PAPER

EXAMINING THE EFFECTS OF CHATGPT-ASSISTED PRACTICE ON VOCABULARY ACQUISITION AMONG EMI UNIVERSITY STUDENTS

Ne'matov Abdullajon[1],*

[1]Fergana State University

* ne'matov@gmail.com

Abstract

The use of artificial intelligence tools in vocabulary learning has gained significant attention recently, with ChatGPT emerging as a potentially game-changing resource for language education. Despite the growing interest, there is limited empirical evidence on the effectiveness of ChatGPT-assisted vocabulary practice in English as a Medium of Instruction (EMI) settings. This study investigates the impact of ChatGPT-assisted vocabulary practice on EMI students' vocabulary development. Over four weeks, a quasi-experimental design compared this new method with traditional vocabulary learning strategies. Sixty EMI students from History, Philosophy, and Pedagogy programs at Fergana State University took part in the research. Pre- and post-vocabulary tests assessed lexical acquisition. Significant improvement is anticipated in the group using ChatGPT-assisted practice compared to the control group. The findings aim to enhance EMI pedagogy and provide insights into effective AI use in academic vocabulary teaching.

Key words: ChatGPT; vocabulary acquisition; EMI students; AI-assisted learning; applied linguistics

Introduction

Vocabulary as Foundation of Academic Success

Vocabulary knowledge is essential for academic success and understanding in higher education (Nation, 2001; Schmitt, 2008). Research shows that vocabulary skills significantly affect students' ability to engage with complex texts, participate in discussions, and achieve learning goals across subjects (Coxhead, 2000). Studies indicate that vocabulary size has a significant impact on reading comprehension (Laufer & Ravenhorst-Kalovski, 2010). For university students, poor vocabulary knowledge creates obstacles in accessing content, hinders critical thinking, and limits academic performance (Hyland & Tse, 2007).

EMI Context and Lexical Demands

English as a Medium of Instruction (EMI) is

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becoming more common globally, especially in higher education institutions focused on internationalization and competitiveness (Macaro et al., 2018). EMI contexts pose unique linguistic challenges because students must master subject-specific content while also improving their academic English skills (Dafouz & Smit, 2020). The vocabulary demands in EMI settings are particularly high, requiring students to learn general academic terms as well as specialized vocabulary relevant to their fields (Evans & Morrison, 2011). Students in EMI programs often face the challenge of understanding complex concepts while dealing with unfamiliar vocabulary, which can slow their academic progress and engagement with course materials (Airey, 2012). The Academic Word List (Coxhead, 2000) and field-specific terms are crucial for success in EMI contexts.

Rise of AI Tools in Language Learning

The rise of artificial intelligence has opened up new possibilities for language learning, with ChatGPT being a significant development in this area (Zhai, 2022). As a large language model created by OpenAI, ChatGPT uses advanced natural language processing to engage in meaningful conversations and generate a range of language outputs (Brown et al., 2020). Unlike traditional Computer-Assisted Language Learning (CALL) tools, ChatGPT offers greater interactivity, personalization, and tailored feedback (Godwin-Jones, 2022). This technology allows learners to receive instant explanations, create context-specific examples, explore meanings, and practice vocabulary in real-life contexts (Kasneci et al., 2023). These features suggest potential advantages for vocabulary acquisition, particularly in promoting the kind of processing and repeated encounters with target words that research has found vital for vocabulary growth (Nation, 2001; Schmitt, 2008).

Research Gap

Though there are many discussions and anecdotes about AI-assisted language learning, research on the effectiveness of ChatGPT for vocabulary acquisition is still lacking, especially in EMI contexts (Baidoo-Anu & Ansah, 2023). Previous studies focused on earlier technologies like flashcard apps, online dictionaries, and corpus-based tools (Chapelle, 2009; Godwin-Jones, 2018). The interactive and generative features of ChatGPT

create a new learning environment that needs more systematic exploration. Additionally, research specifically targeting the vocabulary needs of EMI students is limited, even as EMI programs grow worldwide (Macaro et al., 2018). There is a need for controlled studies that measure actual learning outcomes instead of just surveying perceptions or describing practices, as this would support evidence-based teaching decisions about AI integration in EMI vocabulary instruction.

