Globish (An English-Indonesian journal for English, Education and Culture)
Vol. 15, No.2, July 2026, pp. 164 - 171
P-ISSN: 2301-9913, E-ISSN:2597-9132
DOI: http://dx.doi.org/10.31000/globish.v15i2.16751

USING AI-BASED PLATFORM TO ENHANCE STUDENTS' VOCABULARY MASTERY OF ENGLISH FOR SPECIFIC PURPOSES IN VOCATIONAL HIGH SCHOOL

Salsabila Nur Rohmah
English Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Yogyakarta, Indonesia
e-mail: salsabilanurrohmah07@gmail.com

Abstract

Vocational students often struggle with technical English vocabulary, which highlights the need for a more effective, technology-based learning approach. This study investigates the effectiveness of an AI-based vocabulary learning platform (Qwen AI) in improving English vocabulary mastery among tenth-grade students in vocational education. The research was conducted at SMK N 2 Yogyakarta with 72 participants (36 in the experimental group, 36 in the control group) enrolled in the Visual Communication Design (Desain Komunikasi Visual) program during the second semester of the 2025/2026 academic year. Using a quasi-experimental design, the experimental group received instruction through the Qwen AI Platform while the control group received conventional instruction. Pre-test and post-test measurements assessed vocabulary mastery across three dimensions: meaning, form, and use in context. The results demonstrated that the experimental group achieved a mean gain of 11 points (from 85 to 96), higher than the control group's gain of 4 points (from 94 to 98). The most notable improvement was found in students' ability to use vocabulary appropriately within vocational contexts, which rose by 23 percentage points (from 75% to 98%). This finding suggests that the platform's contextual, scenario-based exercises were particularly effective in helping students apply technical vocabulary in authentic situations. The Wilcoxon Signed-Rank Test (p = 0.000) confirmed the statistical significance of these improvements. The findings indicate that AI-based adaptive vocabulary platforms can effectively enhance vocational students' English proficiency, particularly in the contextual application of technical terminology relevant to their professional fields. This study contributes to the evidence base supporting technology-integrated language instruction aligned with the principles of English for Specific Purposes (ESP) in vocational education.

Keywords: *AI-Based Platform, Vocabulary Mastery, English for Specific Purposes (ESP), Vocational Education, Technology-Enhanced Language Learning*

INTRODUCTION

Artificial Intelligence (AI) has entered nearly every aspect of education, changing not only the way people work but also the way they learn and teach. In line with Indonesia's national curriculum policy and the strengthening of 21st Century Skills, which emphasize critical thinking, creativity, communication, and collaboration (Kemdikbudristek, 2022), the integration of AI into classroom practice is increasingly regarded as a necessity rather than an option. In language learning specifically, AI-based tools support interactive, adaptive, and contextual instruction by offering automatic feedback and contextualized vocabulary practice, thereby contributing to the development of students' overall language competence.

English proficiency is a key requirement in vocational education, where English functions not only as a communication tool but also as a means of understanding technical

Received July 08, 2026; Revised July 15, 2026; Accepted July 30, 2026

material relevant to students' fields of study. Within vocational programs such as engineering, automotive, business, and visual design, English is taught as a language for specific purposes (Fadlia et al., 2020). The English for Specific Purposes (ESP) approach allows vocabulary instruction to be tailored to technical terms, real-world work situations, and the professional tasks that students are likely to encounter after graduation, rather than focusing solely on general grammar or vocabulary.

Despite this potential, many vocational students continue to struggle with vocabulary relevant to their majors (Arroyyani & Maryani, 2025). They are frequently unfamiliar with the technical terms used in authentic workplace settings, such as standard operating procedures, technical manuals, and professional communication (Sintia et al., 2025). Without sufficient exposure to authentic materials, students often fail to internalize technical vocabulary in a way that can be transferred to real situations (Skarpaas & Rødnes, 2022). Conventional vocabulary instruction, which tends to rely on repetitive, decontextualized exercises, offers limited support for this kind of contextual understanding.

AI-based platforms offer a potential solution to this problem by supporting contextual vocabulary mastery through automated feedback, conversational simulation, and adaptive exercises (Bai et al., 2023). Previous studies suggest that AI-assisted instruction can improve vocabulary acquisition, motivation, and learner autonomy (Wei, 2023; Wah, 2025). However, empirical research specifically examining the use of generative AI platforms, such as Qwen AI, in vocational English classrooms remains limited, particularly with regard to English for Specific Purposes instruction. This gap provides an important basis for the present study.

