

## AI-BASED VOCABULARY LEARNING: ENHANCING ENGLISH LEXICAL COMPETENCE THROUGH CHATGPT AMONG UNIVERSITY STUDENTS

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### ABSTRACT

*Artificial intelligence (AI) has emerged as a transformative force in higher education, reshaping the ways in which students acquire knowledge and develop language skills. Among recent AI-driven innovations, ChatGPT has attracted considerable attention for its ability to facilitate interactive, personalized, and context-sensitive language learning. Vocabulary knowledge, as a fundamental component of lexical competence, plays a central role in learners' communicative ability, reading comprehension, writing proficiency, and overall language development. Despite growing interest in AI-assisted language learning, empirical research examining the contribution of ChatGPT to vocabulary development remains limited, particularly within the context of higher education in developing countries.*

*The present study investigates the potential of ChatGPT as an instructional tool for enhancing English lexical competence among university students. Specifically, the study explores how AI-assisted vocabulary learning supports vocabulary acquisition, contextual word usage, collocation development, lexical retention, and learner autonomy. Employing a quasi-experimental mixed-methods design, the research proposes comparing students who receive ChatGPT-supported vocabulary instruction with those who follow conventional vocabulary learning approaches. Data collection includes vocabulary achievement tests, learner perception questionnaires, classroom observations, and semi-structured interviews. Quantitative data are analyzed using descriptive and inferential statistics, while qualitative findings provide deeper insights into students' experiences and attitudes toward AI-assisted learning.*

*The study is expected to contribute to the growing body of literature on artificial intelligence in language education by providing evidence of ChatGPT's pedagogical value in vocabulary instruction. Furthermore, the findings may assist educators, curriculum designers, and higher education institutions in integrating generative AI technologies into English language teaching in an effective, ethical, and learner-centered manner.*

**Keywords:** *Artificial Intelligence; ChatGPT; English Language Teaching; Lexical Competence; Vocabulary Learning; Higher Education; AI-Assisted Language Learning*

## INTRODUCTION

Vocabulary knowledge constitutes one of the most essential dimensions of language proficiency and serves as the foundation for effective communication in a second or foreign language. Learners with a well-developed lexical repertoire demonstrate greater accuracy, fluency, and confidence in speaking, reading, writing, and listening. Consequently, the development of lexical competence has become a primary objective in English language education worldwide.

Traditional vocabulary instruction has largely relied on memorization, textbook exercises, bilingual word lists, and teacher-centered explanations. While these approaches remain valuable, they often provide limited opportunities for personalized learning, immediate feedback, and authentic language use. As digital technologies continue to reshape educational practices, researchers and practitioners have increasingly explored technology-enhanced vocabulary learning environments that promote learner engagement and autonomous learning.

Recent advances in artificial intelligence, particularly generative AI, have introduced new possibilities for language education. ChatGPT, developed by OpenAI, represents one of the most sophisticated AI-powered conversational systems capable of generating human-like responses, explaining vocabulary, creating contextual examples, providing personalized exercises, correcting learner errors, and supporting interactive communication. These capabilities distinguish ChatGPT from traditional vocabulary-learning applications, which often rely on fixed content and limited learner interaction.

The integration of ChatGPT into English language teaching aligns with contemporary educational approaches emphasizing personalized learning, learner autonomy, and adaptive instruction. Unlike conventional mobile applications, ChatGPT dynamically adjusts its responses according to learners' proficiency levels, learning objectives, and immediate needs. This flexibility enables students to practice vocabulary through authentic dialogues, contextualized examples, synonym and antonym exploration, collocation practice, paraphrasing, and writing activities.

Although numerous studies have investigated mobile-assisted vocabulary learning through applications such as Quizlet, Duolingo, and Telegram, considerably fewer studies have examined the pedagogical effectiveness of generative AI in developing lexical competence. Moreover, limited empirical evidence is available

regarding the integration of ChatGPT into English language instruction within higher education institutions in Uzbekistan. This lack of context-specific research highlights an important gap in the existing literature.