Purpose and Research Questions

This study aims to explore how ChatGPT-assisted vocabulary practice affects vocabulary acquisition among EMI university students enrolled in History, Philosophy, and Pedagogy programs. The research focuses on two main questions:

RQ1: Does ChatGPT-assisted vocabulary practice improve vocabulary acquisition among EMI students?

RQ2: Is the improvement in vocabulary acquisition greater for students using ChatGPT-assisted practice compared to those using traditional vocabulary learning methods?

Literature Review

Vocabulary Acquisition Theories

Modern understanding of vocabulary acquisition is based on several theories that explain the cognitive and linguistic processes involved in vocabulary development. Nation (2001) identifies four key areas of vocabulary knowledge: meaning, form, use, and the relationships between these aspects. This perspective acknowledges that knowing a word involves different types of knowledge, including spoken and written forms, word parts, connections between form and meaning, concepts, associations, grammatical functions, collocations, and limitations on use. Schmitt (2008) elaborates on the gradual nature of vocabulary learning, highlighting that vocabulary acquisition occurs along a spectrum from initial recognition to deeper and more flexible knowledge that supports proper use in various contexts. Cognitive theories of vocabulary learning emphasize the importance of depth of processing. Research shows that more engaging activities, including semantic analysis and multiple exposures to target words, lead to better retention than shallow learning focused only on form-meaning connections (Craik & Lockhart,

1972). The involvement load hypothesis (Laufer & Hulstijn, 2001) suggests that vocabulary tasks can be evaluated based on their need, search, and evaluation requirements. Higher involvement levels correlate with better retention. These insights imply that vocabulary learning environments that promote meaningful interaction, contextual use, and cognitive engagement are more effective than those focused solely on rote memorization.

Computer-Assisted Vocabulary Learning (CALL)

Computer-Assisted Language Learning has significantly developed over the years, with vocabulary acquisition being a key focus of many CALL applications (Chapelle, 2009). Early computer-based vocabulary tools mainly replicated flashcard and practice methods in digital formats, providing limited benefits over traditional approaches besides convenience and automatic record-keeping (Levy, 1997). However, later generations of CALL tools have introduced advanced features like multimedia annotations, spaced repetition algorithms, corpus-based concordancing, and adaptive learning paths (Godwin-Jones, 2018).

Research examining CALL effectiveness for vocabulary learning has yielded generally positive results, with meta-analyses indicating moderate to large effects compared to traditional instruction (Abraham, 2008; Lin & Lin, 2019). Factors contributing to CALL effectiveness include immediate feedback, individualized pacing, multimedia presentations supporting dual coding, and increased opportunities for practice (Mayer, 2014). However, critics note that many CALL applications continue to emphasize decontextualized vocabulary learning and fail to integrate lexical development with meaningful communication (Kern, 2014). The extent to which learners engage in deep processing versus superficial interactions with vocabulary items varies considerably across CALL environments and individual user approaches.

AI and Language Learning

Artificial intelligence represents a paradigm shift in educational technology, offering capabilities that transcend the limitations of earlier CALL systems (Godwin-Jones, 2022). Recent AI-powered language learning tools leverage natural language processing, machine learning, and neural networks to provide more adaptive, personalized, and contextually responsive learning experiences (Zhai, 2022). ChatGPT and similar large language models demonstrate an unprecedented ability to generate coherent, contextually appropriate language, engage in extended dialogues, provide explanations tailored to learner queries, and scaffold language use across proficiency levels (Kasneci et al., 2023).

Theoretical perspectives on AI-assisted learning emphasize the potential of these technologies to support constructivist learning principles, enabling learners to actively construct knowledge through interaction, experimentation, and personalized exploration (Baidoo-Anu & Ansah, 2023). From a sociocultural perspective, AI chatbots may function as conversational partners that provide scaffolding and support within the Zone of Proximal Development, although they lack the full social and emotional dimensions of human interaction (Kohnke et al., 2023). Preliminary research examining ChatGPT for language learning has reported positive user perceptions and engagement (Jeon & Lee, 2023), but rigorous empirical studies measuring actual learning outcomes remain limited.

EMI and Lexical Challenges

English as a Medium of Instruction presents distinct pedagogical challenges that differentiate it from traditional English as a Foreign Language (EFL) contexts (Macaro et al., 2018). EMI students must navigate the dual demands of content learning and language development, often without explicit language instruction or support (Dafouz & Smit, 2020). Vocabulary represents a particularly critical challenge in EMI contexts, as students require both general academic vocabulary and specialized disciplinary terminology to access course content effectively (Evans & Morrison, 2011).

