

The Effectiveness of Wordwall Games in Supporting English Vocabulary Retention for EFL Grade 9 Students in Thailand

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Abstract:

Background and Objectives: Vocabulary retention is a fundamental component of English language learning, particularly for learners in English as a Foreign Language (EFL) context where opportunities for authentic language exposure are limited. Traditional vocabulary instruction often emphasizes rote memorization which may not sufficiently promote long-term retention or learner engagement. In recent years, digital game-based learning has gained increasing attention as an innovative pedagogical approach that enhances learner motivation, active participation, and meaningful learning experiences. Among various digital learning platforms, Wordwall offers interactive and customizable educational games that can reinforce vocabulary learning through repeated practice and immediate feedback. Despite its growing popularity in English classrooms, empirical evidence regarding its effectiveness in improving vocabulary retention among Thai secondary school students remains limited. Therefore, this classroom research aimed to investigate the effectiveness of Wordwall games in enhancing English vocabulary retention and to examine students' satisfaction with vocabulary learning through Wordwall game-based activities among ninth-grade students at Mattayomsiriwanwari 2 Songkhla School.

Methods: This study employed a one-group pre-test–post-test classroom research design involving 33 ninth-grade students enrolled in an English course during the academic semester. Students participated in a series of vocabulary learning activities integrated with Wordwall games over the instructional period. The research instruments included a 30-item English vocabulary achievement test administered as both a pre-test and post-test to measure vocabulary retention and a 10-item satisfaction questionnaire using a five-point Likert scale to evaluate students' perceptions of instructional content, learning activities, motivation, engagement, and the overall usefulness of Wordwall games. Descriptive statistics, including mean scores and standard deviations, were used to summarize the data, while a paired-sample t-test was employed to compare students' vocabulary achievement before and after the intervention. Cohen's *d* was calculated to determine the magnitude of the instructional effect.

Results: The findings demonstrated a significant improvement in students' English vocabulary performance following the use of Wordwall games in vocabulary instruction. The mean post-test score ($M = 24.39$, $SD = 3.84$) was significantly higher than the mean pre-test score ($M = 18.58$, $SD = 4.31$), with a mean gain of 5.82 points, $t(32) = 52.62$, $p < .001$. The standardized effect size based on the variability of the paired difference

scores was very large (Cohen's $d = 9.16$, 95% CI [6.89, 11.41]), indicating a substantial magnitude of pre–post improvement. In addition, students reported high overall satisfaction with the use of Wordwall games ($M = 4.31$, $SD = 0.59$). They reported that the interactive activities increased their motivation, sustained their attention, encouraged active participation, and made vocabulary learning more enjoyable and less stressful. The immediate feedback and competitive elements were also perceived as valuable features that supported vocabulary review and reinforced learning.

Conclusions: This study concludes that Wordwall games significantly enhance English vocabulary retention while fostering positive learning experiences among Thai secondary school students. The integration of digital game-based learning into vocabulary instruction not only improves academic achievement but also promotes learner motivation, engagement, and satisfaction. These findings support the adoption of interactive educational technologies as effective instructional tools for English language teaching and provide valuable implications for teachers seeking innovative strategies to improve vocabulary learning outcomes in EFL contexts.

Keywords: Wordwall Games; English Vocabulary; Vocabulary Retention

Introduction

In today's digital era, driven by rapid technological advancement, digital media has increasingly integrated into various dimensions of education, and it has transformed the dynamics of teaching and learning according to UNESCO [1]. In Thai EFL teaching, the rapid expansion of online platforms and digital tools has dramatically changed teaching and learning methods. These platforms and applications help offer opportunities for teachers to enhance student engagement and encourage more interesting teaching practices [2]. Gamebased digital tools have been shown to increase enjoyment and stimulate learner attention in language classrooms [3]. Because these tools can be accessed through web browsers and applications anywhere, they provide teachers with channels to design more interactive content for their learners and needs [4]. At the same time, English continues to play a crucial role in Thai society, serving as an important language for international communication and professional opportunities [5].

Vocabulary development is a fundamental aspect of English language acquisition because lexical knowledge supports the four essential English language skills of listening, speaking, reading, and writing [6]. Learners who have limited vocabulary often face difficulties when reading difficult texts, participating in oral communication, expressing ideas in writing, and engaging with academic content.

