
Teaching English vocabulary through AI-powered mnemonic techniques

Nusratova Mahbuba Usmonxon qizi¹⁰

mahbubanusratova8@gmail.com

Student,

Karshi State University

Annotation *The rapid development of artificial intelligence has changed the nature of modern education, especially in the field of English language teaching. Traditional vocabulary instruction relies on repetition and variation, which may reduce learner motivation and fail to ensure long-term retention of lexical items. This study investigates the effectiveness of AI-based learning strategies on students learning English as a second language. It investigates how the combination of AI tools and mnemonic strategies can improve vocabulary learning, student motivation, contextual understanding, and long-term memory. The study used qualitative and quantitative research among English secondary school students and university-level English learners. AI-learning technologies include digital visualization technology, blended learning activities, interchangeable flash card systems, remote viewing software, interactive chatbot interfaces, and experiential learning. The results showed that the AI-based memory strategy improved word recognition accuracy, context awareness, speed of word recall, and accuracy. Moreover, learners reported reduced anxiety and increased motivation during vocabulary learning activities.*

Keywords *Artificial intelligence, mnemonic techniques, vocabulary acquisition, EFL learners, cognitive learning, memory retention, AI-assisted language learning, vocabulary teaching, psycholinguistics, educational technology*

Sun'iy intellektga asoslangan mnemonika yordamida ingliz tilidagi so'z boyligini o'rgatish

Nusratova Mahbuba Usmonxon qizi

mahbubanusratova8@gmail.com

Talaba,

Qarshi davlat universiteti

Annotatsiya *Sun'iy intellektning jadal rivojlanishi zamonaviy ta'lim tizimi, ayniqsa ingliz tilini o'qitish sohasini sezilarli darajada o'zgartirmoqda. An'anaviy lug'at o'qitish usullari asosan takrorlash va yodlashga asoslangan bo'lib, bu ko'pincha o'quvchilarning motivatsiyasini pasaytiradi hamda leksik birliklarning uzoq muddatli xotirada saqlanishini yetarli darajada ta'minlay olmaydi. Ushbu tadqiqotda ingliz tilini ikkinchi til sifatida o'rganayotgan talabalar uchun AI asosidagi o'rganish strategiyalarining samaradorligini tahlil qilindi. Tadqiqotda AI vositalari va mnemonik strategiyalar uyg'unligi so'z boyligini oshirish, talabalarning motivatsiyasi, kontekstni anglash hamda uzoq muddatli xotirani rivojlantirishga qanday ta'sir ko'rsatishi o'rganilgan. AI asosidagi o'rganish texnologiyalariga raqamli vizualizatsiya vositalari, aralash ta'lim, moslashuvchan flesh-karta tizimlari, masofaviy o'rganish dasturlari, interaktiv chatbot interfeyslari hamda tajribaviy o'rganish metodlari kiritildi. Tadqiqot natijalari AI asosidagi mnemonik strategiyalar so'zlarni tanib olish aniqligi, kontekstual tushunish, shuningdek, so'zlarni eslab*

¹⁰ Nusratova M.U. — ORCID: 0009-0006-4425-192X

qolish tezligi va aniqligini sezilarli darajada oshirganini ko'rsatdi. Maqola yakunida sun'iy intellekt va mnemonik texnikalarning uyg'un qo'llanilishi ingliz tilini chet tili sifatida o'rganishda innovatsion, samarali va boyitilgan yondashuvni taqdim etishi xulosasi berilgan.

Kalit so'zlar Sun'iy intellekt, mnemonik texnikalar, so'z boyligini oshirish, ingliz tilini o'rganuvchilar, kognitiv o'rganish, xotirani saqlash, sun'iy intellekt yordamida til o'rganish, so'z boyligini o'qitish, psixolingvistika, ta'lim texnologiyalari

Обучение английской лексики с помощью мнемонических приемов на основе искусственного интеллекта

Нусратова Махбуба Усмонхон кизи
mahbubanusratova8@gmail.com
Студент,
Каршинский государственный университет

Аннотация Быстрое развитие искусственного интеллекта изменило природу современного образования, особенно в области преподавания английского языка. Традиционное обучение лексике основано на повторении и вариативности, что может снизить мотивацию учащихся и не обеспечить долговременное запоминание лексических единиц. В данном исследовании изучается эффективность стратегий обучения на основе ИИ для студентов, изучающих английский как второй язык. Исследуется, как сочетание инструментов ИИ и мнемонических стратегий может улучшить усвоение лексики, мотивацию студентов, понимание контекста и долговременную память. В исследовании использовались качественные и количественные методы исследования среди учащихся английских средних школ и студентов университетов, изучающих английский язык. Технологии обучения с использованием ИИ включают цифровые технологии визуализации, смешанные формы обучения, системы сменных флеш-карт, программное обеспечение для удаленного просмотра, интерактивные интерфейсы чат-ботов и обучение на основе опыта. Результаты показали, что стратегия запоминания на основе ИИ улучшила точность распознавания слов, контекстную осведомленность, скорость и точность запоминания слов. Кроме того, учащиеся сообщили о снижении тревожности и повышении мотивации во время изучения лексики.

Ключевые слова Искусственный интеллект, мнемонические техники, усвоение лексики, изучающие английский как иностранный, когнитивное обучение, сохранение памяти, изучение языка с помощью ИИ, обучение лексике, психоллингвистика, образовательные технологии

Introduction

Vocabulary acquisition is one of the most important aspects of learning a foreign

language. Without adequate vocabulary, learners find it difficult to understand spoken and written language, express their ideas, and

participate actively in conversations. According to Wilkins (1972), "without grammar very little can be conveyed, without vocabulary nothing can be conveyed." This statement emphasizes the importance of vocabulary for language development.