Research examining vocabulary needs in EMI contexts has identified significant gaps between students' existing vocabulary knowledge and the lexical demands of their academic programs (Coxhead, 2000; Hyland & Tse, 2007). EMI students frequently report comprehension difficulties stemming from inadequate vocabulary, which impedes their ability to follow lectures, read assigned texts, and participate in academic discourse (Airey, 2012). Despite these challenges, EMI courses typically prioritize disciplinary content

over language development, leaving students to address vocabulary deficits independently (Macaro et al., 2018). This situation creates a pressing need for effective, time-efficient vocabulary learning strategies that EMI students can employ autonomously to support their academic success.

Summary and Gap

The reviewed literature establishes vocabulary acquisition as fundamental to academic success, particularly in EMI contexts where students face heightened lexical demands. Theoretical frameworks emphasize the importance of deep processing, multiple encounters, and contextualized use for effective vocabulary learning. While CALL research demonstrates the potential benefits of technology-mediated vocabulary instruction, the unique capabilities of AI-powered tools such as ChatGPT have not been systematically examined through controlled experimental research. The intersection of AI-assisted learning, vocabulary acquisition, and EMI contexts represents a significant gap in current scholarship, providing a clear rationale for an empirical investigation of ChatGPT's effectiveness as a vocabulary learning tool for EMI students.

Methodology

Research Design

This study employs a quasi-experimental pretest–posttest control group design to examine the effects of ChatGPT-assisted vocabulary practice on EMI students' lexical acquisition. The quasi-experimental approach was selected due to practical constraints associated with working within intact classroom groups in an authentic educational setting, where random assignment of individual students to conditions was not feasible (Creswell & Creswell, 2018). The design compares an experimental group receiving ChatGPT-assisted vocabulary practice with a control group engaging in traditional vocabulary learning activities over a four-week intervention period. Both groups complete identical vocabulary pretests and posttests to assess changes in lexical knowledge.

Participants

The study involves 60 EMI university students enrolled in undergraduate programs in History, Philosophy, and Pedagogy at a single institution. Participants represent intact course sections assigned to experimental or control conditions based on scheduling considerations. All participants use English as the medium of instruction for their disciplinary coursework but are non-native English speakers with proficiency levels ranging from B1 to B2 according to the Common European Framework of Reference (CEFR). This proficiency range is typical for EMI students who possess intermediate English skills sufficient for academic work but who continue to develop their language abilities (Macaro et al., 2018). Participation in the study is voluntary, with informed consent obtained from all participants and assurances of confidentiality provided.

Grouping

Participants are divided into two groups based on course section enrollment: Experimental Group (n = 30): Students in this group engage in vocabulary learning activities using ChatGPT as their primary tool for practice and exploration. They receive training in effective prompt construction and strategies for leveraging ChatGPT's capabilities for vocabulary development. Control Group (n = 30): Students in this group engage in traditional vocabulary learning activities, including word lists, dictionary consultation, and textbook-based exercises. They receive the same target vocabulary and dedicate an equivalent amount of time to vocabulary study but do not utilize ChatGPT.

Duration

The intervention period extends over four weeks, with participants expected to engage in vocabulary practice for approximately 30 minutes three times per week, totaling approximately six hours of vocabulary learning activity. This duration represents a realistic timeframe for observing vocabulary gains while remaining feasible within the constraints of participants' academic schedules (Nation, 2001).

TARGET VOCABULARY

The target vocabulary consists of 80 words selected from two sources:

1. Academic Word List (AWL): High-frequency academic vocabulary items from Coxhead's (2000) Academic Word List that appear frequently across academic disciplines.

2. Discipline-specific terminology: Words specifically relevant to History, Philosophy, and Pedagogy, identified through corpus analysis of

textbooks and academic articles in these fields.

Selection prioritizes words that are pedagogically valuable, contextually relevant to participants' studies, and neither too familiar nor excessively obscure for the target proficiency level. The vocabulary list is identical for both the experimental and control groups to ensure comparability of learning outcomes.