During the internship at Mattayomsiriwanwari 2 Songkhla School, conducted from December 2024 to March 2025, classroom observations identified three key challenges faced by ninth-grade students in learning English vocabulary. First, students had difficulty with memorizing and retaining new English words, which negatively affected their broader communicative proficiency [7]. Second, although some students were able to recall their vocabulary items, they lacked deeper meaning understanding and contextual usage. This limited their ability to apply vocabulary accurately across communicative situations [8]. Third, the traditional teacher-centered teaching style contributed to unengaging and stressful classroom conditions, which reduced students' motivation and participation in vocabulary lessons [9].

In response to these three challenges, game-based learning has been adopted as a main teaching approach that can foster interest and curiosity in learning new words, thereby supporting vocabulary development. Kasproicz [10] highlighted the value of gaming activities in supporting language learning through interaction and motivation. Wordwall, a widely used digital platform, enables teachers to design customized games that promote interactive and engaging learning. Nurammida et al. [11] similarly reported that Wordwall allowed teachers to develop interactive materials that enhance classroom participation.

Previous studies have consistently reported the positive effects of Wordwall games on vocabulary learning. Research conducted in Vietnam demonstrated improved vocabulary retention among lowersecondary students, while studies involving elementary learners and Saudi EFL students similarly reported vocabulary gains when Wordwall activities were incorporated into classroom instruction [12-13]. Despite this growing body of evidence, research in Thai secondary EFL contexts remains limited, particularly studies that simultaneously examine vocabulary retention and learner satisfaction within Englishmedium instructional settings. This gap highlights the need to explore how digital gamebased tools can effectively support vocabulary development and students' engagement in Thai classrooms.

Accordingly, this study aims to explore the effectiveness of Wordwall games in improving English vocabulary retention among ninth-grade students at Mattayomsiriwanwari 2 Songkhla School. The study also investigates students' satisfaction towards the use of Wordwall games as part of vocabulary teaching and learning. By focusing on both cognitive gains and affective responses from the students, this study seeks to provide empirical data or evidence on how online interactive digital tools could enhance vocabulary learning and promote student-centered instructional practices within the Thai EFL classrooms.

Research Objectives

1. To evaluate the improvement in English vocabulary retention among ninth-grade students following instruction using Wordwall games, online games, as compared to their baseline performance.
2. To assess the level of students' satisfaction with the English vocabulary learning experiences after engaging with Wordwall games.

Research Questions

1. How does the use of Wordwall games affect English vocabulary memorization or retention skills among ninth-grade students compared to their baseline performance?
2. What is the level of students' satisfaction with the English vocabulary learning experiences after using Wordwall games?

Research Hypotheses

1. H₁: Ninth-grade students who receive vocabulary instruction using Wordwall games will show a significant improvement in English vocabulary retention compared to their baseline performance.
2. H₂: Ninth-grade students will report a high level of satisfaction towards their English vocabulary learning experiences after using Wordwall games.

