The Use of ChatGPT for Vocabulary Acquisition: A Literature Review

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ABSTRACT

This literature review investigates the potential of ChatGPT as a tool for vocabulary learning in the context of English as a Foreign Language (EFL). Vocabulary knowledge is crucial for overall language proficiency, but memorization and retention are daunting tasks for most EFL learners, particularly those studying in exam-oriented contexts like Vietnam. Guided by Krashen's Input Hypothesis and Cognitive Load Theory, the review explores how ChatGPT may facilitate incidental and intentional vocabulary learning. The findings indicate that ChatGPT enhances retention, mitigates cognitive overload, and engages students in autonomous learning, which presents advantages over traditional tools like dictionaries. However, reliance, privacy, and misinformation issues are not solved. This review ends with a series of recommendations for effective use in the Vietnamese education system, including teacher training and guidelines for responsible application in order to maximize benefits while addressing risks.

Keywords: Artificial Intelligence (AI), ChatGPT, vocabulary acquisition

Introduction

Background to the study

Vocabulary acquisition is one of the most important aspects of learning English as a Foreign Language (EFL). Vocabulary knowledge facilitates learners' listening, speaking, reading, and writing skills by creating the basis to obtain language input and output effectively (Nation, 2001). A number of studies have proven that students' vocabulary size can be a good indicator of their academic achievement and an accurate general measure of linguistic competence (Schmitt, 2010). Oral and written English vocabulary plays an important role in learning activities. Nevertheless, vocabulary learning is a difficult task for most EFL learners due to a lack of exposure to the target language input, especially in the non-English speaking environment context, as well as ineffective strategies such as memorization, which provide only shallow processing and lack of contextualized enrichment (Laufer & Hulstijn, 2001). To tackle these challenges, new ways of exposing learners to vocabulary, such as interactive and contextual activities (spoken and written), are needed to promote greater retention and

vocabulary usage (Nation, 2017). Technology-based solutions such as AI platforms or Mobile-Assisted Language Learning (MALL) tools have appeared to bridge this gap.

The integration of technology in language education has widened learners' access to language resources and the practice of language. The transition from a conventional learning environment to a technology-enhanced setting allows more flexibility and personalization in learning (Stockwell, 2012). Language learning applications, online platforms, and AI-integrated tools have facilitated the learners' practice of vocabulary through interactive and enjoyable exercises (Hulstijn, 2012). Also, conversational agents (CAs), e.g., chatbots and virtual assistances, have emerged as a powerful means for language acquisition with the potential to provide learners with real-time interactive support (Wang & Young, 2014). Agents like chatbots were developed decades ago aiming at having conversations in natural language with the learner to help learners improve their oral or written abilities through intrinsically motivated practice, which is important for vocabulary learning and use (Peters, 2019).

AI has revolutionized language learning, advancing various skills such as pronunciation, vocabulary acquisition, writing, and reading comprehension. For instance, ELSA Speak has improved the accuracy of pronunciation by providing real-time feedback on intonation and fluency aspects (Anggraini, 2022; Sholekhah & Fakhrurriana, 2023). The Nguyen and Newton (2020) study demonstrates that mobile AI tools for Vietnamese learners produce better pronunciation outcomes than without them. In writing tasks, tools like ChatGPT have been suggested beneficial for EFL learners in realizing content structure and organization (Marzuki et al., 2023). In vocabulary acquisition, Storyfier uses AI to insert target vocabulary into narratives, a technique shown to be more effective for retention than traditional methods (Peng et al., 2023). Students' interest and proficiency in the target language may improve with the use of digital storytelling (Phan et al., 2024; Du et al., 2024). Duolingo utilizes adaptive learning approaches that facilitate the practice of reading and listening skills with research indicating positive results for beginner and intermediate levels of learners (Xiangying et al., 2024; Loewen et al., 2020). All these studies emphasize that AI can promote learning experiences by keeping students engaged over time while they progress significantly in different aspects of language proficiency.

