Applying Wordwall.net to Improve Mastery of Automotive Light Vehicle Engineering Vocabularies of Vocational Students

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Abstract *English plays a crucial role in vocational education, particularly in preparing students for global work environments. However, students often struggle with mastering technical vocabulary using conventional methods. This study aims to investigate the effectiveness of Wordwall.net as a digital learning tool in enhancing the mastery of technical vocabulary among vocational high school students majoring in Automotive Light Vehicle Engineering. The study employed a quasi-experimental design with two non-equivalent groups. A total of 56 tenth-grade students were selected purposively, with one class receiving Wordwall.net-based instruction and the other using Quizizz. Pre-tests and post-tests were administered to measure vocabulary gains. The results showed a significant improvement in the experimental group's vocabulary scores compared to the control group (p = .014), with a moderate to large effect size (η^2 = 0.108). These findings suggest that Wordwall.net effectively supports the acquisition of technical vocabulary by providing interactive, engaging, and visually supportive activities. The study concludes that Wordwall.net is a valuable pedagogical tool in vocational language education.*
Keywords: technical vocabulary, vocational education, vocabulary learning, Wordwall.net

Abstrak Bahasa Inggris memegang peran penting dalam pendidikan vokasi, khususnya dalam mempersiapkan siswa menghadapi dunia kerja global. Namun, siswa sering mengalami kesulitan dalam menguasai kosakata teknis dengan metode konvensional. Penelitian ini bertujuan untuk mengkaji efektivitas Wordwall.net sebagai alat pembelajaran digital dalam meningkatkan penguasaan kosakata teknis siswa SMK jurusan Teknik Kendaraan Ringan Otomotif. Penelitian ini menggunakan desain kuasi-eksperimen dengan dua kelompok non-ekuivalen. Sebanyak 56 siswa kelas X dipilih secara purposif, dengan satu kelas menggunakan Wordwall.net dan kelas lainnya menggunakan Quizizz. Pre-test dan post-test diberikan untuk mengukur peningkatan kosakata. Hasil menunjukkan bahwa terdapat peningkatan signifikan pada nilai kosakata kelompok eksperimen dibandingkan kelompok kontrol (p = .014) dengan nilai efek sedang hingga besar (η^2 = 0.108). Temuan ini menunjukkan bahwa Wordwall.net secara efektif mendukung penguasaan kosakata teknis melalui aktivitas yang interaktif, menarik, dan didukung visual. Studi ini menyimpulkan bahwa Wordwall.net merupakan alat pedagogis yang bernilai dalam pendidikan bahasa vokasi.
Kata Kunci: kosakata teknis, pembelajaran kosakata, pendidikan vokasi, Wordwall.net

INTRODUCTION

Globalization and rapid progress in information technology have established English as a global lingua franca, crucial for both intercultural communication and worldwide engagement (Kecskes, 2019; Mohamadaid & Rasheed, 2018; Murray, 2020). In Indonesia, English is considered a foreign language, although it is very important for being prepared for both school and work (Aulia Rahmah & Qamariah, 2023). The National Education System Law No. 20/2003 mandates English to be taught at all levels of Indonesian schools. This shows how important it is for students to learn English in order to be able to compete in international arenas (Amaliyah & Rahayu, 2020; Sofiana et al. et al., 2019). The national curriculum encourages English as both an academic discipline and a vital life skill for navigating global contexts and seizing career possibilities.

Vocational High Schools (SMK) play an important role in providing students with practical and industry-relevant skills. In vocational education, English serves as more than just a subject; it is a practical language that facilitates students' preparedness to enter the workforce. The comprehension of technical manuals, the interpretation of industry-standard documents, and the use of specialized vocabulary are all requirements for students majoring in Automotive Light Vehicle Engineering. Nation (2001) defines

technical vocabulary as a specific type of terminology that is essential for professional communication, particularly in vocational professions such as automotive engineering. Similarly, McLaughlin & Parkinson (2018) and Skarpaas & Rødnes (2022) contend that technical vocabulary is indispensable for comprehending field-specific concepts and performing job-related tasks.