Research Framework

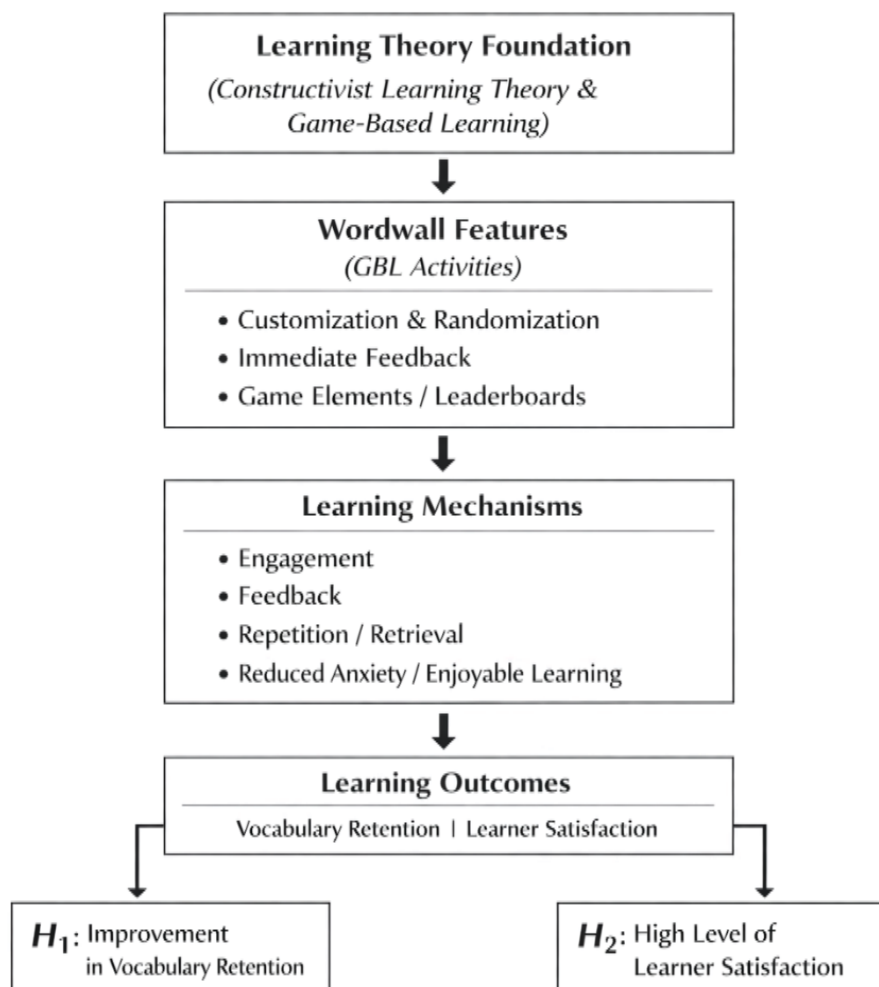
By adopting a constructivist approach, this study posits that knowledge is developed as learners actively participate, interact socially, and receive targeted feedback within carefully structured learning contexts [14]. Such environments help capture learners' attention, maintain active participation, and support longer engagement that are essential for long term vocabulary development in EFL classrooms [15]. Learning vocabulary without repeated practice, timely feedback from teachers, and opportunities for use, newly learned words are easily forgotten. Retrieval practice and repetitive learning are, therefore, key mechanisms that reinforce form–meaning connections and reduce forgetting over time [16]. These principles suggest that learning vocabulary must offer multiple opportunities for learners to recall, apply, and refine target lexical items under supportive learning conditions.

Gamebased learning (GBL) enhances memory by embedding engagement, structured repetition, and immediate feedback into purposeful activities. When games provide clear goals, appropriate challenge levels, and attractive rewards, they sustain learners' attention and offer instant corrective cues that promote revision and retrieval [17]. Because practice occurs in lowstakes, enjoyable environments, anxiety decreases and learners are more willing to persist through difficult tasks [18]. Overall, GBL supports both retention and motivation by integrating cyclical practice, attentioncapturing design features, and realtime feedback into the learning process.

Within the broader framework of game-based learning (GBL), Wordwall games offer distinctive features that play a vital role in English language teaching. The platform allows teachers to customize activities and enables them to be aligned precisely with unit objectives and learner proficiency levels. It also offers immediate correctness feedback and randomized item presentation, which increases retrieval opportunities and support realtime correction during practice [19]. Competitive or interactive activities such as timers and leaderboards can heighten focus and sustain engagement when applied appropriately in EFL classrooms [20]. Collectively, these features build an environment that reinforces autonomy, competence, and enjoyment to promote stronger retention and cultivate more positive learner attitudes.

Further evidence from other contexts also supports the effectiveness of Wordwall activities in vocabulary instruction. Studies involving EFL learners in Indonesia and high school students in Oman integrated Wordwall activities into regular classroom practice and reported increased engagement, improved participation, and significant gains in vocabulary learning [21-22]. These results align with broader game-based learning research, which emphasizes that repeated retrieval, immediate feedback, and motivational elements contribute to improved vocabulary learning outcomes [23]. Although prior research supports the potential of Wordwall for vocabulary learning, little work has addressed the needs of Thai ninthgrade EFL learners from a constructivist or engagementfocused perspective.

Thus, the framework in this study outlines a clear theory-driven pathway grounded in constructivist learning principles that supports the integration of interactive, customizable, and feedback-intensive Wordwall activities. These activities activate mechanisms such as engagement, repeated retrieval, rapid correction, and reduced anxiety, ultimately fostering greater vocabulary retention and higher learner satisfaction in ninth-grade Thai EFL classrooms.



Picture 1: Research Framework

This diagram presents the theoretical pathway connecting constructivist learning theory with Wordwall game-based activities, hypothesizing that these mechanisms enhance vocabulary retention (Hypothesis 1) and increase learner satisfaction (Hypothesis 2) among ninth-grade EFL students.