OpenAI's ChatGPT has recently become very popular as a language-learning tool. As a conversation partner, it stimulates users with immediate dialogue and feedback about the meanings of words, synonyms, and usage examples (Sarrion, 2023; Tran, 2024). Through its responsive, adaptive intervention capability, ChatGPT can assist in modifying dialogues according to the vocabulary level of particular learners, which will enhance retention through personalized interactive practice (Liang & Zhang, 2024). The customized method will also be enriched with higher-order language processing, making ChatGPT a useful tool for language learning (Om, 2024; González, 2024). Moreover, ChatGPT encourages active learning by asking learners to use newly learned words in their immediate conversation with the tool. Active usage of words in speech or writing is known to lead to better word memorization and longer retention (Laufer, 1998). Last but not least, through its generated conversations with learners, ChatGPT helps space repeated presentations of the target word through multiple interactions and varied contexts (Kang, 2016).

Statement of the problems

One of the most important difficulties in vocabulary acquisition that EFL learners face is memorization and retention. Students usually cannot remember the vocabulary they have perceived after a period of time, especially when it is not given in a meaningful context or repeated (Nation, 2013). The conventional ways of teaching and learning, such as the teacher-centered approach, do not usually require the students to be active or consider their own characteristics (Schmitt, 2008). Learners often memorize words for exams, but they do not learn them as an item of knowledge and skill, making them effective language users (Laufer, 1998). In the Vietnamese context, the reliance on exam-oriented learning poses another challenge. Many students learn vocabulary to get good marks in the tests rather than for communication (Vu & Peters, 2021). The test-related learning intention narrows down the learners' knowledge about vocabulary as they do not pay enough attention to such aspects as word meaning nuances or how words are used in context and are not aware of how to use vocabulary to develop their productive skills such as speaking or writing (Nguyen et al., 2014).

A lack of technology integration in language classrooms is also a challenge. While technology-enhanced language learning has gained some adoption, many Vietnamese schools and universities are still using the traditional teacher-centered approach, and teachers might not be equipped or supported to integrate AI technologies into their teaching (Nguyen, 2024). This technology gap also hinders students from accessing innovative learning applications like ChatGPT that can offer more personalized and interactive vocabulary learning experiences.

The use of AI in education has attracted great attention, and recent tools such as ChatGPT have also brought a new way to improve language learning. However, the literature on this topic isn't fully exploited. Most existing studies have investigated overall language proficiency or grammar. Thus, studies specifically examining whether AI can help EFL learners learn vocabulary are yet to be adequate (Liang & Zhang, 2024). Some studies also raise concerns about ChatGPT providing inaccurate or unreliable information (Su & Tran, 2024). This gap in the literature is even more notable in Vietnamese contexts, where there is a dearth of research on utilizing AI for vocabulary acquisition (Nguyen, 2024).

Purpose of the study

This literature review aims to investigate the potential of AI-powered tools, especially ChatGPT, in assisting EFL learners to improve their vocabulary. It also attempts to fill the knowledge gap regarding the effectiveness of AI-supported tools for learning vocabulary items and the role of interactive platforms like ChatGPT in stimulating vocabulary retention and production. Moreover, this research will explore the literature on difficulties with vocabulary acquisition among EFL learners in an exam-oriented, teacher-centered context where lexical items are largely neglected; Vietnam serves as a representative example of such a context. Additionally, through an analysis of studies about AI-based language learning applications, the paper would like to draw attention to the advantages of incorporating technology into EFL classrooms in order to help students develop their vocabulary.

Literature review

Theoretical reviews

The Input Hypothesis (Krashen, 1985) states that language is learned best with comprehensible input and is approximately one step beyond the learner's current stage of linguistic competence (i+1). This hypothesis suggests that learners learn vocabulary or acquire new words most effectively when encountering them in a context (comprehensible input) that slightly stretches their existing language knowledge. ChatGPT, as an AI-based language model, generates responses in conversations appropriate to a learner's level and knowledge. In other words, ChatGPT responses expose users to contextually appropriate new vocabulary by adapting its explanations or expanding on a word, e.g., prompting for clarification, when needed. Such adaptive responses maintain and increase exposure to i+1 vocabulary while generating meaning through interaction.

