiple times. The results showed that the use of gamification leads to improved engagement in vocabulary exercises and better learning outcomes.

Moreover, the results have been found to correspond to Mayer's (2021) Cognitive Theory of Multimedia Learning. The platform of Wordwall offers multiple representation methods to the user. This includes the presentation of vocabulary in text form, pictorial form, visual form, and interactive form. Dual-channel processing of such information might help learners retain vocabulary, as research has shown that this improves memory formation and vocabulary retention. The superior performance of the experimental group therefore supports the proposition that multimedia-supported learning environments contribute positively to vocabulary acquisition.

The findings obtained in the current study can be compared with those by Zou et al. (2022), Bai et al. (2021), Kohnke and Moorhouse (2022), and Alghamdi and Hassan (2024) with respect to meta-analysis research on digital game-based vocabulary learning, gamification-based vocabulary learning, interactive digital games, and gamified vocabulary learning environments.

Nevertheless, contrary to prior studies, which mainly explored the aspects of learners' engagement and perception, the current study used a quasi-experimental design in order to prove vocabulary gains among Indonesian junior secondary school students.

There are both theoretical and practical implications of the current study. Theoretically, this paper expands the existing knowledge on gamification in EFL vocabulary learning through empirical evidence obtained during a quasi-experimental study at an Indonesian secondary school. Moreover, the results of the study contribute to the existing body of literature on digital game-based language learning and vocabulary learning. Practically, this research contributes to English teachers' knowledge of the application of Wordwall as a teaching tool for developing vocabulary. Moreover, the results of the study can help schools and educational policymakers develop modern language learning environments in accordance with the requirements of twenty-first-century education.

However, there are some limitations of the current research. Firstly, the participants of the study were taken from one junior secondary school only. Second, the quasi-experimental design did not allow for complete random assignment of participants. Third, the intervention focused only on short-term vocabulary acquisition; therefore, the long-term retention of vocabulary was not examined. This is important information that should be taken into consideration when analyzing the results but does not decrease the importance of the research in proving the effectiveness of Wordwall-based gamified learning in the Indonesian EFL setting.

The areas for further research could be focused on the long-term effects of Wordwall-based gamified learning on vocabulary retention and other language skills such as reading, speaking, and writing. Research conducted using a wider range of participants at various levels of education in different regions will be helpful to generalize the obtained results. Moreover, future research may focus on comparing Wordwall with other gamified learning websites or studying the impact of learners' characteristics and digital literacy on gamified vocabulary instruction.

## **Conclusion**

Nevertheless, the present findings also reveal that the control group experienced significant improvement despite the absence of Wordwall. This outcome suggests that conventional instruction continues to contribute to vocabulary learning when implemented consistently. The difference lies in the magnitude of improvement. However, while the traditional method led to vocabulary development, the new approach was faster and resulted in higher levels of achievement. This statement is consistent with the claims made by Webb and Nation (2017), who noted that vocabulary development involves not just the process of exposure to lexical elements but also their quantity and quality. Therefore, the use of Wordwall seems to boost both aspects.

Theoretically, this research adds to the increasing body of literature dealing with the issue of language learning through the use of technological means. In particular, this work

contributes to the understanding of how constructivism, gamification, and multimedia learning theories can be integrated to provide a unified framework for explaining the observed phenomena. According to the results of this study, the mediating factor that connects gamified instructional design and vocabulary development is learner engagement. Therefore, future theoretical models can take into account engagement and motivation as central factors in explaining vocabulary development through technological means. There are several practical implications of this research related to EFL education. In particular, first, English teachers need to include Wordwall in regular vocabulary lessons since it offers an opportunity for repeated lexical exposure. Secondly, schools can help their teachers through professional development programs aimed at gamified and digital pedagogy. Finally, curriculum designers can integrate interactive digital activities in vocabulary instruction alongside traditional methods.