Although technical vocabulary is essential, various vocational students encounter persistent obstacles to its acquisition. These issues come up from traditional pedagogical methods that lack contextual relevance and are unsuccessful to engage students. Students frequently must complete vocabulary exercises with less explanation or engagement, hindering their capacity to use technical terms effectively. Additionally, these challenges are made worse by psychological obstacles such a lack of drive, a fear of making mistakes, and cognitive overload (Rosyada & Apoko, 2023; Havwini et al. et al., 2024). More engaging and student-centered approaches to vocabulary instruction are required in response to these issues.

In order to confront these obstacles, educational technology provides innovative ideas that foster motivation and interactive learning experiences. Digital platforms using gamified elements have demonstrated enhancements in vocabulary acquisition and student engagement in language education (Guaqueta & Castro-Garces, 2018; Raw & Ismail, 2021). Wordwall.net is a platform that allows educators to design personalized, game-oriented learning experiences. The platform accommodates multiple activity types, including quizzes, matching games, and crosswords, all of which offer quick feedback and promote active learning (Pradini & Adnyayanti, 2022; Dakhi, 2019; Bilova, 2023). This digital technology not only improves vocabulary retention but also provides learning more engaging and accessible.

Wordwall.net has been demonstrated to be effective in enhancing general vocabulary mastery in previous studies (Amaliyah & Rahayu, 2023; Wandari et al., 2024; Az Zahrah & Anwar, 2023). However, its potential for teaching technical vocabulary, particularly within vocational education contexts, has not been extensively explored. Current research indicates a significant gap in the investigation of the ways in which interactive digital tools, such as Wordwall.net, might assist in the acquisition of industry-specific languages. This study aims to address this gap by examining the effectiveness of Wordwall.net in enhancing students' proficiency in automotive light vehicle engineering vocabulary at a vocational high school in Surabaya.

METHODS

This study employed a quantitative research design specifically, a quasi-experimental design was implemented, utilizing a non-equivalent groups design in which both experimental and control groups were selected from existing classes rather than through random assignment (Creswell & Creswell, 2018; Gopalan et al., 2020). This design was chosen to maintain ethical considerations and minimize disruption to normal class groupings.

The participants in this study were Grade 10 students enrolled in the Automotive Light Vehicle Engineering TKRO program. From a total of 102 students across three classes, two classes were selected purposively, each consisting of 28 students. One class served as the experimental group, which received instruction through Wordwall.net, while the other functioned as the control group, taught using Quizizz. Quizizz was selected not for comparative analysis, but to ensure that both groups experienced modern digital tools rather than traditional methods such as textbooks or worksheets (Campbell et al., 2020).

Vocabulary mastery was measured using a pre-test and post-test containing 30 items aligned with curriculum standards and validated by an English teacher with expertise in automotive content. The items included matching activities adapted from the Updated Vocabulary Levels Test (Webb et al., 2017) and were curated using the Merriam-Webster online dictionary to ensure relevance and accuracy. The research instrument underwent both content and face validation and was approved without revision. For reliability testing, a pilot study was conducted and analyzed using Cronbach's Alpha, which yielded $\alpha = 0.762$, indicating that it was reliable (Cohen et al., 2007; Taber, 2018).

The data collection process included three phases: before, during, and after the treatment. In the pre-treatment phase, a pre-test was administered to both groups to assess their initial vocabulary knowledge. During the treatment phase, students in the experimental group engaged with Wordwall.net over three

consecutive 90-minute sessions. Each session included 60 minutes of classroom instruction and 30 minutes of interactive activities on Wordwall.net.

