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Unlocking English Vocabulary Mastery: An Innovative Learning Experience with the Wordwall Platform

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Abstract

This research underscored the transformative capabilities of gamified platforms, such as Wordwall, in overcoming vocabulary mastery obstacles within resource-constrained educational environments. It advocates for targeted investments in both infrastructure and teacher training to alleviate technical challenges, including issues related to connectivity and device accessibility, while also promoting a balance between competitive gamification and deeper cognitive engagement. Conducted as Classroom Action Research (CAR) with eighth-grade students at SMP Negeri 1 Bontomarannu, the intervention utilized principles of spaced repetition, Dual Coding Theory, and collaborative learning, resulting in notable advancements in vocabulary proficiency: pronunciation accuracy improved from 21.05% to 63.15%, spelling from 28.94% to 78.96%, comprehension from 15.07% to 78.94%, and the achievement of Minimum Competency Criteria (KKM) increased from 44.73% to 84.21% over two cycles. A mixed-methods approach, incorporating tests, observations, and interviews, demonstrated Wordwall's effectiveness in enhancing retention and motivation through interactive and visually stimulating tasks. However, challenges such as technical interruptions, inconsistent participation, and time limitations highlighted the necessity for adaptive

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content design and improved classroom management techniques. These results reinforced the notion that gamified tools can serve as scalable solutions to address educational disparities, particularly when combined with infrastructure enhancements and pedagogical refinements, thereby providing a replicable framework for student-centered innovation in language education. This research not only demonstrates the effectiveness of Wordwall as an interactive learning tool but also confirms the importance of synergy between technology, educational policy, and teaching practices in creating sustainable innovation in language education.

Keywords: *English Vocabulary Mastery, Student Engagement, Wordwall Platform*

1. Introduction

English plays a crucial role in global affairs. Its widespread use, compared to other international languages, has made it the most prominent. In contemporary times, English is integral to nearly every aspect of global affairs, including education, economics, sports, science, medicine, and security. Moreover, it is essential to recognize that most scientific literature is written in English. Consequently, to fully comprehend these resources and acquire knowledge, individuals, including Indonesian students, must possess proficiency in English (Jambari et al., 2021). In Indonesia, English is taught as a foreign language, commonly referred to as TEFL (Teaching English as a Foreign Language). This term describes the teaching of English in contexts where it is neither the native language nor the second language. Broadly speaking, as a foreign language, English is taught as a subject in schools but does not function as the medium of instruction or as a language of communication within the country's government, business, or industry sectors. The teaching of English in schools encompasses language components, including the skills of listening, speaking, reading, and writing. Among these four skills, improving vocabulary is essential as it serves as the foundation for enhancing all of them.

Numerous vocabulary-related challenges emerge in the process of teaching and learning English. While vocabulary constitutes a crucial element of language that students need to acquire, a significant number continue to demonstrate inadequate levels of vocabulary proficiency. Based on the researcher's observations in Grade VIII at SMPN 1 Bontomarannu, students face challenges in expressing their thoughts due to their limited English vocabulary. Additionally, some students lack

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confidence when communicating in English. In line with Sardi (2022), his research found that many students in schools exhibit a lack of motivation and diligence when it comes to memorizing English vocabulary. They typically have only ninety minutes of English instruction per week, which often leads to boredom and disengagement. Some students even skip class, or if they do attend, tend to become distracted or sleepy, or skip lessons altogether. One contributing factor is that English teachers primarily focus on tasks such as writing and reading without emphasizing the importance of vocabulary memorization. These challenges are attributed to several factors, including the teaching methods employed, students' lack of motivation and interest in learning English, and their difficulty in comprehending the language. From these observations, the researcher identifies two primary factors contributing to the challenges in developing students' vocabulary knowledge. First, internal factors include students' ability and motivation to improve their vocabulary knowledge. Second, external factors are mainly related to teachers' strategies. Vocabulary teaching and learning may face obstacles because many teachers lack confidence in best practices for vocabulary instruction and, at times, are uncertain about how to prioritize and effectively emphasize word learning. Recognizing the importance of vocabulary and the challenges students face in improving their vocabulary knowledge, English teachers must adopt engaging methods to capture students' attention. Teachers need to explore and implement effective strategies for teaching English vocabulary. They should develop efficient vocabulary acquisition techniques that cater to students' needs. Teaching vocabulary strategies often helps students memorize vocabulary and enables them to assess their progress in learning new words. There are various techniques and strategies for teaching English vocabulary, such as puzzles, stick figures, card games, pictures, and many others. One commonly used strategy is the Wordwall.