This study therefore investigates the effectiveness of the Qwen AI Platform in enhancing vocational students' English vocabulary mastery, guided by the following research questions: (1) How does the use of an AI-based vocabulary platform affect vocational students' vocabulary mastery? (2) Which dimension of vocabulary mastery—meaning, form, or use in context—shows the greatest improvement following the use of an AI-based vocabulary learning platform?

LITERATURE REVIEW

Vocabulary Mastery

Vocabulary mastery is a fundamental component of language proficiency, encompassing the words and phrases individuals use to understand and express meaning (Alqahtani, 2015). Vocabulary knowledge develops progressively rather than as a fixed state, and is best understood as a set of interconnected abilities related to a word's form, meaning, and use (Daskalovska, 2020). Building on this view, vocabulary mastery is commonly conceptualized along three dimensions: meaning, form, and use in context (Schmitt, 2010). The meaning dimension concerns understanding a word's sense and its relationship to other words; the form dimension covers spelling, pronunciation, and word structure; and the use-in-context dimension refers to the ability to apply vocabulary appropriately according to grammatical function, register, and situation. Vocabulary knowledge is therefore multidimensional, meaning that a learner may know a word's meaning yet still struggle to use it correctly in a sentence or in a specific communicative situation (Nation, 2013; Read, 2000).

In vocational settings, vocabulary mastery extends beyond general English to include technical terminology specific to students' fields, such as the vocabulary needed to interpret manuals, explain procedures, or communicate with industry partners (Coxhead & Demecheleer, 2018). Because technical vocabulary carries precise, often monoreferential meaning within a given profession, a single misunderstood term can lead to significant errors in real work contexts. Mastery of vocabulary within ESP settings is therefore best supported by authentic tasks and workplace-related simulation, which provide learners with a genuine communicative purpose for acquiring new words (Coxhead, 2012).

English for Specific Purposes (ESP)

English for Specific Purposes (ESP) is an approach to language teaching in which all decisions about content and method are driven by learners' actual communicative needs, rather than by general English syllabi (Hutchinson & Waters, 1987). ESP is characterized by its responsiveness to the specific needs of a defined group of learners and by its use of the methodology and content appropriate to their discipline or profession (Dudley-Evans & St John, 1998). Within vocational high schools, ESP is generally implemented as English for Occupational Purposes, preparing students to use English in the context of the jobs they intend to pursue, whether that involves reading technical manuals, communicating with colleagues, or serving international clients. Vocabulary selection under this approach should be based on an analysis of workplace communication needs, ensuring that the material taught has direct relevance to students' future careers.

AI-Based Vocabulary Learning and the Qwen AI Platform

AI-based vocabulary learning platforms provide interactive learning experiences through adaptive exercises, contextual tasks, and immediate feedback, allowing learners to practice vocabulary through quizzes, simulated conversations, and context-based tasks. Such systems have been found to improve vocabulary learning by offering personalized material and instant feedback that helps students identify and correct their own mistakes (Bai et al., 2023; Wei, 2023). Repeated exposure to vocabulary within digital environments can further strengthen retention over time (Antia et al., 2021), while multimedia content has similarly been shown to support vocabulary retention (Alhazmi, 2024).

Qwen AI is a large language model capable of facilitating natural, text-based interaction between users and a digital system, generating vocabulary exercises and explanations tailored to a learner's proficiency level in real time (Bai et al., 2023; Wang et al., 2024). Within vocational English instruction, this kind of platform can provide contextual vocabulary exercises related to workplace situations, technical tasks, and professional communication, allowing students to connect new vocabulary with authentic professional contexts (Silitonga et al., 2024; Kamlun et al., 2025). Nevertheless, empirical research examining the specific use of Qwen AI to support technical vocabulary mastery among vocational students—particularly in creative fields such as Visual Communication Design—remains limited, which is the gap this study addresses.

Research Hypothesis

Based on the theoretical review above, the following hypotheses were formulated:

H_0: There is no significant difference in students' vocabulary learning achievement before and after using the Qwen AI Platform.

H_1: There is a significant difference in students' vocabulary learning achievement before and after using the Qwen AI Platform.