However, several limitations must be considered. First, the experiment took place in one school and thus may be difficult to generalize to any other educational setting. Moreover, the experiment lasted for only a few weeks and covered only vocabulary teaching and learning. Other language skills like reading, speaking, and writing have not been tested. Moreover, no attention has been paid to mediating variables such as learner motivation, self-efficacy, or engagement that could help to understand the effect of the platform on learners' learning outcomes.

Future studies should include a greater number of participants and should cover more diverse educational contexts – other schools and regions. Long-term longitudinal experiments will help researchers understand how vocabulary gains that are made using Wordwall can be retained by students. Moreover, future research could examine the interrelation between gamification of learning and psychological factors such as motivation, self-regulation, and digital literacy. Comparative studies that will help understand Wordwall in comparison with other gamified educational platforms such as Kahoot!, Quizizz, and Blooket could also be useful.

### Acknowledgement

The authors are thankful to the Principal, English teachers, and students of SMP Negeri 1 Pinggir, Bengkalis, Riau Province, for their cooperation, participation, and support in the course of this research. Their willingness to participate in this research helped make it feasible and has contributed considerably to the success of this study. Furthermore, the authors wish to express their gratitude to the academic community of STAI Hubbulwathan Duri for their guidance and encouragement in the preparation of this research. The authors would like to thank their colleagues and reviewers for their recommendations to improve the quality of the manuscript. In summary, the authors would like to extend their appreciation to everyone that has helped in any form in this research. Any mistakes remaining in the manuscript will be wholly attributable to the authors. This research was funded by STAI Hubbulwathan Duri through the Institutional Research and Community Service Grant Program 2026

### References

- Alghamdi, A., & Hassan, R. (2024). Gamified vocabulary learning and lexical achievement among EFL learners. *Education and Information Technologies*, 29(4), 4121–4142.
- American Educational Research Association. (2024). *Code of ethics*. American Educational Research Association.
- Bai, B., Wang, J., & Chai, C. S. (2021). Understanding Hong Kong primary students' English vocabulary learning through digital game-based learning. *Computer Assisted Language Learning*, 34(5–6), 769–790.
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approach* (6th ed.). SAGE.

- Deterding, S., Sicart, M., Nacke, L. E., O'Hara, K., & Dixon, D. (2019). Gamification: Using game-design elements in non-gaming contexts. In *CHI Extended Abstracts on Human Factors in Computing Systems*.
- Field, A. (2022). *Discovering statistics using IBM SPSS Statistics* (6th ed.). SAGE.
- Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2020). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. *Computers in Human Behavior*, 54, 170–179.
- Jonassen, D. H. (2017). *Learning to solve problems: A handbook for designing problem-solving learning environments*. Routledge.
- Kapp, K. M. (2021). *The gamification of learning and instruction*. Wiley.
- Kohnke, L., & Moorhouse, B. L. (2022). Facilitating synchronous online language learning through interactive digital tools. *RELC Journal*, 53(2), 296–311.
- Lin, M. H., & Chen, H. G. (2023). Multimedia-assisted vocabulary learning and lexical retention in EFL contexts. *Computer Assisted Language Learning*, 36(4), 652–674.
- Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press.
- Nation, I. S. P. (2022). *Learning vocabulary in another language* (2nd ed.). Cambridge University Press.
- Rachels, J. R., & Rockinson-Szapkiw, A. J. (2018). The effects of a mobile gamification app on elementary students' vocabulary learning. *Computers & Education*, 72, 276–286.
- Schmitt, N. (2019). Understanding vocabulary acquisition, instruction, and assessment. *Language Teaching Research*, 23(2), 181–195.
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), 1273–1296.
- Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning: A literature review. *Computers & Education*, 149, Article 103818.
- Webb, S., & Nation, P. (2017). *How vocabulary is learned*. Oxford University Press.
- Zou, D., Huang, Y., & Xie, H. (2022). Digital game-based vocabulary learning: A meta-analysis. *Educational Technology Research and Development*, 70(4), 1981–2005.