2. Literature

Wordwall is a learning platform specifically designed to help teachers create and utilize interactive word cards in the teaching process. This platform enables teachers to digitally create, organize, and use word cards in various learning activities (Jannah et al., 2024). By using interactive word cards from this platform, teachers

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can make the learning process more engaging, expand students' vocabulary, and strengthen their understanding of the material being taught.

Despite the increasing interest in gamified educational platforms such as Wordwall (Jannah et al., 2024), significant deficiencies remain. Firstly, current research predominantly addresses general vocabulary teaching, overlooking intricate grammatical aspects, such as the Comparison Degree, which necessitate tailored pedagogical strategies. Secondly, the utilization of Wordwall in Indonesian classrooms, particularly those facing resource limitations and pronounced technical and curricular obstacles, has not been sufficiently investigated. Thirdly, existing studies frequently prioritize quantitative measures of success (e.g., test scores) while failing to explore the alignment of gamified tools with cognitive frameworks, such as Dual Coding Theory by Paivio (1986), as outlined in Mayer (2002), which could enhance learning experiences. Lastly, there is a notable absence of context-specific Classroom Action Research (CAR) that systematically evaluates and modifies these tools to tackle pervasive issues such as student disengagement and teacher uncertainty. This study is motivated by the necessity to tackle the ongoing difficulties students face in mastering vocabulary, particularly among Grade VIII learners at SMP Negeri 1 Bontomarannu. It utilizes Classroom Action Research (CAR) to assess the effectiveness of Wordwall as a pedagogical tool aimed at improving students' understanding of Comparison Degree vocabulary. Anchored in Dual Coding Theory and characterized by a process of iterative refinement, this research aims to address existing theoretical, contextual, and methodological gaps in Teaching English as a Foreign Language (TEFL) vocabulary instruction. It focuses on less-explored domains, such as the application of gamified teaching strategies for vocabulary with grammatical subtleties, while also accommodating the realities of resource-limited classroom environments. Furthermore, it aligns interactive educational tools with cognitive learning theories to promote enhanced retention and student engagement.

3. Method

This study employed Classroom Action Research (CAR), a method designed to address specific issues within a classroom setting through the implementation

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of targeted actions. Educators typically conduct CAR to enhance the teaching and learning process, with the ultimate goal of improving student outcomes. From the perspective of its scope, objectives, and practical application, CAR is often regarded as a form of micro-level research. One of its defining features is the active collaboration and participation between researchers and members of the targeted group. Arikunto (2021) describes CAR as a systematic investigation into learning activities involving intentional and collective actions within a classroom environment. Similarly, Saputra (2021) characterizes CAR as a reflective process aimed at identifying and resolving instructional challenges by implementing carefully planned interventions in real-world classroom settings and evaluating their impact. Based on prior observations, it was identified that students' vocabulary comprehension remains insufficient. To address this issue, an intervention was designed to enhance their understanding of English vocabulary by employing interactive learning media, which aimed to make the learning process more engaging and facilitate easier comprehension. One of the interactive tools that actively involves students is the Wordwall platform. Through this medium, students were tasked with selecting challenging English words encountered in the reading materials provided by the teacher.

The objective of this study was to examine the English proficiency of class VIII students at SMP Negeri 1 Bontomarannu, specifically in mastering vocabulary related to the topic of Comparison Degree, using the Wordwall platform as a learning medium. The research was conducted over two cycles, with each cycle focusing on vocabulary learning through Wordwall. Data collection techniques encompassed observation, field notes, documentation, evaluation tests, and semi-structured interviews conducted with 10 randomly chosen students to investigate their views on the Wordwall platform. The feedback from students was subjected to thematic analysis to enhance the observational data. The gathered data included the success rates of each cycle, which were indicative of the enhancement in students' academic performance. Among the various instruments utilized, the predominant method of data collection was the administration of tests, as this method effectively assesses the results and efficacy of the learning strategies that were implemented.

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The data analysis in this study did not employ statistical tests; instead, it utilized a descriptive analysis technique. This approach aligned with qualitative research methods, where the research setting serves as a natural source of data collection. The analysis process focused on descriptive interpretation, with the researcher serving as the key instrument. Emphasis was placed on understanding the processes through which students achieved their performance, rather than solely evaluating the outcomes they obtained.