RESEARCH METHOD

This study employed a quasi-experimental design involving an experimental group and a control group without random assignment (Cresswell, 2013). The research was conducted at SMK N 2 Yogyakarta during the second semester of the 2025/2026 academic year, with 72 tenth-grade students from the Visual Communication Design (Desain Komunikasi Visual/DKV) program as participants: 36 students in class X DKV 1, assigned as the experimental group, and 36 students in class X DKV 2, assigned as the control group. Participants were selected through purposive sampling, based on their relatively high exposure to international design software and their consistent access to the digital devices required for AI-based learning.

The independent variable in this study was the AI-based vocabulary platform (Qwen AI), while the dependent variable was students' ability to understand, use, and relate vocabulary to authentic vocational contexts. Both groups completed a pre-test before treatment. The experimental group then received vocabulary instruction integrated with the Qwen AI Platform, in which students explored DKV-related vocabulary, generated contextual procedure texts with AI assistance, and compared their own writing with AI-generated output. The control group received conventional instruction on the same material without AI integration. Both groups subsequently completed an equivalent post-test.

Vocabulary mastery was measured using a 20-item pre-test/post-test instrument based on the ESP Composition Vocabulary Mastery Rubric, covering three dimensions: meaning (10 items), form (5 items), and use in context (5 items). The instrument was validated by an expert lecturer from the English Education Study Program. Data were analyzed using IBM SPSS Version 25, beginning with descriptive statistics (mean, standard deviation, minimum, and maximum scores), followed by a normality test (Kolmogorov–Smirnov), a homogeneity test (Levene's test), and a hypothesis test. Because the data were found to be non-normally distributed, the non-parametric Wilcoxon Signed-Rank Test was used to test the research hypothesis, with the criterion that H_0 is rejected if the significance value is below 0.05.

RESULTS AND DISCUSSION

Results

Descriptive analysis showed that the experimental group's mean score increased from 85 in the pre-test to 96 in the post-test, a gain of 11 points, with post-test scores ranging from 91 to 100. The control group's mean score increased from 94 to 98, a gain of only 4 points, with post-test scores ranging from 67 to 100. Although the control group began with a higher pre-test mean, the experimental group demonstrated a substantially larger gain, suggesting a stronger overall effect of the AI-based intervention.

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

Group	Pre-test Mean	Post-test Mean	Gain	Min–Max (Post)
Experimental (Qwen AI)	85	96	+11	91–100
Control (Conventional)	94	98	+4	67–100

An analysis of the three vocabulary dimensions in the experimental group revealed a distinct pattern of improvement. The meaning dimension improved only slightly, from 97% to 98% (a 1% gain), while the form dimension improved from 64% to 86% (a 22% gain). The largest improvement was observed in the use-in-context dimension, which rose from 75% to 98% (a 23% gain), indicating that the platform was most effective in helping students apply vocabulary appropriately within procedural and communicative situations relevant to their vocational field.

Table 2. Percentage Gain by Vocabulary Dimension (Experimental Group)

Dimension	Items	Pre-test	Post-test	Gain
Meaning	10	97%	98%	1%
Form	5	64%	86%	22%
Use in Context	5	75%	98%	23%

Prior to hypothesis testing, normality and homogeneity assumptions were examined. The Kolmogorov–Smirnov test indicated that the data were not normally distributed (Sig. = 0.000), while Levene's test confirmed that the variances between groups were homogeneous (Sig. = 0.229). Because the normality assumption was not met, the non-parametric Wilcoxon Signed-Rank Test was applied to test the hypothesis. The test produced an Asymp. Sig. (2-tailed) value of 0.000, which is below the 0.05 threshold, leading to the rejection of H_0 and the acceptance of H_1. This indicates a statistically significant difference between students' vocabulary achievement before and after the use of the Qwen AI Platform.

Table 3. Summary of Assumption and Hypothesis Testing

Statistical Test	Result	Interpretation
Normality (Kolmogorov–Smirnov)	Sig. = 0.000	Data not normally distributed
Homogeneity (Levene's Test)	Sig. = 0.229	Data homogeneous ($p > 0.05$)
Wilcoxon Signed-Rank Test	Asymp. Sig. (2-tailed) = 0.000	Significant difference ($p < 0.05$)

Discussion

This study applied Schmitt's three dimensions of vocabulary mastery—meaning, form, and use in context—as its theoretical foundation, reflecting the view that knowing a word involves several interrelated kinds of knowledge rather than a single ability (Schmitt et al., 2017; Nation, 2013). This multidimensional view aligns with the principles of ESP, which prioritize vocabulary that is useful and relevant to learners' authentic needs (Coxhead, 2012). Throughout the treatment, the Qwen AI Platform applied this principle by embedding

vocabulary practice within authentic vocational tasks and procedure texts rather than isolated word lists.