The present study seeks to address this gap by examining the effectiveness of ChatGPT-assisted vocabulary learning among university students. The study investigates not only vocabulary acquisition but also broader dimensions of lexical competence, including contextual word use, collocational knowledge, lexical retention, and learner perceptions of AI-supported instruction. By combining quantitative and qualitative methods, the research aims to provide comprehensive evidence regarding the pedagogical potential of ChatGPT in English language education.

The findings of this study are expected to contribute to current discussions on artificial intelligence in language learning and offer practical recommendations for English language teachers, curriculum developers, and higher education policymakers seeking to integrate AI technologies into vocabulary instruction responsibly and effectively.

## LITERATURE REVIEW

Lexical competence is widely recognized as one of the fundamental components of communicative competence and an essential indicator of second language proficiency. It encompasses not only the knowledge of individual words but also the ability to understand their meanings, grammatical functions, collocations, stylistic appropriateness, and contextual usage. According to Nation (2022), effective vocabulary knowledge includes several interconnected dimensions, such as vocabulary breadth, vocabulary depth, receptive and productive knowledge, and fluency in lexical retrieval. Consequently, lexical competence extends beyond memorizing isolated words and requires learners to use vocabulary accurately and appropriately in authentic communicative situations.

Schmitt (2019) argues that vocabulary acquisition is a gradual and cumulative process in which repeated exposure, contextual learning, and meaningful interaction significantly influence long-term retention. Rather than relying solely on rote memorization, learners benefit from opportunities to encounter lexical items in diverse contexts where semantic, syntactic, and pragmatic features become apparent. This perspective has shifted vocabulary instruction from teacher-centered practices toward communicative and learner-centered approaches.

The growing emphasis on communicative language teaching has also expanded the conceptualization of lexical competence. Contemporary research considers vocabulary knowledge as a multidimensional construct involving collocational

competence, phraseological knowledge, lexical inferencing, and strategic vocabulary learning. Webb (2020) emphasizes that successful vocabulary instruction should encourage learners to recognize word associations, collocations, and semantic relationships rather than isolated lexical items. Such an approach enhances learners' ability to produce natural and contextually appropriate language.

In higher education, lexical competence plays a particularly important role because university students are expected to process discipline-specific terminology, academic texts, and complex communicative tasks. Limited vocabulary knowledge frequently restricts students' reading comprehension, academic writing, classroom participation, and critical thinking abilities. Consequently, improving lexical competence has become a major priority in English language programs across universities worldwide.

Recent developments in educational technology have provided additional opportunities for vocabulary learning. Digital resources allow learners to receive immediate feedback, individualized learning support, multimedia input, and repeated vocabulary practice beyond classroom instruction. These technological affordances have encouraged researchers to investigate how digital environments facilitate vocabulary acquisition more effectively than conventional instructional approaches.

Artificial intelligence has rapidly transformed educational practices by introducing intelligent tutoring systems, adaptive learning environments, automated assessment, and personalized instructional support. In language education, AI technologies have become increasingly influential because they provide individualized feedback, simulate authentic communication, and support learner autonomy. Unlike traditional computer-assisted language learning systems, modern AI applications employ natural language processing and machine learning algorithms to generate contextually appropriate responses that closely resemble human interaction.

Generative AI, particularly large language models (LLMs), represents one of the most significant technological developments in contemporary education. These systems are capable of understanding learner input, generating coherent explanations, correcting linguistic errors, producing authentic examples, and adapting instructional content according to learners' proficiency levels. Such characteristics make AI an effective tool for developing multiple language skills, including vocabulary acquisition.

Research has demonstrated that AI-supported language learning enhances learner motivation, engagement, and self-directed learning. According to Zawacki-Richter et al. (2019), artificial intelligence enables highly personalized learning

experiences by continuously adapting instructional materials based on learners' progress and individual needs. Instead of following predetermined learning sequences, AI systems provide flexible learning pathways that encourage active participation and independent knowledge construction.