Data were analyzed using SPSS software. A Shapiro-Wilk test was applied to check data normality (Mishra et al., 2019; King & Eckersley, 2019), followed by a Levene's Test for homogeneity (Usmadi, 2020). Once both assumptions were satisfied, an Independent Sample T-Test was conducted to determine whether there was a statistically significant difference in vocabulary gains between the experimental and control groups (Kesgin & Arslan, 2015). Additionally, the effect size was calculated using the Eta Squared formula, with interpretation based on criteria established by Cohen et al. (2007): .01 (small), .06 (moderate), and .14 (large), to measure the practical significance of the intervention.

RESULTS AND DISCUSSION

In order to establish an appropriate baseline prior to intervention, a pre-test was administered, and tests for homogeneity and normality were conducted.

Table 1
Homogeneity Test – Pre-test

Test of Homogeneity of Variances		Levene Statistic	df1	df2	Sig.
Pre-Test	Based on Mean	2.277	1	54	.137
	Based on Median	.763	1	54	.386

The output in **Table 1** showed that the significance value (Sig.) based on mean was 0.137, which is >0.05. According to Pallant (2020), if the significance value is >0.05, the data indicating equal variances across the experimental and control groups.

Table 2
Normality Test – Pre-test

Tests of Normality			
	Shapiro-Wilk		
	Statistic	df	Sig.
Experimental	.964	28	.429
Control	.880	28	.004

As shown in **Table 2**, the experimental group had a Sig. value of 0.429 (> 0.05), indicating normal distribution, while the control group had a Sig. value of 0.033 (< 0.05), indicating non-normality. Based on Pallant (2020), this justified the use of a non-parametric test.

Table 3
Mann-Whitney U Test – Pre-test

Mann-Whitney U Test			
Group	N	Mean Rank	Sum of Ranks
Experimental	28	31.84	891.50
Control	28	25.16	754.50
U			298.500
Sig. (2-tailed)			0.125

Shown in **Table 3**, the mean rank of the experimental group was higher (31.84 vs 25.16), but the difference was not statistically significant (p = 0.125), confirming comparable baseline vocabulary levels across groups.

After the intervention using Wordwall.net, both experimental and control groups undertook a post-test to measure the effectiveness of the digital tool in improving technical vocabulary mastery. Prior to

conducting the main statistical test, the data were subjected to assumption checks for normality and homogeneity to determine the suitability of parametric testing methods.

Table 4

Normality Test – Post-test

Tests of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Experimental	.960	28	.353
Control	.937	28	.094

According to **Table 4** showed that the post-test scores in both groups were normally distributed, with a significance value of 0.353 for the experimental group and 0.094 for the control group, both exceeding the 0.05 threshold. According to Mishra et al. (2019), data can be considered normally distributed when p> 0.05, especially in small sample sizes. These results confirmed the assumption of normality for both groups.

Table 5

Homogeneity Test – Post-test

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Post-Test	Based on Mean	3.630	1	54	.062
	Based on Median	3.716	1	54	.059

According to **Table 5**, resulted in a significance value of 0.062. Since the p-value >0.05, the assumption of equal variances between groups was also met. As Pallant (2020) explains, meeting the assumptions of both normality and homogeneity enables researchers to proceed with parametric analysis, such as the independent samples t-test.

Table 6

Group Statistic – Post-test

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Post-Test	Experimental	28	20.75	5.707	1.078
	Control	28	15.93	8.210	1.552

Table 6 showed that the experimental group achieved a higher mean score (20.75) than the control group (15.93), with a mean difference of 4.82 points. The lower standard deviation in the experimental group (5.707 vs. 8.210) indicates more consistent results. To determine whether this difference was statistically significant, the researcher referred to the Independent Samples Test presented in the following table.