The first research question concerned the overall effectiveness of the Qwen AI Platform. The experimental group's substantially larger gain (11 points versus 4 points in the control group), together with a statistically significant Wilcoxon test result ($p = 0.000$), indicates that the improvement can reasonably be attributed to the AI-based intervention rather than to chance. This finding is consistent with previous research showing that AI-driven language applications can significantly improve vocabulary acquisition (Liang & Jia-Ying, 2024; Rodríguez Altamiranda et al., 2024). Several mechanisms likely explain this advantage: the platform provided immediate, individualized feedback rather than delayed, whole-class feedback (Wei, 2023); it adjusted task difficulty to each learner's level (Wah, 2025); and it embedded vocabulary in authentic, context-based tasks, which tends to produce deeper word learning than decontextualized instruction (Antia et al., 2021).

The second research question concerned which dimension of vocabulary knowledge benefited most from the intervention. The clear concentration of improvement in the use-in-context dimension (23%), followed by form (22%) and then meaning (1%), suggests that vocabulary knowledge does not improve uniformly. The large gain in contextual use is particularly significant for vocational learners, whose future work depends on applying vocabulary appropriately rather than simply recognizing its meaning. This finding is consistent with research showing that vocabulary and technical terms are learned more effectively when practiced within authentic scenarios (Coxhead & Demecheleer, 2018). The moderate gain in the form dimension likely reflects the platform's capacity to provide immediate, private correction of spelling and grammatical errors, a form of feedback difficult to replicate consistently in a conventional classroom with many students. The minimal gain in the meaning dimension, by contrast, likely reflects a ceiling effect: students already possessed relatively strong knowledge of word meaning before treatment, since this is typically the least cognitively demanding aspect of vocabulary knowledge (Nation, 2013; Read, 2000), leaving comparatively more room for growth in form and contextual use.

It should be noted that the three dimensions of vocabulary knowledge are not entirely independent; using a word correctly in context also depends on accurate meaning and correct form, so the dimensional breakdown, while analytically useful, is somewhat simplified. Even so, the overall pattern indicates that the Qwen AI Platform delivered its strongest benefit precisely where vocational students need it most: the ability to use technical vocabulary appropriately in authentic, work-related communication, which is central to the goals of English for Specific Purposes instruction (Fadlia et al., 2020).

CONCLUSION

This study examined the effectiveness of the Qwen AI Platform in enhancing the English vocabulary mastery of tenth-grade Visual Communication Design students within an ESP framework. The findings show that the experimental group, which received instruction through the Qwen AI Platform, achieved a considerably larger gain in vocabulary mastery than the control group taught through conventional instruction (11 points versus 4 points), a difference confirmed as statistically significant by the Wilcoxon Signed-Rank Test ($p = 0.000$).

Among the three dimensions of vocabulary knowledge examined, use in context showed the greatest improvement (23%), followed by form (22%) and meaning (1%), indicating that the platform was particularly effective in helping students apply technical vocabulary appropriately within authentic vocational situations.

These findings suggest that AI-based vocabulary platforms hold considerable promise as a complement to conventional instruction in vocational English classrooms, particularly for developing students' ability to use technical vocabulary in real communicative and procedural contexts. Teachers are encouraged to integrate such platforms alongside, rather than in place of, classroom guidance, and to design vocabulary tasks that are explicitly linked to students' vocational majors. Given the greatest gains observed in contextual use, teachers may also consider emphasizing procedural and scenario-based activities, such as guided writing of procedure texts, to further strengthen students' ability to apply vocabulary in authentic settings. Future research involving larger samples, longer treatment periods, and comparisons across different AI platforms and vocational majors would help to build a more comprehensive understanding of how AI-based tools can support ESP vocabulary instruction in vocational education.

REFERENCES

Alhazmi, K. (2024). The effect of multimedia on vocabulary learning and retention. World Journal of English Language, 14(6), 390–399. https://doi.org/10.5430/wjel.v14n6p390

Alqahtani, M. (2015). The importance of vocabulary in language learning and how to be taught. International Journal of Teaching and Education, III(3). https://doi.org/10.20472/te.2015.3.3.002

Antia, S. D., Catalano, J. A., Rivera, M. C., & Creamer, C. (2021). Explicit and contextual vocabulary intervention: Effects on word and definition learning. Journal of Deaf Studies and Deaf Education, 26(3). https://doi.org/10.1093/deafed/enab002

Arroyyani, R., & Maryani. (2025). Vocational high school students' learning difficulty in ESP. Sintuwu Maroso Journal of English Teaching (SintuwumarosoJET), 11(01).