Another important advantage of AI lies in its capacity to deliver immediate formative feedback. Immediate correction enables learners to recognize vocabulary errors, inappropriate word choices, grammatical inaccuracies, and collocational problems during the learning process rather than after task completion. This continuous interaction supports deeper lexical processing and facilitates long-term vocabulary retention.

Despite these advantages, researchers also emphasize several challenges associated with AI integration into education. Concerns regarding academic integrity, overreliance on AI-generated responses, digital literacy, data privacy, and ethical use have become central topics in recent literature. Therefore, effective implementation of AI requires carefully designed pedagogical strategies that encourage critical thinking rather than passive dependence on technology.

The release of ChatGPT has generated considerable interest among language educators because of its ability to simulate authentic conversation and provide individualized instructional support. Unlike conventional vocabulary-learning applications, ChatGPT enables learners to interact dynamically with language through contextualized dialogue, personalized explanations, synonym generation, collocation practice, sentence construction, and writing assistance.

Several recent studies suggest that ChatGPT facilitates vocabulary learning by encouraging meaningful language use instead of isolated word memorization. Learners may request definitions, contextual examples, pronunciation guidance, paraphrases, antonyms, synonyms, idiomatic expressions, and discipline-specific terminology through natural conversation. Such interaction promotes deeper lexical processing and strengthens semantic networks that contribute to vocabulary retention.

An additional advantage of ChatGPT concerns adaptive instruction. Students with different proficiency levels may receive explanations adjusted to their linguistic competence. Beginners can request simplified definitions, whereas advanced learners may explore nuanced semantic distinctions, register variation, academic vocabulary, and collocational patterns. Consequently, ChatGPT supports differentiated instruction without requiring substantial additional teacher workload.

Furthermore, ChatGPT encourages learner autonomy by allowing students to practice vocabulary independently beyond classroom settings. Autonomous vocabulary learning has consistently been associated with improved motivation,

greater learning responsibility, and increased exposure to authentic language. Since learners may interact with ChatGPT at any time and receive immediate responses, vocabulary practice becomes continuous rather than restricted to classroom instruction.

Nevertheless, scholars caution that ChatGPT should complement rather than replace language teachers. AI-generated responses occasionally contain factual inaccuracies, inappropriate lexical choices, or contextually unsuitable expressions. Consequently, teacher guidance remains essential for evaluating AI-generated language and developing learners' critical digital literacy skills.

Although previous research has extensively examined technology-enhanced vocabulary learning through mobile applications, online learning platforms, and computer-assisted language learning environments, empirical investigations focusing specifically on ChatGPT-assisted lexical competence remain limited. Existing studies primarily explore learners' perceptions of artificial intelligence or provide theoretical discussions of its educational potential, while relatively few employ experimental or mixed-methods designs to evaluate measurable improvements in lexical competence.

Moreover, current literature is largely based on educational contexts in North America, Europe, and East Asia. Comparatively little empirical evidence is available regarding the implementation of ChatGPT in English language teaching within Central Asian higher education institutions, particularly in Uzbekistan. Differences in educational infrastructure, digital literacy, instructional practices, and curriculum design suggest that findings from other regions may not be directly transferable to the Uzbek context.

This study addresses these gaps by investigating the effectiveness of ChatGPT-assisted vocabulary instruction among university students in Uzbekistan. By examining both measurable learning outcomes and students' perceptions, the research seeks to provide context-specific evidence regarding the pedagogical value of generative artificial intelligence in developing English lexical competence.

### **Research methodology**

This study employs a **mixed-methods quasi-experimental research design** to investigate the effectiveness of ChatGPT-assisted vocabulary instruction in developing English lexical competence among university students. A mixed-methods approach was selected because it allows the integration of quantitative and qualitative data, providing a comprehensive understanding of both learning outcomes and students' experiences with AI-supported vocabulary learning.

The quantitative component focuses on measuring changes in students' lexical competence through pre-tests and post-tests, while the qualitative component

explores students' perceptions, learning experiences, and attitudes toward using ChatGPT as a vocabulary learning tool through questionnaires and semi-structured interviews.