Incidental Vocabulary Learning Theory posits that most vocabulary learning occurs not through direct vocabulary study but as an unintended result of interacting with language while meaningfully engaged (Hulstijn, 2001). The theory argues that learners learn new words or phrases while they are using them for other forms of meaningful communication, such as listening, reading, or speaking. The conversational nature of ChatGPT prompts users to have a conversation in a naturally flowing language where learners would stumble upon unfamiliar words and expressions on this journey. Learners tend to worry about memorizing these new elements from those conversations at first, but they will repeatedly be exposed to various words and expressions in context and gradually absorb them unconsciously. This is exactly how to acquire new vocabulary incidentally by using ChatGPT.

Cognitive Load Theory (Sweller, 1988) hypothesizes that learning occurs when instructional design eliminates unnecessary cognitive load (3 types). Intrinsic load is the task's inherent complexity, extraneous load is the additional unnecessary load created by poorly designed instruction, and germane load is the effort involved in processing and making sense of new information (Sweller, 2010). With second-language learning in mind, tools like ChatGPT can dramatically facilitate vocabulary acquisition by reducing extraneous cognitive load toward achieving optimal learning conditions. Through immediate, structured, and contextualized feedback, ChatGPT can minimize the search for meaning or examples, thereby enabling learners to deal with germane load (Van Merriënboer & Kester, 2014). ChatGPT eliminates the need for additional resources that help relieve working memory for meaningful language retention by providing vocabulary explanations in real time based on the learner's current knowledge state. As Paas and Ayres (2014) suggested, reducing extraneous load allows learners to produce more productive cognitive activities required for long-term retention of vocabulary and developing schema. Furthermore, ChatGPT can facilitate personalized learning, which is consistent with the underlying principle of the cognitive load theory of individual difference-sensitive treatment (Sweller et al., 1998). Moreover, it exposes learners to vocabulary in a familiar context, which would lead to a better acquisition effect (Baddeley, 2000).

Reviews of related literature

AI tools in enhancing vocabulary acquisition around the world

The reviews below are of studies that provide a global perspective on the use of AI technologies, such as ChatGPT, and their effects on vocabulary learning for different educational scenarios. The reviews analyze to what extent AI can help improve the effectiveness of vocabulary learning outcomes and the concerns regarding its application. Reviewing them provides insights into the promise as well as the constraints of AI integration in global language teaching.

Losi et al. (2024) conducted a study to explore students' perceptions of the use of ChatGPT in learning English vocabulary. Using descriptive quantitative, the author gathered data by administering a Likert scale questionnaire to 30 students of SMAN 2 Binjai, North Sumatra. The result revealed that student perceived ChatGPT positively in terms of simplicity, convenience, and effectiveness in improving their English vocabulary. Students felt it has improved their independent learning and problem-solving skills, but they are also concerned with its occasional errors and potential academic dishonesty since some students become dependent on it. In this regard, providing instructions and guidelines regarding its responsible use is highly suggested. The study revealed that, despite extensive discourse on AI in education, there is a deficiency of targeted research examining student engagement with AI-based apps, specifically for vocabulary acquisition.

Lew et al. (2024) compared three AI tools, ChatGPT-3.5, the Longman Dictionary of Contemporary English (LDOCE), and Diki.pl, with three user groups of Polish EFL students at a university. During two paper-based tests – a production test (a sentence translation task) and a reception test (an English sentence comprehension task), 166 participants were randomly assigned to use one of the three AI tools to complete the tests. The results revealed that in terms of effectiveness in supporting both lexical tasks, ChatGPT was superior to the monolingual dictionary, but the bilingual resource outperformed ChatGPT in receptive tasks. Lew et al. raised concerns about using AI-based lexical resources, particularly language production applications with writing practice elements based on their findings.