Methodology

Population and Sample

The population for this study comprised two classes of 60 ninth-grade students from Matthayomsirirwanwari 2 Songkhla School. Purposive sampling was employed to select 33 students in one class taught by the student teacher during the teaching practicum (December 2024–March 2025). The participants represented a mixed group with English proficiency levels ranging from beginner to intermediate. Prior to data collection, the researchers informed the school director, supervising teacher, and students about the study and provided an explanation of its objectives, procedures, tests, and questionnaires.

Research Instruments

Lesson Plans

Eight lesson plans were developed, one for each week of the 8-week intervention. Each plan was designed for a 50-minute class session, focusing on 15 vocabulary words per unit, using eight different Wordwall games for interactive instructional activities. The vocabulary utilized in this study was drawn from the ninth-grade basic English course (Course Code: A23102, Semester 2, as outlined in New Frontiers Student's Book, published by Institute of Academic Development (IAD). The course content aligned with the 2008 Basic Education Core Curriculum and comprised four selected units: «What's Cooking?», «Know the Rules?», «Let's Go Shopping!», and «After School.»

English Vocabulary Skills Test (Pre-test and Post-test)

A 30-item English vocabulary test was developed, selected from the four units, to assess students' vocabulary retention. The test comprised three distinct sections:

Part 1: Multiple-choice questions (10 items) focused on assessing the understanding of vocabulary meaning.

Part 2: Word scramble (10 items) required students to complete words with missing letters, testing spelling and word recognition.

Part 3: Sentence completion (10 items) required students to select the appropriate vocabulary word to complete sentences, assessing contextual usage.

The content validity of the vocabulary test was evaluated by three subject matter experts using the Index of Item-Objective Congruence (IOC), yielding a reliability score of 1.0.

Student Satisfaction Questionnaire

A 10-item student satisfaction questionnaire was designed to gather feedback on learning management through the Wordwall games online platform. The questionnaire covered three aspects: content, learning activities, and perceived benefits. Responses were collected using a 5-point Likert scale, ranging from «very satisfied» to «not satisfied.» The content validity of the questionnaire was also assessed by three experts using the IOC method, yielding IOC values at 1.00.

Data Analysis

Data from the pre-test, post-test, and satisfaction questionnaires were analyzed by IBM SPSS software. The following statistics were applied.

Descriptive Statistics

The mean and standard deviation were computed to provide a summary of students' vocabulary test scores and their levels of satisfaction with the learning experiences. To interpret the satisfaction ratings, a five-level scale was employed:

- Very High: 4.51 – 5.00
- High: 4.01 – 4.50
- Moderate: 3.51 – 4.00
- Low: 2.01 – 3.50
- Very Low: 1.00 – 2.00

Paired Sample T-Test

A paired sample *t*-test was conducted to examine whether a statistically significant difference existed between pre-test and post-test vocabulary scores ($p < .001$), thereby evaluating the effectiveness of the Wordwall games intervention.

Cohen's d Effect Size

Cohen's *d* (SD of difference scores) was calculated to determine the magnitude of the difference between the two sets of scores, expressed in terms of standard deviation units, offering insight into the practical significance of the intervention.

Research Results

A comprehensive analysis of students' academic performance and their satisfaction with Wordwall gamebased learning activities was presented below. The findings were based on a sample of 33 participants ($N = 33$) to evaluate the effectiveness of the instructional intervention.

Table 1. Descriptive Statistics of Post-test and Pre-test Scores

Test	N	Min	Max	M	SE	SD
Post-test	33	17.00	30.00	24.39	0.67	3.84
Pre-test	33	10.00	25.00	18.58	0.75	4.31

Table 1 presented the descriptive statistics for the post-test and pre-test scores of the participants. The results showed that the post-test scores ($M = 24.39$, $SD = 3.84$) were higher than the pre-test scores ($M = 18.58$, $SD = 4.31$), indicating an improvement after the intervention. The post-test scores ranged from 17.00 to 30.00, whereas the pre-test scores ranged from 10.00 to 25.00. Both tests included 33 participants, with standard errors of 0.67 for the post-test and 0.75 for the pre-test.