The quasi-experimental design was chosen because the study is conducted in a natural educational setting where participants are assigned to existing classes rather than randomly allocated to groups.

The participants of the study will be undergraduate students enrolled in English language programs at a university in Uzbekistan. Approximately **60 – 80 students** are expected to participate in the research. They will be divided into two groups:

- **Experimental Group** – students receiving ChatGPT-assisted vocabulary instruction.

- **Control Group** – students receiving conventional vocabulary instruction based on textbooks and teacher-led classroom activities.

Participants are expected to have an intermediate level of English proficiency (approximately **B1 – B2 according to the CEFR**) to ensure that they can effectively interact with ChatGPT during learning activities.

Participation in the study will be voluntary, and informed consent will be obtained from all participants before data collection begins.

### 3.3. Research instruments

To ensure the validity and reliability of the findings, multiple research instruments will be employed.

#### Vocabulary achievement test

A researcher-designed vocabulary achievement test will be administered before and after the intervention. The test will assess several dimensions of lexical competence, including:

- vocabulary breadth;
- vocabulary depth;
- contextual word use;
- collocational knowledge;
- productive vocabulary use.

The same test structure will be used for both the pre-test and post-test to facilitate comparison while minimizing testing bias.

#### Student questionnaire

A structured questionnaire based on a five-point Likert scale will be used to investigate students' perceptions of ChatGPT-assisted vocabulary learning. The questionnaire will examine several dimensions, including:

- perceived usefulness;

- ease of use;
- learner motivation;
- learner autonomy;
- satisfaction with AI-supported instruction.

Open-ended questions will also be included to allow participants to provide additional comments regarding their learning experiences.

### **Semi-structured interviews**

To gain deeper insights into students' experiences, a sample of participants from the experimental group will be invited to participate in semi-structured interviews. These interviews will explore students' opinions regarding:

- advantages of ChatGPT;
- challenges encountered during vocabulary learning;
- perceived improvements in lexical competence;
- recommendations for future classroom implementation.

The study will be conducted over an **eight-week instructional period**.

During the first week, all participants will complete the vocabulary pre-test to determine their initial level of lexical competence.

Throughout the intervention, the experimental group will engage in vocabulary learning activities using ChatGPT. Students will use ChatGPT to:

- learn new academic vocabulary;
- generate example sentences;
- practice synonyms and antonyms;
- explore collocations;
- complete contextual vocabulary exercises;
- receive immediate feedback on vocabulary use.

Meanwhile, the control group will study the same vocabulary items using traditional instructional methods, including textbook exercises, teacher explanations, and classroom discussions.

At the conclusion of the intervention, both groups will complete the post-test. Subsequently, students in the experimental group will complete the perception questionnaire, and selected participants will take part in semi-structured interviews.

Quantitative data obtained from vocabulary tests and questionnaires will be analyzed using appropriate statistical procedures.

Descriptive statistics will summarize participants' performance and responses, including means, standard deviations, and frequency distributions. To evaluate changes in lexical competence, inferential statistical techniques such as paired-samples t-tests and independent-samples t-tests may be employed, provided that the

assumptions for these tests are met. If assumptions are violated, appropriate non-parametric alternatives will be considered. Effect sizes (e.g., Cohen's  $d$ ) will be reported to indicate the practical significance of any observed differences.

Qualitative data collected through interviews and open-ended questionnaire responses will be analyzed using thematic analysis. The analysis will involve coding participants' responses, identifying recurring themes, and interpreting patterns related to the use of ChatGPT for vocabulary learning.

The integration of quantitative and qualitative findings will provide a more comprehensive understanding of the effectiveness of AI-assisted vocabulary instruction.

The study will adhere to established ethical principles in educational research. Participation will be voluntary, and informed consent will be obtained from all participants before the study begins. Participants will be informed about the purpose of the research, the procedures involved, and their right to withdraw at any stage without penalty.

All collected data will be treated confidentially and used exclusively for academic research purposes. Personal information will be anonymized to protect participants' identities, and the reporting of results will ensure that no individual participant can be identified.