Oktadela et al. (2023) explored the use of AI chatbots to enhance the vocabulary skills of 20 elementary students at SD-IT Imam Syafei, Indonesia. The study aimed to engage the students in interactive language learning through AI chatbot technology, foster self-learning, and improve vocabulary retention. This study employed lecturing, demonstrating, and practicing techniques to introduce the AI chatbot application to students. Following eight weeks of interactions with AI chatbots, the researchers then utilized conversations as a way of gathering feedback and data. The result reveals that students had strong positive responses towards AI chatbot usage, which highly motivated them to improve their English vocabulary, especially in spelling words correctly. Using an AI tool as a 'teacher' during a lesson, the students can enjoy practicing the English language independently at any time and place via mobile phone because it offers real-time interaction for continuous learning. However, there was a lack of scientifically designed models or guidelines to assist teachers in using these tools in their classrooms. Therefore, more structured support is needed to be developed on how such AI tools can be effectively implemented for student-centered learning.

Xiao and Zhi (2023) inspected EFL learners' perceptions and experiences of utilizing ChatGPT in language learning. This study aimed to explore how the students made use of ChatGPT and whether they perceived it as helpful in improving their language proficiency related to grammar, vocabulary, and writing. 5 undergraduate participants with different majors from a Chinese international university who have been using ChatGPT for writing essays and IELTS preparation were involved in semi-structured interviews. The findings suggested that students generally considered the tool useful for providing individualized feedback, brainstorming topics, enhancing grammar accuracy, and expanding vocabulary range. Nonetheless, they also noted problems such as the limited correctness of the software's advice and overreliance on it. Future research was suggested to examine how to design appropriate prompts and enhance the implementation of higher-order language skills.

Peng et al. (2023) examined the feasibility of using the Storyfier AI model for vocabulary learning. The tool generates stories where target words are parts of the story. Then, they carried out a study with 28 university students from different majors in China. The research aimed to investigate the effects of the usage of such AI-generated stories on vocabulary recall and form and meaning consolidation through reading and writing activities. To measure those effects, they administered quantitative tests, including pre- and post-tests for reading and writing and cloze tests, as well as qualitative tests, including interviews, observations, and a post-exposure memory task. Findings revealed that although the learners found the AI tool interesting and useful in facilitating vocabulary learning, the AI-generated context did not result in any major increase in word retrieval and word application performance over conventional exposure types, i.e., by either using dictionaries or books… The writing opportunity was negatively affected because it required minimal effort to engage with the AI-assisted writing task, which also resulted in minimal retention and application.

Alharbi and Khalil (2023) conducted an exploratory study to investigate students' and teachers' perceptions of the use of AI in English as a Second Language (ESL) vocabulary learning. This was done to gain insight into their beliefs, attitudes, and expectations about the effectiveness and issues related to the integration of AI for vocabulary acquisition. Two different questionnaires— one each for students and teachers—were used to collect data from 77 university students and 22 English language teachers in Pakistan. The results indicated that students held positive views about AI because they believed it could present personalized, authentic, real-life-like learning activities more effectively than traditional materials-based learning methods. Conversely, teachers had a range of reactions. Younger teachers were more optimistic about how technology could help teach and learn English vocabulary, while older teachers were more worried about how technology could make students too dependent on it and less likely to interact with each other during class.

In 2024, Wang et al. tested the influence of AI tools on vocabulary acquisition in EFL. The Apriori algorithm and data mining were applied to track the learning behavior of 110 undergraduate students from four different majors, who were using two AI-powered platforms (UNIPUS AIGC and iTEST mobile) for learning vocabulary. Data collection involved surveys capturing students' engagement with AI-powered platforms, which provided insights into their learning through self-testing and in-class quizzes. Results suggested that AI-powered platforms

have positively affected vocabulary learning effect for EFL learners, especially when students combine classroom learning with self-testing using these platforms. Thereafter, the authors urged the design of personalized AI-driven learning paths that fit EFL learners' needs related to gaining vocabulary involvement and retention.