Table 2. Paired Samples *t*-Test Results for Post-test and Pre-test Scores

Test	N	M	SD	t
Post-test	33	24.39	3.84	52.62***
Pre-test	33	18.58	4.31	

*** $P < .001$

Table 2 presented the results of the paired-samples *t*-test comparing students' post-test and pre-test scores. The findings indicated that the mean score on the post-test ($M = 24.39$, $SD = 3.84$) was higher than the mean score on the pre-test ($M = 18.58$, $SD = 4.31$) for the 33 participants. The paired-samples *t*-test revealed a statistically significant difference between the two tests, $t(32) = 52.62$, $p < .001$. This result suggested that students' performance significantly improved after the intervention. The very large *t* value reflected the combination of a sizable mean gain and minimal variability in the paired differences, the high post-test scores and the low pre-test scores, indicating that nearly all participants showed a similarly strong improvement following the use of Wordwall activities.

Table 3. Paired Samples Effect Sizes

Comparison	Effect Size	Standardizer	Estimate	95% CI Lower	95%CI Upper
Post-test–	<i>d</i> (Cohen's <i>d</i>)	0.63	9.16	6.89	11.41
Pre-test	<i>g</i> (Hedges' <i>g</i>)	0.64	9.05	6.81	11.28

Note. Cohen's *d* was calculated as the mean paired difference divided by the standard deviation of the paired differences (SD_{D}). The mean difference was 5.82 ($SD_{D} = 0.64$), yielding Cohen's *d* = 9.16, which represents a very large effect according to conventional benchmarks.

Table 3 presented the standardized effect sizes for the difference between students' post-test and pre-test vocabulary scores. The results showed Cohen's *d* = %95 ,9.16 CI [11.41 ,6.89], and Hedges' *g* = %95 ,9.05 CI [11.28 ,6.81], both of which substantially exceeded Cohen's benchmark for a large effect (*d* = 0.80) and indicated a very large effect. Cohen's *d* was calculated from the mean paired difference (5.82) divided by the standard deviation of the paired differences ($SD_{D} = 0.64$), yielding *d* = 9.16. Together with the significant paired-samples *t*-test reported in Table 2, these findings indicated substantial pre–post growth in vocabulary performance. However, given the one-group pre-test–post-test design, the results demonstrated strong pre–post gains rather than definitive evidence of a causal effect of the Wordwall intervention alone.

Table 4. Learners' Satisfaction

Item	M	SD	Level of Satisfaction
Content Presentation			
1. Relevance and engagement	4.52	0.51	Very High
2. Clarity and understandability	4.52	0.51	Very High
3. Sufficiency for learning objectives	4.00	0.71	Moderate
Learning Activities			
4. Enjoyable and motivating	4.52	0.51	Very High
5. Supports learning and memory	4.52	0.51	Very High
6. Practice and application	4.00	0.71	Moderate
7. Appropriate difficulty	4.00	0.71	Moderate
Perceived Benefits			
8. Enhances enjoyment and interaction	4.52	0.51	Very High
9. Improves learning outcomes	4.52	0.51	Very High
10. Vocabulary retention	4.00	0.71	Moderate
Total Mean = 4.31		.59	

Table 4 summarized the learners' satisfaction with the use of Wordwall games in terms of content presentation, learning activities, and perceived benefits. Students rated the content as highly relevant and easy to understand ($M = 4.52$, $SD = 0.51$), although adequacy for achieving learning objectives received a moderate rating ($M = 4.00$, $SD = 0.71$). Wordwall games were perceived as enjoyable and motivating ($M = 4.52$, $SD = 0.51$) and supportive of memory retention ($M = 4.52$, $SD = 0.51$). However, opportunities for practice and the appropriateness of the difficulty level were rated moderately ($M = 4.00$, $SD = 0.71$). Wordwall games were seen as enhancing enjoyment, interaction, and outcomes ($M = 4.52$, $SD = 0.51$), though vocabulary retention was rated moderately ($M = 4.00$, $SD = 0.71$). Overall, the total mean score was 4.31 ($SD = 0.59$), which indicated a substantial level of satisfaction with Wordwall games as a digital learning tool.