This study followed a series of steps. According to Hopkins (2014), the procedure for conducting classroom action research comprises four key components: planning, acting, observing, and reflecting. These steps are iteratively repeated until the desired improvement or success criteria are achieved. Below is an illustration and explanation of these steps:

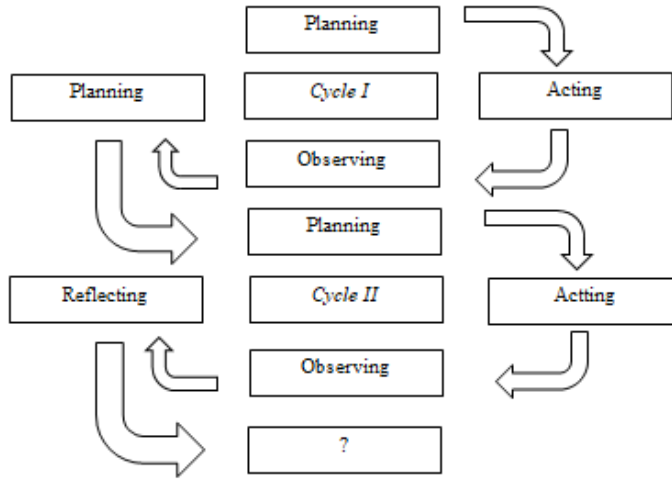

Figure 1. A Series of CAR Steps

Based on the illustration of the steps in Classroom Action Research (CAR), the following stages were implemented as the action scenario in this study:

1. Identifying the Problem: At this stage, the researcher identified the problem or challenge to be addressed using the Wordwall platform. Specifically, the researcher aimed to tackle students' difficulties in expanding their vocabulary and retaining new words.

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2. Defining the Research Objectives: Here, the researcher established the specific goals of the CAR, focusing on the desired outcomes to be achieved through the intervention.
3. Planning the Learning Process: This stage involved preparing RPPs that emphasized a contextual learning approach aligned with the teaching methodology.
4. Implementing the Learning Actions: During this phase, the teacher conducted the teaching process by the lesson plans. The Wordwall platform was introduced and utilized as planned, actively involving students in its use. The teacher observed and recorded students' interactions with the Wordwall, monitoring their progress in understanding and applying vocabulary related to the Comparison Degree topic.
5. Analyzing the Data: The teacher analyzed the collected data to assess whether there was an improvement in students' vocabulary comprehension and usage following the implementation of Wordwall.
6. Evaluation and Reflection: The teacher evaluated the learning outcomes and reflected on the CAR process. This involved identifying any shortcomings in the completed cycle and revising these issues to improve them.
7. Implementing Improvements: Based on the evaluation and reflection, the teacher made necessary modifications to enhance the effectiveness of Wordwall and refined the learning process for the subsequent cycle.
8. Reporting: Finally, the teacher prepared a comprehensive report on the CAR with Wordwall. This report outlines the steps taken, the collected data, the data analysis, and the conclusions and recommendations drawn from the findings.

4. Results and Discussion

This study was conducted at SMPN 1 Bontomarannu, Gowa Regency, with the research subjects being students from Class VIII.7, comprising 38 learners. The classroom action research focused on improving students' vocabulary mastery on the topic of comparison degrees using the Wordwall teaching media in English

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for Class VIII.7 during the even semester of the 2022/2023 academic year. The research began on February 28, 2023, and ended on March 18, 2023. Meanwhile, Cycle II, Meetings 1 and 2, were held on Tuesday, March 14, 2023, and Saturday, March 18, 2023, respectively. The Basic Competence in Cycle II was 3.9, which involved applying the social function, text structure, and linguistic elements of spoken and written transactional interaction texts that include actions of giving and requesting information related to the comparison of quantities and qualities of people, animals, and objects by their context (paying attention to the linguistic elements of degrees of comparison).

4.1.Results

Cycle I

Cycle I, Meeting 1, in this study began on Tuesday, February 28, 2023, and Meeting 2 was conducted on Saturday, March 4, 2023. The Basic Competence in Cycle I required applying the social functions, text structures, and linguistic elements of spoken and written transactional interaction texts, involving actions such as giving and requesting information related to comparing quantities and qualities of people, animals, and objects, based on their context. The teaching material in this cycle was the comparison degree.

During the planning stage, the researcher first observed the condition of English learning among the Class VIII.7 students of SMP Negeri 1 Bontomarannu, Gowa Regency. The researcher then prepared a lesson plan (RPP) that integrated the use of the Wordwall platform and student worksheets. Additionally, observation sheets were prepared to assess the teacher's teaching process during Meetings 1 and 2, as well as activity sheets to monitor students' engagement during the learning process.