Yunjiu et al. (2022) conducted a comparative study that investigated the construct validity implications when using AI-generated vocabulary test items and those written by human experts in the context of Chinese English as a Second language. A mixed methods research design was used. Quantitative data were collected through performing multiple-choice questions with 78 participants, and thinking-aloud tasks gathered qualitative data with 13 participants. The results showed that although the item difficulty generated by the AI system was higher, the discrimination indices obtained by participants were not as high as those of the human expert item writers. The findings also suggested that there might be a difference between AI and expert-generated in terms of skills applied. More specifically, the bottom-up strategy was mostly used with AI, while the top-down strategy was mostly used with expert-defined generation.

Wei-Xun and Jia-Ying (2024) investigated the effects of AI-powered language learning apps on ESL learners' vocabulary learning regarding the effectiveness of personalized learning and gamification. The study involved an experimental group that used AI-powered apps (e.g., Duolingo, Babbel) and a control group. This study used a mixed-method approach, applying standardized tests as quantitative measures and interview data as qualitative information pertaining to participant experience. Results after 12 weeks showed that the experimental group retained and recalled vocabulary better than the control group. The adaptive content in AI-powered applications provided immediate feedback based on learners' abilities and peer support to encourage continuous learning. Additionally, the gamification aspect was kept by quizzes, levels, and rewards that motivated users to stay longer mastering vocabulary.

Alsadoon (2021) examined the impact of an AI chatbot with various vocabulary support tools in promoting the vocabularies of Saudi EFL learners. The AI chatbot was enabled with different vocabulary support tools such as dictionaries, images, L1 translation tools, and concordancers. This study aimed to identify which tool facilitated by AI chatbot would be the most effective in learning vocabulary. 20 Saudi EFL students from the British Council in Riyadh were taken as a sample for this study. Pre-test, post-test, delayed post-test, and attitude questionnaire were applied as data collecting tools. The findings indicated that the dictionary was the most favorite and supportive tool for vocabulary learning by learners, followed by L1 translation, which indicated slightly better gain scores for retention. Meanwhile, a concordancer proved to be the least preferred and least effective tool for vocabulary learning among learners. However, promoting the effectiveness of a variety of different online choices was important. It also revealed that more research on how various available tools might increase long-term memory tasks would be necessary, such as studies with larger samples and longer intervention periods.

Farr (2024) conducted an exploratory study to investigate the challenges of using ChatGPT for vocabulary learning in English as an Additional Language (EAL). The study aimed to evaluate ChatGPT's effectiveness in vocabulary acquisition in general and for ESAP learners in particular. The study employed a mixed-method approach consisting of guided interactions with

ChatGPT and learner surveys. During these guided interactions, students interacted with ChatGPT to determine whether it could offer informative responses and contextually relevant information while learning vocabulary. Data were collected through student logs, a questionnaire, and performance tasks. Findings revealed several positive factors and potential areas of concern, including cultural sensitivity, grammatical errors, and source validity. However, the results suggested that ChatGPT has a future as an additional resource for language learning/teaching purposes but under the guidance of aware instructors or facilitators.

From the above-reviewed studies, AI tools like ChatGPT have shown their potential in helping vocabulary learning by providing personalized formative feedback, enhancing retention, and promoting autonomous learning. These tools are convenient and effective to use, supporting vocabulary learning in general and assisting students with practice due to real-time interactions in particular. However, challenges still exist, such as dependence, occasional mistakes, and the demand for structured suggestions to support the educational use of AI technology. As beneficial as they are, AI tools cannot outperform traditional means all the time yet, especially for tasks like writing involving more profound language knowledge. In this regard, we should utilize AI as a complementary tool for language education and continue to explore how it can be effectively used in vocabulary teaching and learning with future research.

AI tools in enhancing vocabulary acquisition in Vietnam

The reviews below summarize a number of investigations that have been carried out in an attempt to introduce AI applications, namely, ChatGPT and VoiceGPT, into English vocabulary learning for Vietnamese students. They are employed in different educational levels, like high school and university, to determine whether such innovative technologies can enhance pedagogical practice, student engagement, vocabulary achievement, and overall learning performance. These reviews demonstrate the increasing demand for innovation in vocabulary instruction in Vietnam by embracing AI technology.