Bai, J., Bai, S., Chu, Y., Cui, Z., Dang, K., Deng, X., Fan, Y., Ge, W., Han, Y., Huang, F., Hui, B., Ji, L., Li, M., Lin, J., Lin, R., Liu, D., Liu, G., Lu, C., Lu, K., … Zhu, T. (2023). Qwen technical report. http://arxiv.org/abs/2309.16609

Coxhead, A. (2012). Vocabulary and ESP. In The Handbook of English for Specific Purposes (pp. 115–132). Wiley. https://doi.org/10.1002/9781118339855.ch6

Coxhead, A., & Demecheleer, M. (2018). Investigating the technical vocabulary of plumbing. English for Specific Purposes, 51. https://doi.org/10.1016/j.esp.2018.03.006

Cresswell, J. W. (2013). Research design: Qualitative, quantitative, and mixed methods approaches. SAGE Publications.

Daskalovska, N. (2020). Vocabulary size at four stages of language development. European Journal of English Language Teaching, 6(2). https://doi.org/10.46827/ejel.v6i2.3392

Dudley-Evans, T., & St John, M. J. (1998). Developments in ESP: A multi-disciplinary approach. Cambridge University Press.

Fadlia, F., Zulida, E., Asra, S., Rahmiati, R., & Bania, A. S. (2020). English subject on English for Specific Purposes (ESP) in vocational schools. Language Literacy: Journal of Linguistics, Literature, and Language Teaching, 4(2).

Hutchinson, T., & Waters, A. (1987). English for Specific Purposes. Cambridge University Press. https://doi.org/10.1017/CBO9780511733031

Kamlun, K., Abu Bakar, A. L., Osman, W. H., & Hamzah, N. N. (2025). AI-powered English for Specific Purposes: Empowering learners through personalised resume writing instruction. MANU Jurnal Pusat.

Kemdikbudristek. (2022). Capaian Pembelajaran [Learning outcomes framework]. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Liang, W.-X., & Jia-Ying, Z. (2024). Impact of AI-driven language learning apps on vocabulary acquisition among English learners. Research Studies in English Language Teaching and Learning.

Nation, I. S. P. (2013). Learning vocabulary in another language. Cambridge University Press. https://doi.org/10.1017/CBO9781139524759

Read, J. A. S. (2000). Assessing vocabulary. Cambridge University Press.

Rodríguez Altamiranda, M. del C., Villamizar Parada, N. J., Martinez Bula, L. R., Restrepo Ruiz, M., Herazo Chamorro, M., & Gómez Díaz, C. (2024). Artificial intelligence in language learning. International Journal of Intelligent Systems and Applications in Engineering.

Schmitt, N. (2010). Researching vocabulary: A vocabulary research manual. Palgrave Macmillan.

Schmitt, N., O'Sullivan, B., Anthony, L., Dunn, K., & Kremmel, B. (2017). Understanding vocabulary acquisition, instruction, and assessment: A research agenda.

Silitonga, L. M., Wiyaka, W., & Prastikawati, E. F. (2024). Boosting students' ESP vocabulary by utilizing AI chatbot. ETERNAL (English Teaching Journal), 15(2), 275–283. https://doi.org/10.26877/eternal.v15i2.605

Sintia, D., Perdana, I., & Karani, E. (2025). ESP in practice: A literature review of challenges faced by teachers and learners. Journal of English Language Teaching, 9(2).

Skarpaas, K. G., & Rødnes, K. A. (2022). Vocabulary teaching practices of L2 English in upper secondary vocational classrooms. Languages, 7(1). https://doi.org/10.3390/languages7010055

Wah, J. N. K. (2025). Artificial intelligence in language learning: A systematic review of personalization and learner engagement. Forum for Linguistic Studies, 7(9). https://doi.org/10.30564/fls.v7i9.10336

Wang, S., Xu, T., Li, H., Zhang, C., Liang, J., Tang, J., Yu, P. S., & Wen, Q. (2024). Large language models for education: A survey and outlook. http://arxiv.org/abs/2403.18105

Wei, L. (2023). Artificial intelligence in language instruction: Impact on English learning achievement, L2 motivation, and self-regulated learning. Frontiers in Psychology, 14. https://doi.org/10.3389/fpsyg.2023.1261955