The researcher carried out the actions according to the Lesson Plan that had been developed. The first meeting of Cycle I was held on Tuesday, February 28, 2023, from 08:50 to 10:10 WITA, with an allocated time of 2 class hours (2 x 40 minutes). A total of 35 students attended this meeting. Meanwhile, the second meeting was held on Saturday, March 4, 2023, from 11:20 to 12:40 WITA, with an allocated time of 2 class hours (2 x 40 minutes). A total of 36 students attended this

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meeting. During the learning process, in addition to using PowerPoint presentation media, the researcher also utilized the Wordwall platform to deliver the material and evaluate students' understanding, particularly their vocabulary mastery.

Cycle II

Cycle II, Meeting 1, in this study began on Tuesday, March 14, 2023, and Meeting 2 was conducted on Saturday, March 18, 2023. The Basic Competence in Cycle II involved applying the social functions, text structures, and linguistic elements of spoken and written transactional interaction texts that involved actions of giving and requesting information related to comparing quantities and qualities of people, animals, and objects based on their context. The teaching material in this cycle was the comparison degree.

Before implementing the actions in Cycle II, the researcher carefully reviewed the reflections from Cycle I. This approach ensured that the learning process in Cycle II would be improved. During the planning stage, the researcher prepared the Lesson Plan (RPP) and Student Worksheets. Additionally, observation sheets were prepared to assess the teacher's teaching process during Meetings 1 and 2 in Cycle II, as well as activity sheets to monitor students' engagement during the learning process.

As in Cycle I, the researcher carried out actions in Cycle II by the Lesson Plan. In this cycle, the researcher continued using Wordwall as a teaching medium to improve students' vocabulary mastery on the topic of comparison degrees. The first meeting in Cycle II was held on Tuesday, March 14, 2023, from 8:50 to 10:10 WITA, with an allocated time of 2 class hours (2 x 40 minutes). A total of 37 students attended this meeting. Meanwhile, the second meeting was held on Saturday, March 18, 2023, from 11:20 to 12:40 WITA, with an allocated time of 2 class hours (2 x 40 minutes). A total of 36 students attended this meeting.

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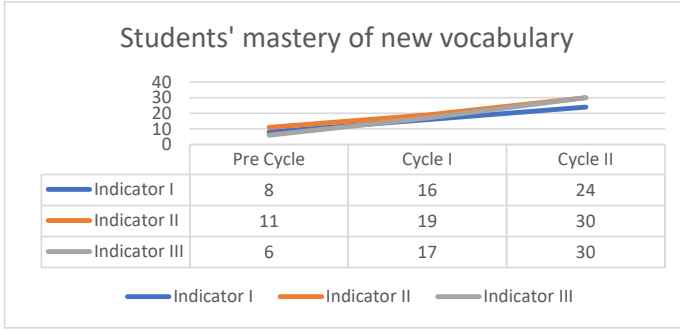
Vocabulary Mastery and Learning Outcomes of Students on Comparison Degree Material

Based on the results of the action research conducted in Class VIII.7 of SMPN 1 Bontomarannu regarding the use of Wordwall as a teaching media to improve students' vocabulary mastery on the topic of comparison degrees, the following findings are obtained.

Table 1. Data on Students' Mastery of New Vocabulary Before and After Action

No.	Aspects Observed	Pre Cycle	After Action		Description
			Cycle I	Cycle II	
1	Pronunciation	8 21,05%	16 42,10%	24 63,15%	Increased
2	Spelling	11 28,94%	19 50,00%	30 78,96%	Increased
3	Meaning	6 15,07%	17 44,73%	30 78,94%	Increased

The observed vocabulary mastery data of students in class VIII.7 is presented in the graph as follows:



Indicator Description:

Indicator 1: Pronunciation
Indicator 2: Spelling
Indicator 3: Meaning

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Table 2. Data on the Improvement of Learners' Learning Outcomes Before and After Action Learners who reach the Minimum Completion Criteria (KKM), which is 75

Aspect Observed	Pre Cycle	After Action		Description
		Cycle I	**Cycle II**	
Students' Learning Outcomes	17 44,73%	26 68,42%	32 84,21%	Increased

The data on student learning outcomes on comparison degree material for 2 cycles is presented in the following graph:

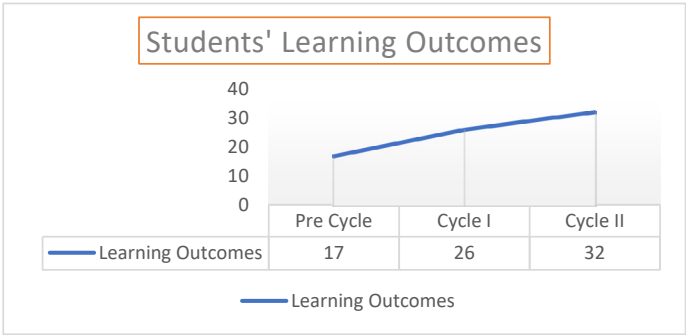

Table 1 illustrates an improvement in students' vocabulary mastery after the researcher employed Wordwall as a teaching medium to enhance their vocabulary understanding during lessons, compared to the initial learning process prior to any intervention. These results were obtained from evaluation tests administered by the researcher at the end of each learning cycle.