Nguyen and Cao (2023) studied the use of ChatGPT in Vietnamese foreign language classrooms. The authors hypothesized that integration of ChatGPT could enhance educational outcomes like personalization, teacher support, and accessibility for remote learners. The study used a mixed methods design to collect data from teachers and students through survey and interview questions. A total of 200 participants took part in the study. Survey data were collected to measure teachers' and students' general attitudes toward ChatGPT, perceived usefulness when using ChatGPT in classrooms, and problems encountered when using it. Interviews were also conducted with the teachers to learn their thoughts and experiences with ChatGPT. Results revealed that teachers using ChatGPT can enhance student engagement, provide personalized feedback on an individual basis, and manage teaching content for improved learning, while some of the issues faced include content privacy, quality control, and accuracy when deploying this technology.

Sirichokcharoenkun et al. (2023) studied the use of ChatGPT in supporting English language teaching and learning at a public high school in Ho Chi Minh City. The purpose of this study is to investigate whether ChatGPT could function as an effective 'practice partner' for teachers in offering students more practice and for students to review their language, particularly grammar,

vocabulary, listening, reading, and pronunciation stresses. A total of 368 eleventh-grade students and eight EFL teachers were recruited as participants. Quantitative and qualitative data were collected via questionnaires in order to gain insights into users' attitudes towards the AI tool. The results showed that ChatGPT performed best at grammar, vocabulary, and reading tasks but struggled with pronunciation and stress instructions. Nonetheless, more positive perceptions suggested that ChatGPT could also serve as a useful English language instructional resource. Given the limited duration of the study and issues related specifically to pronunciation stress responses for further research are discussed.

Nguyen et al. (2024) studied the use of VoiceGPT in grade 6 for learning English vocabulary at Lam Son Secondary School in Ho Chi Minh City. This study was carried out to explore how students employed VoiceGPT to learn new English vocabulary and to understand the perception and experience of students with this AI support. A quasi-experimental design was applied where 10 grade-6 students were utilizing VoiceGPT performing tasks of 30 min while another 10 students were doing similar tasks using conventional resources used in English vocabulary learning as a comparison group. Data were generated through semi-structured interviews, pre-tests, post-tests, and writing tasks. The results demonstrated that students who utilized VoiceGPT obtained higher scores than those with conventional resources in terms of accuracy of vocabulary. However, some problems related to logging in and less interactive response from VoiceGPT during tasks impeded most of its use by the students. The authors recommended that further research is required on how AI-supported technology such as VoiceGPT can be integrated into secondary education.

Pham et al. (2024) explored Vietnamese tertiary EFL learners' engagement in vocabulary learning mediated by an AI tool, namely POE. The study aimed to investigate the students' behavioral, emotional, and cognitive engagement with an AI chatbot for vocabulary learning purposes. A mixed-methods design was utilized with 31 English-major students in a Vietnamese public university. Data were collected through weekly questionnaires and interviews for four weeks. The results indicated that the use of POE promoted all three types of engagement among students. Behavioral engagement increased regarding the time spent on tasks; emotional engagement increased because students found this AI tool fun and interesting; and cognitive engagement increased as students made associations to their prior knowledge and used more sophisticated words and expressions. This study provided insights into AI tools' advantages in language classrooms. Nonetheless, the authors suggested that longitudinal investigations are needed to explore the long-term effects of using AI more and studies with larger sample sizes to enhance generalizability.

The aforementioned research in Vietnamese contexts revealed the potential benefits of AI technologies such as ChatGPT and VoiceGPT on vocabulary learning for students at all educational levels in Vietnam schools. They provided helpful support to increase students' learning motivation, higher personalization of learning, and better retention rate of acquired vocabulary. However, some challenges still needed to be overcome, such as accuracy, technical issues, and concern about private information content when deploying these technologies. To have a better overview of effectiveness as well as obstacles associated with these applications in practice to redesign the integration process and ensure the enhancement effect from AI-

focused education for language learning in the Vietnamese context, it should be investigated more deeply.