Conclusion and Discussion

The findings indicate that Wordwall games have considerable potential to support English vocabulary learning among ninth-grade Thai EFL students. Students demonstrated a statistically significant improvement in vocabulary performance from the pre-test ($M = 18.58$, $SD = 4.31$) to the post-test ($M = 24.39$, $SD = 3.84$), $t(32) = 52.62$, $p < .001$. This substantial pre–post improvement is consistent with previous research showing that digital game-based learning (GBL) can facilitate vocabulary acquisition by combining learning activities with interactive and engaging experiences [24]. However, because the present study employed a one-group pre-test–post-test design, the findings should be interpreted as evidence of substantial improvement following the intervention rather than definitive evidence that Wordwall alone caused the observed gains. The standardized effect size was very large (Cohen's $d = 9.16$). This value, however, should be interpreted cautiously because it was standardized using the standard deviation of the paired difference scores rather than the pooled standard deviation of the pre-test and post-test scores. As a result, the magnitude is considerably larger than effect sizes calculated using the pooled-SD convention commonly reported in literature. Thus, the effect size indicates a substantial magnitude of change within the sample but should not be interpreted as evidence of an exceptionally large causal effect of Wordwall. Nevertheless, the significant paired-samples t-test and the magnitude of the standardized difference together provide evidence of meaningful improvement in students' vocabulary performance during the intervention period. In addition to cognitive gains, students reported a high level of satisfaction with the Wordwall activities ($M = 4.31$, $SD = 0.59$), particularly in terms of enjoyment, motivation, and interaction. These findings support previous research suggesting that GBL can foster interactive and low-stress learning environments that encourage learner participation and motivation [25]. The positive affective responses observed in this study may be attributed to the interactive nature of Wordwall, which allows students to participate actively, receive immediate feedback, and repeatedly engage with target vocabulary. However, the moderate ratings for practice adequacy and difficulty level suggest that engagement alone may not be sufficient to promote deeper vocabulary learning. Wordwall activities should therefore be supplemented with structured practice, contextualized language use, and opportunities for students to apply newly learned vocabulary.

From a theoretical perspective, the findings are consistent with constructivist learning principles, which emphasize that learners actively construct knowledge through interaction and meaningful learning experiences [26]. The customizable features of Wordwall, including varied activity formats, randomization, repetition, and immediate feedback, provide opportunities for students to actively retrieve and process vocabulary rather than simply encounter words passively. Repeated retrieval and exposure may strengthen form–meaning associations, while immediate feedback can help learners recognize and correct errors. These mechanisms provide a plausible explanation for the improvement observed between the pre-test and post-test and are consistent with previous research highlighting the cognitive and affective benefits of digital games in language learning. The findings are particularly relevant to persistent challenges in vocabulary instruction, including limited retention, insufficient opportunities for retrieval, shallow processing, and low learner engagement. Digital games can integrate repetition, feedback, interaction, and contextualized learning opportunities, thereby addressing both cognitive and affective aspects of language learning [27]. In the present study, Wordwall provided repeated opportunities for learners to encounter and retrieve target vocabulary in an interactive environment. Such repeated retrieval is important because newly learned vocabulary can be easily forgotten when opportunities for subsequent review are limited. Therefore, the pedagogical value of Wordwall extends beyond entertainment; when purposefully integrated into instruction, it can provide a practical mechanism for vocabulary reinforcement and repeated retrieval [28]. From a pedagogical perspective, Wordwall should be addressed as a complementary instructional tool rather than a replacement for systematic vocabulary instruction. Teachers can employ Wordwall to introduce, review, and reinforce vocabulary while combining game-based activities with explicit instruction, contextualized practice, productive language use, and assessment. Careful customization is also essential. Activities should be aligned with

clearly defined learning objectives, provide an appropriate level of challenge, and create opportunities for students to apply vocabulary in meaningful contexts [29]. The moderate satisfaction ratings for practice adequacy and difficulty level further suggest that teachers need to balance enjoyment and challenge with sufficient repetition and opportunities for deeper processing. Such purposeful integration can enhance the instructional value of digital game-based learning while maintaining alignment with intended learning outcomes.