For the first indicator, which was the pronunciation of new vocabulary in the pre-cycle stage before the action, only eight students, or 21.05% of the total 38 students, could correctly pronounce the vocabulary given by the teacher. After the teacher began integrating Wordwall as a teaching medium to improve students' vocabulary on the topic of comparison degrees, the results were as follows: In Cycle I, the number of students who could pronounce the vocabulary correctly increased to 16 students, representing 42.10% of the total. In Cycle II, the number increased further to 24 students, or 63.15% of the total.

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For the second indicator, which was spelling new vocabulary, in the pre-cycle stage before the action, only 11 students, or 28.94% of the total 38 students, could correctly spell the vocabulary given. After the teacher began integrating Wordwall as a teaching medium to enhance students' vocabulary, the results were as follows: In Cycle I, the number of students who could correctly spell the vocabulary increased to 19 students, or 50.00% of the total. In Cycle II, this number increased to 30 students, or 78.96% of the total.

For the third indicator, which involved understanding the meaning of new vocabulary in the pre-cycle stage before the action, only six students, or 15.79% of the total 38 students, could correctly understand the meaning of the given vocabulary. After the teacher began integrating Wordwall as a teaching medium to improve students' vocabulary on the topic of comparison degrees, the results were as follows: In Cycle I, the number of students who could understand the meaning of the vocabulary increased to 17 students, or 44.73% of the total. In Cycle II, the number increased further to 30 students, or 78.96% of the total.

The improvement in students' vocabulary mastery in each action cycle also impacted their overall learning achievement and mastery of the material in comparison to previous degrees. Table 2 shows that, prior to the action being taken, the learning outcomes of students who reached the KKM (score ≥ 75) were only 17 students, or 44.73% of all students. While in Cycle I, 26 students (68.42%) reached the KKM, in Cycle II, as many as 32 students (84.21%) also reached the KKM.

Students' Perceptions and Experiences with Wordwall

In addition to the quantitative data on vocabulary acquisition and educational outcomes, this research also included qualitative perspectives obtained from semi-structured interviews with ten randomly selected students. The purpose of these interviews was to gather students' views on the Wordwall platform, their educational experiences, and the challenges they encountered during the intervention. This section provides a comprehensive overview of the impact of Wordwall on vocabulary retention, student engagement, and classroom interactions, incorporating student feedback. The results are organized thematically, featuring direct quotations from

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students and correlating with quantitative data to highlight the relationship between teaching methods and student performance.

a. Enhanced Motivation and Engagement

The introduction of Wordwall markedly enhanced students' motivation and engagement in vocabulary acquisition by converting conventional teaching methods into an interactive, game-oriented format. Numerous students who had previously perceived English classes as tedious reported a notable change in their outlook, characterizing the platform as "enjoyable" and "fun." This gamified strategy not only alleviated feelings of boredom but also fostered active involvement, particularly among individuals who had struggled with traditional, passive learning approaches. Empirical evidence supports this positive trend: Spelling accuracy increased from 28.94% in the Pre-Cycle to 78.96% by Cycle II. In comparison, the proportion of students meeting the Minimum Competency Standard (KKM) escalated from 44.73% prior to the intervention to 84.21% in Cycle II. The students' reflections further emphasized this favorable transformation. For example, Student 2 remarked that "*Wordwall makes learning less tedious. I feel more enthusiastic about studying vocabulary now because it resembles play*." In a similar vein, Student 7 observed a rise in self-directed practice, expressing, "*I engage with Wordwall quizzes at home since they are enjoyable. I never did that with textbooks*." These testimonials illustrate how the platform's interactive features cultivated intrinsic motivation, transforming vocabulary practice into an enjoyable endeavor rather than a mundane task.

b. Visual and Interactive Learning (Dual Coding Theory)

The design of Wordwall, which effectively merges visual components (such as images and color-coded tasks) with verbal cues (including sentences and definitions), aligns directly with Dual Coding Theory (Paivio, 1986). This synthesis of dual cognitive pathways has significantly enhanced students' capacity to connect vocabulary with contextual usage, resulting in notable