While global and Vietnamese studies evidence the potential of AI tools in vocabulary learning, many aspects still require further investigation. Globally, the research on the long-term effects of AI on vocabulary retention and its impact on the development of higher-order language skills isn't adequate. In Vietnam, issues concerning content privacy, technical aspects, and guidelines for implementation have not been sufficiently addressed. Moreover, more large-scale and longitudinal research should be conducted in both contexts to obtain a more comprehensive view of the effectiveness and challenges of using AI in vocabulary instruction.

Discussion

Discussing the research methodologies

Both global and Vietnamese studies commonly adopt mixed methods, in which both qualitative and quantitative data are collected. For example, in line with international studies such as Alharbi and Khalil (2023), Peng et al. (2023); Vietnamese works such as Nguyen and Cao (2023), Pham et al. (2024). Questionnaires and interviews were applied to elicit student engagement, perception, and vocabulary performance. The research designs encompassed pre- and post-tests and semi-structured interview protocols to gain insights into learning outcomes and learners' and teachers' experiences and perceptions. This combination of quantitative assessment of learning gains and exploration into users' perceptions is the most appropriate when investigating AI applications in education (Riazi & Candlin, 2014).

A notable distinction is that most global studies compared AI tools with traditional learning resources to evaluate effectiveness. For example, Lew et al. (2024) compared the effectiveness of ChatGPT with monolingual and bilingual dictionaries. This distinction rarely occurs in Vietnamese studies, in which most studies only investigated the effectiveness of AI tools regardless of traditional resources. A second distinction is the target population. Most global studies investigate different learners from diverse countries with various educational levels (Losi et al., 2024; Xiao & Zhi, 2023). Yet, most Vietnamese studies focus on investigating some particular educational levels within Vietnam such as high school and tertiary learners (Pham et al., 2024).

Considering these methodologies, the mixed-methods design appears most appropriate for a study on ChatGPT for vocabulary learning. We can use quantitative data from pre-tests and post-tests to evaluate the learning outcomes, and through qualitative interviews or surveys, we can gather data on user experiences with ChatGPT. It is also a good idea to conduct a comparative study, in which we compare the effectiveness of ChatGPT with traditional vocabulary learning instruments such as dictionaries or textbooks. Furthermore, an additional longitudinal component would allow us to measure users' progress over time and gain insights into the long-term retention of vocabulary learned with AI tools (Derwing et al., 2007).

Discussing the results and findings

The results of the above studies on the use of AI in vocabulary learning activities show several points of convergence and divergence between the international and Vietnamese contexts. In the international context, studies such as Losi et al. (2024) and Lew et al. (2024) have demonstrated positive learners' attitudes toward ChatGPT as a tool to support vocabulary learning. Losi et al. (2024) found that students agreed that ChatGPT is simple and useful for learning vocabulary, but they also reported concerns about reliance on and occasional errors from the system. Similarly, Lew et al.'s study (2024) provided strong evidence indicating that ChatGPT performs well in supporting participants' work with lexical forms regarding sentence translation; however, bilingual resources outperformed ChatGPT for language reception. While recognizing the value of ChatGPT, its incorporation should be evaluated with other existing resources.

In contrast, studies in Vietnam (Nguyen & Cao, 2023) indicated that the use of AI tools (i.e., ChatGPT) could foster students' engagement and provide personalized feedback related to their learning needs. Also, the use of AI tools can enhance independent learning and motivation of the learners when face-to-face classroom teaching is not possible. However, issues such as privacy, content quality, and technical difficulties still existed before AI tools were widely implemented in educational settings in Vietnam.

Interestingly, although most studies in Vietnamese contexts have also recommended AI as a supplement to vocabulary learning, Vietnamese researchers have not directly investigated AI tools as an alternative to non-AI tools. Therefore, future research could be to conduct comparison studies in Vietnam regarding the effectiveness of AI tools and traditional methods. Moreover, the effect of ChatGPT is still underexploited, and a lot more should be done globally and specifically in Vietnam with regards to investigating the issues of long-term vocabulary retention, higher-order language skills, and content privacy.