Despite these promising findings, several limitations should be acknowledged. First, the sample consisted of only 33 ninth-grade students from a specific educational context, which limits the generalizability of the findings to other Thai EFL learners. Second, the absence of a control or comparison group makes it difficult to determine whether the observed improvement was attributable exclusively to Wordwall. Other factors, including regular classroom instruction, maturation, test familiarity, or additional learning experiences, may have contributed to the improvement. Third, although the study demonstrated significant pre–post gains, it did not employ a delayed post-test; therefore, the findings should not be interpreted as definitive evidence of long-term vocabulary retention. Future studies should address these limitations by employing larger and more diverse samples, control or comparison groups, and delayed retention tests. Longitudinal research would also be valuable for determining whether vocabulary gains are maintained over time. Future research could further examine the effectiveness of Wordwall in comparison with conventional vocabulary instruction and other forms of digital game-based learning. Researchers could also investigate whether the use of Wordwall contributes to broader language outcomes, including reading comprehension, speaking, writing, and communicative competence. Examining how different levels of task difficulty, frequency of repetition, feedback types, and opportunities for contextualized vocabulary use influence learning outcomes could provide additional insight into how digital games can be most effectively integrated into EFL classrooms. Overall, the findings suggest that Wordwall games can serve as an engaging and potentially effective complement to conventional English vocabulary instruction. The significant pre–post improvement in vocabulary performance, together with students' high satisfaction with the activities, indicates that digital game-based learning can provide meaningful opportunities for active participation, retrieval, repetition, feedback, and motivation. While the current design does not permit definitive causal conclusions or claims regarding long-term retention, the findings provide encouraging evidence for the pedagogical potential of Wordwall in Thai EFL classrooms. Accordingly, teachers are encouraged to use digital game-based activities purposefully, linking them to clear learning objectives and combining them with structured practice and authentic language use. Further research using stronger experimental designs, larger samples, and delayed retention measures is needed to establish the durability and broader educational impact of this approach.

References

- [1] UNESCO. (2025). *2025 East Asia report: Leadership in education is key to digital transformation*. Global Education Monitoring Report. <https://www.unesco.org/gem-report/en/2025eastasia>
- [2] Kawinkoonlasate, P. (2020). Online language learning for Thai EFL learners: An analysis of effective alternative learning methods in response to the COVID-19 outbreak. *English Language Teaching*, 13(12), 15–26. <https://doi.org/10.5539/elt.v13n12p15>
- [3] Chaopipat, Y., Boontham, A., & Charoensatsiri, R. (2023). Effects of game-based learning on student engagement and academic achievement of metabolism of biomolecules in first-year nursing students. *Journal of Education, Chulalongkorn University*, 51(3), 1–13. tcj-thaijo.org (In Thai).
- [4] Tae-tong, T., & Thaima, W. (2023). The development of English vocabulary learning by using team game tournament technique with gamification for grade 1 students. *Journal of Paramita*, 5(2), 67–79. <https://awut.org/ojs/index.php/paramita/article/view/246>

- [5] Chaayasat, C., & Intakaew, A. (2023). Communicative language teaching for Thai EFL students and classroom silences in English medium instruction. *Issues in Educational Research*, 33(4), 1323–1340. <http://www.iier.org.au/iier33/chaayasat.pdf>
- [6] Ali, Z., Mankash, M. A., & Ullah, N. (2022). Vocabulary learning strategies and their influence on language proficiency of multilingual undergraduate ESL learners. *Journal of Educational Research & Social Sciences Review*, 2(3), 21–34. <https://www.researchgate.net/publication/369660047>
- [7] Ali, H. M., & Fredriksson, M. (2023). *The effect of vocabulary acquisition on L2 student's communicative competence through task-based learning* [Independent project, Jönköping University]. DiVA Portal. <https://www.diva-portal.org/smash/get/diva2:1733985/FULLTEXT02.pdf>
- [8] Masrai, A., & Milton, J. (2021). Vocabulary knowledge and academic achievement revisited: General and academic vocabulary as determinant factors. *Southern African Linguistics and Applied Language Studies*, 39(3), 282–294. <https://doi.org/10.2989/16073614.2021.1942097>
- [9] Bozna, H., & Yüzer, T. V. (2020). Digital natives' use of Web 2.0 tools in learning foreign language: A case study. *Language and Technology*, 2(1), 26–43.
- [10] Kasprowicz, R. (2017, November 28). *Gaming Grammar—How can games support language learning?* [Video]. YouTube. <https://www.youtube.com/watch?v=atDSOIbPkRo>
- [11] Nurammida, N., Nizarrahmadi, & Yolanda, A. (2024). The effectiveness of Wordwall game as media to teach students' English vocabulary mastery of eighth-grade. *Jurnal Jendela Pendidikan*, 4(3), 283–292. <https://www.ejournal.jendelaedukasi.id/index.php/JJP>
- [12] Dang, T. H. T., & Hoang, H. L. (2025). Using Wordwall application to enhance English vocabulary for 7th grader students at a lower secondary school in Thai Nguyen. *International Journal of Education, Humanities and Social Science*, 8(5), 177–187. <https://doi.org/10.54922/IJEHSS.2025.1091>
- [13] Almuafa, H. A., & Alqurashi, H. S. (2025). The impact of using Wordwall interactive games on English vocabulary acquisition: Evidence from Saudi Arabia. *International Journal of Linguistics*, 17(2), 64–78. <https://doi.org/10.5296/ijl.v17i2.22685>
- [14] McLeod, S. (2025). *Constructivism learning theory & philosophy of education*. Simply Psychology. <https://www.simplypsychology.org/constructivism.html>
- [15] Sotthikun, R., Dibyamandala, J., & Mangkhang, C. (2022). Digital game-based learning management to enhance English vocabulary skill and collaborative skill in 21st century for high school students. *Rajabhat Journal of Northern Rajabhat Universities*, 12(2), 45–60. tcj-thaijo.org (In Thai).
- [16] Saksittanupab, P. (2024). Enhancing vocabulary acquisition and retention: The role of spaced repetition in language learning. *Journal of Modern Learning Development*, 9(5), 205–215.
- [17] Bruggink, S., Dawson, J. W., & McKinnell, I. W. (2025). Isolating the effect of gamification—Design and analysis of a learning engagement app tailored to course content. *Technology, Knowledge and Learning*, 30(2), 1149–1166. <https://doi.org/10.1007/s10758-025-09823-z>
- [18] Phunsa, S., & Pawala, T. (2024). Learning through gameplay: Creating memorable learning experiences with games. *Journal of Education and Learning Reviews*, 1(1), 39–46. <https://doi.org/10.60027/jelr.2024.678>
- [19] Ilahiyati, N., Rohmah, Z., & Hamamah. (2023). The implementation of Wordwall games in vocabulary learning. *IJEE (Indonesian Journal of English Education)*, 10(1), 144–159. <https://doi.org/10.15408/ijee.v10i1.29905>
- [20] Philpott, A., & Son, J.-B. (2022). Leaderboards in an EFL course: Student performance and motivation. *Computers & Education*, 190, 104605. <https://doi.org/10.1016/j.compedu.2022.104605>
- [21] Marpaung, A. W., & Katemba, C. V. (2025). Improving students' vocabulary through unjumbled word wall medium at grade seven of SMPN 1 Parongpong. *Journal of Innovative and Creativity*, 5(3), 35282–35291.