Table 7

Independent Sample Test – Post-test

Independent Samples Test

t-test for Equality of Means

		t	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Post-Test	Equal variances assumed	2.552	.014	4.821	1.890	1.033	8.610

Equal variances not assumed	2.552	.014	4.821	1.890	1.023	8.620

Based on the output in **Table 7**, the 2-tailed significance value of 0.014 (p < 0.05) confirms that this difference is statistically significant. These results validate the hypothesis that Wordwall.net effectively enhances students' technical vocabulary acquisition, particularly in the context of 10th Grade Automotive Engineering students. The data suggest that integrating interactive digital tools into vocabulary instruction can yield measurable learning improvements.

To assess the magnitude of the effect, Eta Squared was calculated. The resulting value was 0.108, indicating a moderate to large effect size (Cohen, 1988), confirming that Wordwall.net had a substantial impact.

The study's interpretation further emphasizes that Wordwall.net's interactive nature and gamified elements likely contributed to increased student engagement, facilitating better retention. This is consistent with Shabrina & Taufiq, (2023), who reported an increase in vocabulary scores from 65.00 to 89.13, and with Hartatiningsih, (2022), who observed improvements in vocabulary mastery through engaging digital sessions. Additionally, Wandari et al., (2024) and Hasram et al., (2021) emphasized the effectiveness of repeated exposure to vocabulary through digital games, mirroring the principles applied in this study.

The integration of visual support in Wordwall.net also played a pivotal role. Hiebert and Kamil (2005) stressed that visual representation aids memory and comprehension, a finding reinforced by Tahir et al., (2020), who found improved vocabulary outcomes through visual input. Further support comes from Teng, (2023) and Chung, (2023), both of whom noted measurable gains in vocabulary retention among students exposed to visuals alongside textual definitions.

Moreover, the effectiveness of Wordwall.net is consistent with broader digital learning frameworks. Guaqueta & Castro-Garces, (2018) highlighted how digital platforms enhance vocabulary acquisition through motivation and engagement, while Raw and Ismail (2021) underscored the importance of instant feedback. The present study observed similar benefits, where students could quickly identify and correct vocabulary errors, leading to improved outcomes.

From a theoretical perspective, the findings affirm Hao et al. (2021), who argued for the transformative potential of technology-assisted vocabulary instruction. Khalid and Aziz (2021) also advocate for integrating digital tools in ESL contexts, particularly to support vocabulary learning. These established theories are confirmed by the current results, reinforcing the pedagogical validity of using Wordwall.net in technical education settings.

Beyond cognitive improvements, Wordwall.net fostered a highly engaging classroom environment. This is aligned with Hartatiningsih (2022), who found that Wordwall.net increases student motivation, and Widhiatama & Brameswari (2024), who reported enhanced participation in literature classes. Jannah & Masnawati, (2024) and Rahmah et al., (2024) further highlighted that gamified learning environments can improve motivation up to 75%. In this study, students displayed high enthusiasm, perceiving vocabulary practice more as a game than a formal academic task.

CONCLUSION

This study concludes that the integration of Wordwall.net significantly improved students' mastery of technical vocabulary in automotive light vehicle engineering. The interactive and gamified nature of the platform enhanced student engagement and motivation, supporting more effective vocabulary learning. These findings are in line with Nugraha & Srisudarso, (2023) and Afify & Latif, (2021), who highlighted the benefits of ESP and digital tools in vocational education. The visual elements of Wordwall.net also aided memory retention, consistent with Hiebert and Kamil (2005), making it a pedagogically sound choice for EFL instruction in technical contexts.

However, the study had limitations, including a small sample size from a single vocational school and a short intervention period, which limit the generalizability and long-term insights of the findings. The research relied solely on quantitative methods, without incorporating qualitative data that could provide

deeper insights into students' experiences. Additionally, external factors such as students' digital literacy and variations in teaching methods were not controlled.

Future research is recommended to involve a larger and more diverse sample, extend the duration of the intervention, and adopt mixed-method approaches to capture a more comprehensive understanding of learning outcomes. Greater attention should also be given to individual learner factors and classroom environments that may influence the effectiveness of digital vocabulary tools.

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