Discussing the research gaps

Despite these positive results about using AI in vocabulary learning, there are several research gaps that need to be addressed. First, at a higher level of generality, there isn't an adequate investigation into how AI devices such as ChatGPT and AI-written stories impact the development of learners' vocabulary (Losi et al., 2024; Peng et al., 2023). Although these studies show that ChatGPT and AI-written stories considerably enhance engagement and personalized feedback in EFL conditions, whether vocabulary acquired through the AI tools could be retained for a longer time requires more extensive research. This also applies to other traditional learning resources like dictionaries (Lew et al., 2024). Second, the same studies call for research on the relationship between AI and higher-order language measures, such as writing, which often demands more complex linguistic knowledge (Peng et al., 2023). Third, more investigations should be conducted to promote the balanced use of AI, as Xiao and Zhi's (2023) study indicates an over-dependence on AI for English writing.

In the Vietnamese context, despite the positive impacts of AI tools including ChatGPT and VoiceGPT on vocabulary learning and learner motivation (Nguyen & Cao, 2023; Pham et al., 2024), there are concerns about content security issues, limitations in technical terms, as well

as lack of specific guides for teachers in utilizing these tools (Pham et al., 2024). Similar to this issue, Sirichokcharoenkun et al. (2023) revealed certain difficulties concerning pronunciation and word stress using AI tools that need further investigation into privacy, technology aspects, and language pedagogy when AI is adopted inside Vietnamese language classrooms. Additionally, most investigations conducted in Vietnam were small-scale studies with short treatment duration. Hence, further investigation with a larger sample size and longer intervention period was suggested to have more generalizable evidence regarding the long-term effects of AI on Vietnamese language learning.

Future research should fill these gaps by exploring the long-term retention of vocabulary acquired through ChatGPT and its impact over time. Research is also needed to examine the effects of using ChatGPT on higher-order language skills, such as critical thinking, which have been significantly overlooked. Studies addressing privacy and technical issues related to Vietnamese classrooms with targeted experiments would be interesting for practical application. Some thoughts can be added to enlarge sample sizes and intervention periods, possibly leading to more generalizable results that could inform the effective incorporation of artificial intelligence into language learning.

Conclusion

In sum, the application of ChatGPT in vocabulary acquisition has several advantages. First, it helps to create personalized and interactive learning spaces that can improve learners' vocabulary and language performance. Second, as an agent involved in real-time dialogue with learners and offering immediate responses, ChatGPT is also expected to help foster incidental learning by providing learners with specific words that are likely to be both appropriate to the context and within their productive ability limits. Finally, the input that ChatGPT provides is often more accessible than the traditional input. Nevertheless, despite these potential benefits, several research gaps still exist. There are no studies that follow up over time on how much vocabulary learned through AI systems like ChatGPT is retained by students. The impact of ChatGPT on higher-order language skills requires further examination. In addition, although AI applications are proliferating and increasingly used in various public exam preparation contexts (like Vietnam), the number of studies conducted on this topic is limited, and therefore, no definitive conclusions can be drawn.

For ChatGPT to function productively within the Vietnamese educational context, there needs to be targeted training for teachers to ensure that they are equipped to support the technology while also being able to use it effectively and create suitable prompts. Policies will outline the appropriate use and clarify the role of the tool as an adjunct resource toward academic integrity. Its integration will be required into already developed EFL syllabi; specific activities designed will include vocabulary acquisition, oral practice, and writing support, which should fit curricular aims while simultaneously meeting demands placed on Vietnamese students so that they can excel in exam-centered contexts. Educational institutions can ensure the privacy of student data by implementing stringent regulations about secure data management techniques that safeguard user information. Infrastructure requires enhancement to ensure reliable access

to ChatGPT, including the availability of devices, steady internet connections, and technical assistance, particularly in remote regions. Collectively, these measures would facilitate the responsible and effective enhancement of language acquisition in Vietnam using ChatGPT's potential.

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