- [22] Bouzaiane, B., & Youzbashi, A. (2024). The role of digital game-based language learning in EFL vocabulary learning and retention: A case study at a higher educational institute in Oman. *Journal of Language Teaching and Research*, 15(5), 1660–1669. <https://doi.org/10.17507/jltr.1505.27>
- [23] Sinaga, Y., Aryani, N., Herman, H., Fadhly, F., Rahmawati, R., & Al-Awawdeh, N. (2025). The effect of Wordwall media game on vocabulary development: A quasi-experimental study. *English Review: Journal of English Education*, 13(3), 1145–1154. <https://doi.org/10.25134/englishreview.v13i3.101>
- [24] Jia, W., Zhang, L., Pack, A., Guan, Y., & Zou, B. (2024). Digital game-based learning's effectiveness on EFL learners' receptive and productive vocabulary knowledge. *Language Learning & Technology*, 28(1), 1–21. <https://doi.org/10.64152/10125/73554>
- [25] Rajendran, M., Ray, M., Ilangovan, A., Xavier, Y., & Parthasarathy, G. (2024). Game-based learning and its impact on students' motivation and academic performance. *Multidisciplinary Reviews*, 8, e2025074. <https://doi.org/10.31893/multirev.2025074>
- [26] Puangpunsi, N. (2023). Efficacy of Flipgrid app as an assistant for speaking skill development in EFL classroom. *Parichart Journal*, 36(4), 78–88. <https://doi.org/10.55164/pactj.v36i4.265526>
- [27] Morales, L., Castillo, J., & Cuarte, R. (2024). A systematic review on the effectiveness of digital game-based learning in the development of vocabulary skills. *International Journal of Multidisciplinary Studies in Higher Education*, 1(1), 55–62. <https://doi.org/10.70847/586368>
- [28] Putera, Z. F. (2023). The impact of game-based language learning apps on student engagement and proficiency. *Transformational Language, Literature, and Technology Overview in Learning (TRANSTOOL)*, 2(3), 7–13. <https://ojs.transpublika.com/index.php/TRANSTOOL>
- [29] Meng, C., Zhao, M., Pan, Z., Pan, Q., & Bonk, C. J. (2024). Investigating the impact of gamification components on online learners' engagement. *Smart Learning Environments*, 11(47). <https://doi.org/10.1186/s40561-024-00336-3>