## RESULTS AND DISCUSSION

The review of current literature indicates that artificial intelligence, particularly ChatGPT, has considerable potential to enhance university students' English lexical competence. Unlike traditional vocabulary learning methods that often emphasize memorization of isolated words, ChatGPT enables learners to acquire vocabulary through meaningful interaction, contextualized examples, and immediate feedback. These features create a more dynamic and learner-centered environment for vocabulary development.

One of the most significant advantages of ChatGPT is its ability to provide personalized vocabulary instruction. Learners can request explanations according to their language proficiency, receive simplified or advanced definitions, and practice newly acquired vocabulary through interactive conversations. Such individualized learning opportunities contribute to greater learner autonomy and encourage continuous vocabulary practice outside the classroom.

Another important contribution of ChatGPT is the development of contextual vocabulary knowledge. Rather than presenting vocabulary items as isolated lexical units, the system generates authentic sentences, demonstrates collocations, explains semantic nuances, and provides multiple contextual examples. This process supports

both vocabulary breadth and vocabulary depth, which are recognized as essential components of lexical competence.

Furthermore, ChatGPT promotes productive vocabulary use by encouraging students to create original sentences, summarize texts, paraphrase information, and participate in simulated dialogues. These activities require learners to actively retrieve and apply vocabulary in meaningful communicative situations, thereby strengthening long-term lexical retention.

The integration of ChatGPT into vocabulary instruction also has positive implications for learner motivation. The conversational nature of AI interaction reduces learners' anxiety and increases their willingness to practice English independently. Students receive immediate responses without fear of making mistakes in front of classmates, creating a supportive learning environment that fosters confidence and active participation.

Despite these advantages, several limitations should also be considered. ChatGPT may occasionally generate inaccurate or contextually inappropriate lexical information. In addition, excessive dependence on AI could reduce learners' critical thinking and independent problem-solving abilities if instructional activities are not carefully designed. Therefore, ChatGPT should be regarded as a complementary educational tool rather than a replacement for teachers.

Overall, the findings of previous studies suggest that the successful integration of ChatGPT into English language education depends largely on appropriate pedagogical design. Teachers play a crucial role in selecting suitable learning tasks, monitoring AI-generated content, and guiding students toward effective and responsible use of artificial intelligence.

The analysis presented in this study demonstrates that ChatGPT offers promising opportunities for enhancing lexical competence through personalized instruction, authentic language practice, and continuous learner engagement. Consequently, integrating AI technologies into vocabulary instruction may contribute to more effective English language teaching in higher education.

## CONCLUSION

The rapid development of artificial intelligence has transformed educational practices and created new opportunities for English language learning. Among contemporary AI technologies, ChatGPT has emerged as an innovative instructional tool capable of supporting vocabulary acquisition through interactive communication, contextual learning, and personalized feedback.

This study examined the theoretical foundations and educational potential of ChatGPT in developing English lexical competence among university students. The

analysis indicates that ChatGPT can facilitate vocabulary learning by improving learners' understanding of word meanings, contextual usage, collocations, and productive language skills. In addition, AI-supported learning promotes learner autonomy, increases motivation, and provides flexible opportunities for independent vocabulary practice beyond traditional classroom settings.

Although ChatGPT demonstrates considerable educational value, its implementation should be guided by sound pedagogical principles. Teachers remain essential in designing learning activities, evaluating AI-generated responses, and helping students develop critical digital literacy. Artificial intelligence should therefore be viewed as a supportive instructional resource that complements, rather than replaces, human teaching.

The study also highlights the need for further empirical research investigating the long-term impact of AI-assisted vocabulary learning across different educational contexts and proficiency levels. Future studies may compare various AI tools, examine their effectiveness in developing different dimensions of lexical competence, and explore learners' attitudes toward AI-supported language education.

In conclusion, integrating ChatGPT into English vocabulary instruction represents a promising direction for modern language education. When used appropriately, generative AI has the potential to enhance lexical competence, foster learner engagement, and contribute to more effective and innovative English language teaching practices.

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