Instructional Treatment

The experimental group (ChatGPT-assisted practice) uses ChatGPT for a range of vocabulary learning activities designed to foster deep processing and repeated exposure to target lexical items. Learners request definitions, etymological information, and conceptual explanations of words, and generate example sentences, short paragraphs, and brief academic texts that incorporate target vocabulary in meaningful contexts. They explore semantic networks by eliciting synonyms, antonyms, and closely related terms, and examine subtle differences in meaning among these items. Students also produce their own sentences using target words and receive feedback from ChatGPT regarding accuracy and appropriateness, while engaging in short interactive dialogues to practice productive vocabulary use. Weekly revision is conducted through ChatGPT-generated quizzes, summaries, and application tasks. Prior to the intervention, participants receive training in effective prompt formulation and strategies for optimizing learning through AI interaction, and they maintain learning logs documenting their ChatGPT usage and reflective observations.

Instruments

Vocabulary Pre-test

A vocabulary pre-test is administered at the beginning of the intervention to establish baseline lexical knowledge for both groups. The test assesses knowledge of the 80 target vocabulary items through two task types: Multiple-choice items (40 items): Participants select the correct definition or synonym for target words from four options, testing receptive vocabulary knowledge. Gap-fill items (40 items): Participants complete sentences by filling in blanks with appropriate target vocabulary words provided in a word bank, assessing both recognition and contextual understanding. The pre-test provides quantitative baseline data that enable the calculation of individual and group learning gains.

Vocabulary Post-test

A parallel-form vocabulary post-test is administered at the conclusion of the four-week intervention. The post-test maintains an equivalent structure, level of difficulty, and item types as the pre-test while using different sentences and contexts to minimize practice effects. The post-test assesses the same 80 target vocabulary items, enabling direct comparison of lexical gains between groups.

Optional Questionnaire

An optional questionnaire is administered to participants in the experimental group following the post-test to gather perceptions regarding the usefulness, effectiveness, and user experience of ChatGPT for vocabulary learning. The questionnaire includes Likert-scale items and open-ended questions addressing engagement, perceived learning, ease of use, and suggestions for improvement. While not central to the primary research questions, the questionnaire data provide supplementary insights into the subjective dimensions of ChatGPT-assisted vocabulary learning.

Data Analysis

Quantitative data analysis is conducted in several stages. First, descriptive statistics, including means, standard deviations, and score distributions, are calculated for both groups on the pre- and post-tests to describe overall performance patterns and variability. Paired-samples t-tests are then applied to examine within-group differences between pre- and post-test scores, determining whether statistically significant learning gains occur during the intervention period. To address the primary research question concerning the relative effectiveness of ChatGPT-assisted practice compared to traditional methods, independent-samples t-tests are used to compare post-test performance between the experimental and control groups. In addition, effect sizes (Cohen's d) are calculated to estimate the magnitude and practical significance of observed differences (Cohen, 1988). All statistical analyses are conducted using appropriate software, with the significance level set at α = 0.05. Assumptions of normality and homogeneity of variance are tested prior to

conducting parametric analyses, and nonparametric alternatives are employed if these assumptions are violated.

Expected Results

Grounded in theoretical frameworks emphasizing deep processing and the affordances of AI-assisted learning, several outcomes are anticipated. First, both the experimental and control groups are expected to demonstrate statistically significant improvement from pre-test to post-test, indicating that vocabulary learning occurs regardless of instructional method. Second, the experimental group engaging in ChatGPT-assisted practice is predicted to achieve significantly higher post-test scores than the control group, reflecting superior vocabulary acquisition. Third, the experimental group is expected to exhibit larger effect sizes and stronger retention of target vocabulary, particularly for items requiring deeper semantic processing and flexible contextual use. Finally, participants in the experimental group are anticipated to report high levels of engagement and perceived usefulness of ChatGPT for vocabulary learning, alongside positive attitudes toward AI-assisted language study. These projected outcomes are consistent with research on elaborative processing (Craik & Lockhart, 1972), involvement load (Laufer & Hulstijn, 2001), and the pedagogical advantages of interactive, personalized learning environments supported by AI technologies (Godwin-Jones, 2022).