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advancements in both retention and comprehension. Quantitative data underscore this improvement: the understanding of word meanings surged from 15.07% in the Pre-Cycle to 78.96% by Cycle II. In comparison, spelling proficiency also achieved 78.96% in the final cycle, indicating a marked enhancement in long-term retention. Students credited their achievements to the interactive and visual elements of Wordwall. For instance, Student 4 noted, "*Connecting words with images on Wordwall facilitated my retention of their meanings*." In a similar vein, Student 5 highlighted the impact of gamified challenges on enhancing precision: "*The quizzes compelled me to concentrate on spelling. I needed to input words accurately to succeed*!" These observations support the theory that dual-channel processing, involving both visual and verbal channels, enhances cognitive encoding and thereby facilitates vocabulary acquisition.

c. Increased Confidence through Repeated Practice

Frequent engagement with vocabulary exercises on Wordwall markedly enhanced students' confidence in employing newly learned terms. The platform's interactive activities and prompt feedback systems facilitated consistent practice in pronunciation, spelling, and contextual application, resulting in observable improvements in self-assurance. Quantitative evidence supports this advancement: pronunciation accuracy increased significantly from 21.05% in the Pre-Cycle to 63.15% by Cycle II, demonstrating an enhanced capacity to articulate words accurately and with confidence. Students attributed their heightened confidence to the engaging and repetitive nature of Wordwall's format. For example, Student 10 remarked, "*I no longer fear using new words because I practiced them consistently on Wordwall*." In a similar vein, Student 1 emphasized the importance of guided practice, stating, "*The pronunciation guides on Wordwall enabled me to speak English with confidence*." These testimonials demonstrate how systematic and repetitive practice effectively alleviated anxiety and empowered students to utilize vocabulary proficiently in both written and oral communication.

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d. Implementation Challenges

Wordwall exhibited significant advantages in enhancing vocabulary acquisition; however, its application encountered practical difficulties, revealing opportunities for improvement. The challenges identified, organized into three subthemes outlined below, emphasize the need for strategic adjustments to optimize the platform's effectiveness.

1) *Technical Difficulties*

Intermittent internet connectivity and constraints related to device capabilities occasionally hindered educational sessions, especially within a classroom environment characterized by inadequate technological resources. Student 3 noted, "*At times, the internet connection was excessively slow, causing the screen to freeze. We experienced significant delays.*" Similarly, Student 10 remarked, "*Reading the text was challenging when the phone screen was insufficiently large*." Such challenges periodically impeded the flow of activities and diminished accessibility for sure students.

2) *Uneven Participation*

While there have been general advancements in student engagement, specific individuals participated only at a superficial level during group activities or competitive exercises. Student 8 remarked, "*Some classmates merely rushed to provide answers in order to be the first to finish. They did not genuinely absorb the material.*" Additionally, Student 3 pointed out the presence of distractions during collaborative efforts: "*The classroom became excessively loud during competitions, which hindered our ability to concentrate*." This disparity in participation highlights the need for improved classroom management techniques to foster equitable learning experiences.

3) *Time Constraints*

The predetermined length of sessions restricted the potential for comprehensive practice, especially for novice learners or intricate subjects.

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Student 5 noted, "*The quiz time was too short for beginners*." Additionally, Student 9 highlighted, "*Some topics lacked sufficient practice questions*." Although 84.21% of students met the KKM (Table 2), these limitations may have impeded a more profound understanding for those students needing extra assistance.

e. Improved Retention through Repetitive Practice

The focus of Wordwall on repetitive and contextualized practice has been crucial in enhancing long-term vocabulary retention. By regularly engaging students with target vocabulary through quizzes, matching activities, and interactive tasks, the platform has enhanced their ability to recall and apply vocabulary across diverse contexts. This approach is consistent with the principles of spaced repetition and cognitive reinforcement, which suggest that repeated exposure strengthens memory pathways. Quantitative data supports this assertion: Spelling proficiency increased from 28.94% in the Pre-Cycle phase to 78.96% in Cycle II, while comprehension of word meanings improved from 15.07% to 78.96% during the same timeframe. Students specifically attributed their enhanced retention to the repetitive framework provided by Wordwall. Student 4 noted, "T*he repeated quizzes on Wordwall helped me remember words long after the lesson*." In a similar vein, Student 9 connected their academic advancement to the platform's approach: "*I achieved better test scores because Wordwall helped solidify the vocabulary in my memory*." These insights highlight the effectiveness of iterative practice in transforming ephemeral memorization into lasting knowledge, enabling students to internalize vocabulary for both academic assessments and practical application.