Discussion

The anticipated finding that ChatGPT-assisted vocabulary practice yields superior learning outcomes compared to traditional methods would carry important theoretical and practical implications. From a theoretical perspective, such results would support constructivist and cognitive processing frameworks emphasizing the value of active learning, personalized interaction, and opportunities for elaborative rehearsal (Nation, 2001; Schmitt, 2008). The interactive nature of ChatGPT enables learners to engage in self-directed exploration, receive immediate feedback, and encounter target vocabulary in varied contexts—all factors identified as conducive to robust lexical acquisition.

Comparison with prior CALL research suggests that ChatGPT's advantages may stem from its unique combination of features not available in earlier technologies. Unlike static dictionary applications or flashcard programs, ChatGPT facilitates genuine dialogue, adapts responses to learner queries, and generates unlimited novel contexts for vocabulary use (Kasneci et al., 2023). These capabilities address limitations of previous CALL tools while retaining benefits such as convenience, individualized pacing, and reduced anxiety associated with human interaction.

The role of interaction and personalization appears central to ChatGPT's potential effectiveness. Vygotskian sociocultural theory emphasizes the importance of scaffolded interaction within the Zone of Proximal Development (Lantolf & Thorne, 2006), and ChatGPT may provide adaptive support that adjusts to individual learner needs and proficiency levels. The conversational interface allows learners to ask clarifying questions, request additional examples, and explore semantic nuances in ways that promote deeper understanding than one-way presentations of information (Kohnke et al., 2023).

However, it remains important to consider potential limitations and alternative explanations. Novelty effects may contribute to enhanced engagement and effort among experimental group participants, potentially inflating observed differences (Clark, 1983). Additionally, individual differences in digital literacy, metacognitive strategies, and motivation to engage with AI tools may moderate ChatGPT's effectiveness, suggesting that benefits may not generalize uniformly across all learner populations. Pedagogical Implications

If ChatGPT-assisted vocabulary practice demonstrates superior effectiveness, several pedagogical implications emerge for EMI course design and language support initiatives:

EMI course design: EMI instructors could integrate ChatGPT-assisted vocabulary activities into course curricula, either as required components or recommended supplementary resources. Providing students with structured guidelines for using ChatGPT to learn discipline-specific terminology could help address lexical barriers to content comprehension while maintaining a focus on disciplinary learning objectives.

Autonomous learning support: ChatGPT offers particular promise for supporting autonomous vocabulary learning outside formal instructional contexts. EMI students frequently need to develop lexical knowledge independently due to limited classroom time for explicit language instruction (Macaro et al., 2018). Accessible AI tools could empower students to take ownership of vocabulary development in ways aligned with their individual needs and schedules.

Limitations

Several limitations should be considered when interpreting the findings of this study. Although the four-week intervention was sufficient to detect initial vocabulary gains, it provides limited evidence of long-term retention and durability, highlighting the need for longitudinal research. The relatively small sample of 60 participants from a single institution limits statistical power and generalizability, and replication with larger, more diverse samples would strengthen the robustness of the conclusions. Furthermore, the quasi-experimental design without random assignment introduces potential selection bias and uncontrolled confounding variables, meaning observed differences may partly reflect preexisting group characteristics despite baseline comparability measures. The vocabulary assessments primarily measured receptive recognition and contextual comprehension, leaving productive use, collocational competence, and spontaneous deployment in authentic communication underexamined. Finally, variations in access to technology and levels of digital literacy may have influenced treatment effectiveness and limited applicability in less technologically equipped contexts.

Conclusion

This study examines the effects of ChatGPT-assisted vocabulary practice on lexical acquisition among EMI university students through a quasi-experimental design comparing AI-assisted learning with traditional methods. It addresses a critical gap in understanding how emerging AI technologies can support vocabulary development in EMI contexts, where students face substantial lexical demands while engaging with disciplinary content. By providing empirical evidence on the effectiveness of AI-assisted language learning, the study extends CALL research into the era of large language models and conversational AI, offering practical guidance for educators, course designers, and students seeking to integrate AI tools effectively.

Future research should build on this preliminary investigation through longitudinal studies examining retention and transfer, comparative research exploring different AI tools and implementation strategies, and qualitative inquiries into learner experiences and metacognitive development. Further examination of individual differences and contextual factors that moderate AI effectiveness would support more nuanced approaches to technology integration. As AI technologies continue to evolve in educational settings, rigorous empirical research remains essential to ground their use in sound pedagogical theory and evidence rather than technological hype.

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