f. Social Learning and Collaboration

The competitive attributes of Wordwall, including leaderboards and timed quizzes, fostered an engaging social learning atmosphere in which peer interaction served as a driving force for motivation and improvement. By incorporating aspects of amicable rivalry, the platform promoted collaboration among students, enabling them to exchange strategies and provide mutual support. The collaborative

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environment significantly enhanced student engagement and bolstered vocabulary retention through the exchange of knowledge among peers. The quantitative advancements, exemplified by the increase in KKM achievement from 44.73% in the Pre-Cycle to 84.21% in Cycle II, underscore the extensive benefits of this socially enriched educational framework. Students emphasized the significance of competition in motivating their endeavors. For example, student 6 remarked, "*Competing with friends encouraged me to exert more effort. We even engaged in practice sessions together after school.*" Similarly, student 8 noted, "*It was enjoyable to see who achieved the highest score. This motivated all of us to strive for improvement.*" These testimonies demonstrate how the gamified framework of Wordwall transformed solitary learning into a collaborative pursuit, utilizing social interactions to enhance both engagement and educational outcomes.

4.2 Discussion

The incorporation of Wordwall into vocabulary instruction has demonstrated a significant positive impact on students' learning outcomes, as supported by both quantitative and qualitative evidence. Comparisons made before and after the intervention revealed notable improvements in all evaluated areas: pronunciation accuracy increased from 21.05% to 63.15%, spelling skills improved from 28.94% to 78.96%, and understanding of word meanings rose from 15.07% to 78.96%. Additionally, the percentage of students achieving the Minimum Competency Standard (KKM) increased from 44.73% to 84.21%, highlighting the platform's contribution to improved academic performance. These improvements are consistent with previous research that validates Wordwall's effectiveness in vocabulary learning (Fatimah, 2020; Nurammida et al., 2024) and emphasizes its potential as a transformative educational resource.

A significant element influencing these results was the platform's capacity to enhance intrinsic motivation through the use of gamification. Students frequently expressed increased enthusiasm for vocabulary exercises, characterizing Wordwall activities as more engaging and enjoyable than conventional approaches. This change in viewpoint aligns with the assertion by Filgona et al. (2020) that motivation

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plays a crucial role in academic achievement, a finding corroborated by Pradini and Adnyayanti (2022), who demonstrated Wordwall's capacity to enhance vocabulary achievement and motivation in English learning. The interactive, game-like format of Wordwall, combined with apperception activities (Rokhmawan et al., 2023), effectively mitigated boredom and promoted self-directed learning, as evidenced by an increase in voluntary practice beyond classroom hours. Additionally, reward systems further intensified this engagement, supporting Sigalingging et al.'s (2023) conclusions regarding the motivational impact of recognition within educational contexts.

The design of the platform, which incorporates both visual and verbal components (such as image-word associations and color-coded activities), is consistent with Paivio's (1986) Dual Coding Theory. Arrosyad et al. (2023) emphasize that Wordwall's extensive template library, including quizzes, anagrams, and word searches, enhances its versatility in addressing diverse vocabulary learning needs. Students reported that these multimodal features significantly enhanced their retention, highlighting the role of visual connections in facilitating memory consolidation. This dual-channel encoding likely played a crucial role in the notable improvement in comprehension and spelling accuracy, corroborating Hartatiningsih's (2022) assertion that Wordwall promotes deeper material internalization. When utilized alongside PowerPoint-based instruction, Mai et al. (2024) stated that the platform's interactive visuals foster a unified learning environment that addresses various cognitive preferences, allowing students to contextualize vocabulary instead of relying solely on rote memorization.

Repetitive engagement with Wordwall significantly contributed to enhancing students' confidence. The platform's immediate feedback features enabled learners to improve their pronunciation, spelling, and contextual usage independently, thereby alleviating the anxiety often linked to language application. This observation is consistent with the findings of Setyaningsih et al. (2023), which indicate that learners who take initiative tend to thrive in self-directed skill enhancement. By converting passive learners into active participants, Wordwall effectively connected theoretical understanding with practical execution, an essential element of language

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proficiency (Nation, 2001). Marhamah and Mulyadi (2020) further noted that such engagement reduces students' reliance on dictionaries or teacher-provided definitions, fostering independent vocabulary acquisition.

Implementation challenges have identified specific areas that require improvement. Technical difficulties, including unreliable internet access and device limitations, sometimes interrupted the continuity of learning, especially in settings with limited resources. Despite these challenges, Bueno et al. (2022) highlighted Wordwall's usability as a key strength, noting its user-friendly design and high satisfaction rates in online learning environments. Furthermore, inconsistent participation in group activities highlighted the need for more rigorous classroom management strategies (Sholeh et al., 2021) to promote equitable involvement. Additionally, time limitations presented obstacles for novice learners, reinforcing Putra's (2023) emphasis on the importance of flexible time management. These issues underscore the crucial need for strategic planning in the deployment of digital tools across diverse classroom environments.

The primary contribution of the study is Wordwall's ability to enhance long-term retention via spaced repetition. The platform's use of randomized quizzes and matching activities effectively strengthened memory pathways, as evidenced by consistent advancements in spelling and comprehension skills. These results support the assertion made by Grant et al. (2013) that online platforms facilitate language development through practical tasks, and they further corroborate Nation's (2001) assertion regarding the importance of vocabulary acquisition for academic success.

Finally, the competitive elements of Wordwall have cultivated a culture of collaborative learning. Engagement among peers during leaderboard competitions and group tasks not only heightened motivation but also facilitated the exchange of knowledge, reflecting the insights of Fushshilat (2018) regarding the social aspects of gamified education. The overall improvement in KKM achievement demonstrates how technology-enhanced collaboration can promote comprehensive academic development.

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In summary, although Wordwall does not serve as a comprehensive solution to all educational challenges, its organized yet adaptable framework presents a practical approach to enhancing vocabulary teaching. Subsequent research should examine its long-term impacts on language proficiency and explore adaptive strategies to overcome technical and participatory obstacles, thereby ensuring equitable access to its advantages.

5. Conclusion

The incorporation of the Wordwall platform into English vocabulary instruction proved highly effective in improving students' proficiency, as indicated by both numerical data and qualitative feedback. The success of this intervention can be linked to its adherence to educational principles, including gamification, Dual Coding Theory, spaced repetition, and collaborative learning. These elements collectively catered to the cognitive, motivational, and social aspects of the learning process. These results were confirmed through tests conducted by the researcher at the end of Learning Cycles I and II. The improvements in students' vocabulary mastery are as follows:

1. There was an improvement in students' vocabulary mastery in the aspect of pronouncing new vocabulary. Before the action, 21.05% of the total students (38) could correctly pronounce the vocabulary provided. This percentage increased after the intervention, reaching 42.10% in Cycle I and 63.15% in Cycle II.
2. There was an improvement in students' vocabulary mastery in the aspect of spelling new vocabulary. Before the action, 28.94% of the total students (38) could correctly spell the vocabulary provided. This percentage increased after the intervention, reaching 50.00% in Cycle I and 78.96% in Cycle II.
3. There was an improvement in students' vocabulary mastery in the aspect of understanding the meaning of new vocabulary. Before the action, 15.07% of the total students (38) could correctly understand the meaning of the vocabulary provided. This percentage increased after the intervention, reaching 44.73% in Cycle I and 78.94% in Cycle II.

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4. The use of Wordwall as a teaching medium effectively improved students' vocabulary mastery, learning outcomes, and achievement levels. In the pre-cycle stage, before the intervention, the number of students who achieved the Minimum Competency Criteria (KKM) (score ≥ 75) was only 17 students, or 44.73% of the total. In Cycle I, the number increased to 26 students (68.42%), and in Cycle II, it increased further to 32 students (84.21%).

Although these achievements are noteworthy, various challenges have been identified, including technical difficulties such as connectivity issues, device accessibility, and complications with the user interface. Additionally, concerns exist regarding inconsistent student engagement and classroom distractions. These obstacles underscore the need for enhanced infrastructure, the development of adaptive content, and the refinement of teaching methodologies to harness the platform's capabilities fully. The results underscore the advantages of gamification in education, especially regarding vocabulary learning, by employing strategies like spaced repetition, visual-verbal associations, and collaborative participation. This methodology not only improves retention and fosters motivation but has also proven effective in environments with limited resources. Nevertheless, to maximize its effectiveness, it is crucial to overcome technical challenges and strike a balance between competitive aspects and more profound learning experiences.

This research highlights the efficacy of Wordwall within the context of the CAR framework; however, the short-term and context-dependent characteristics of CAR restrict its capacity to evaluate long-term retention. Future investigations should employ experimental or longitudinal approaches to further examine the durability and broader relevance of these results. Such inquiries would help connect the practical insights derived from CAR with a more extensive educational influence.

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