Despite its importance, vocabulary acquisition is one of the biggest challenges for English learners. Many learners struggle to memorize and retain new information because traditional learning methods rely on repetition, explanations, dictionaries, and isolated word lists. These methods do not promote deep thinking and therefore do not contribute to long-term retention of vocabulary.

Modern educational psychology emphasizes that learning is most effective when learners actively interact with information, make meaningful connections, engage emotionally, and process visual information. In this context, learning methods have attracted much interest in language learning. Mnemonics are special behaviors designed to enhance memorization through associations, visual representations, classifications, stories, visual language, and emotional connections. Artificial intelligence (AI) has emerged as one of the most important innovations in education. AI-based learning programs can adapt to learners' interests, cognitive abilities, learning styles, and memory. Unlike traditional teaching methods, AI can provide personalized learning with more appropriate rewards. The combination of AI and mnemonics offers a unique opportunity to improve vocabulary acquisition. AI tools can automatically generate specific stories, images, key comparisons, memory associations, and repetition patterns to promote long-term retention of words.

This study examined the effectiveness of AI-based mnemonics for learning English words in foreign speakers. It focused on the cognitive, motivational, and pedagogical benefits of combining artificial intelligence with memory-based learning strategies.

The study addressed the following research questions:

1. How do AI-powered mnemonic techniques influence vocabulary retention among EFL learners?
2. What is the impact of AI-assisted mnemonics on learner motivation and engagement in the classroom?
3. How can AI support the learning of specific words?
4. What are the benefits of integrating AI tools with memory-removal techniques?

Literature Review

Artificial intelligence (AI) refers to computer systems that can perform tasks that typically require human intelligence, including problem solving, natural language processing, pattern recognition, specialized tasks and adaptive learning. In education, AI technologies are increasingly being used in the development of personalized learning, computer-based learning, intelligent learning tools, and personalized learning technologies. In English language teaching, AI-powered tools such as ChatGPT, Duolingo Max, Quizlet AI, Grammarly, and Chatbots provide learners with specific ideas, real-world word models, pronunciation support, and conversational communication tools to help learners learn the skills needed to communicate with students.

One of the biggest advantages of AI in language learning is its personalization. Traditional teaching methods treat students equally, regardless of individual differences in learning ability, recall ability, learning style, and motivation. Artificial intelligence overcomes this limitation by analyzing the learning process and adjusting learning materials accordingly.

Mnemonic techniques are specific techniques for organizing and improving information processing. The word "mnemonic" comes from the Greek word "mneme" (memory). Mnemonic learning is based on association, visualization, emotional engagement, categorization, and meaningful connection (Oxford, 1990). Common

mnemonic techniques include: visual imagery; keyword method; storytelling; memory palace technique; chunking; acronyms; association chains; spaced repetition.

Psychologists have demonstrated that mnemonic techniques enhance learning because the human brain stores information related to complex and emotional information in the brain more effectively than isolated data.

Paivio's Dual Coding Theory suggests that simultaneous processing of verbal and visual information improves memory performance. According to this theory, learners retain information better when words are paired with pictures, stories, symbols, or visual associations (Paivio, 1986; 67). AI-generated visual prompts and contextual imagery therefore support vocabulary learning by activating both verbal and visual memory systems.

Sweller's Cognitive Load Theory suggests that learners will experience difficulties when instructional materials overload working memory (Sweller, 1988; 257-285). Traditional vocabulary learning often leads to cognitive difficulties because learners tend to retain simple words without contextual context. Mnemonic techniques reduce cognitive difficulty by organizing words into meaningful models. AI-based approaches improve this process with the help of adaptive repetition schedules and personalized contextual support.

Several studies have examined word acquisition from linguistic, cognitive, technological, and educational perspectives.

Oxford believes that language learning strategies, particularly mnemonic strategies, are effective in improving vocabulary acquisition and learning autonomy. Memory connections help students retrieve information more efficiently by making more complex mental connections.

Gardner's theory (2011) of Multiple Intelligences also supports observational and rote learning. Visual-spatial learners particularly benefit from programs in visual

recognition, color coding, storytelling, and contextual memory strategies.

Recent technological developments have created scientific breakthroughs in AI-assisted education. Holmes (2019; 53) emphasizes that artificial intelligence transforms learning by supporting personalized and adaptive learning. AI technologies can analyze learning behaviors and improve the quality of learning.

Wang's research (2022) showed that AI-powered word processing tasks significantly improved recall accuracy and learning motivation. Similarly, Chen found that AI-generated visual storytelling improved students' ability to remember word lists (Chen Yu, 2023).

Another area of research is the spaced repetition systems. Scientific studies have shown that scientifically timed repetition intervals improve long-term memory. AI-powered shared learning programs automatically determine optimal learning times based on an individual's learning style.

Despite the increasing popularity of AI-based education, especially in Central Asian countries, little research has been conducted on the relationship between AI and mnemonic learning strategies. Therefore, this study contributes to the literature in this area by investigating the impact of AI-powered mnemonic techniques on vocabulary acquisition by English as a Foreign Language (EFL) students.

Methodology

The study used a mixed-method research design combining quantitative and a qualitative research design. Quantitative methods were used to measure vocabulary improvement statistically, while qualitative methods explored learner perceptions, motivation, and classroom behavior. Fifty English as a Foreign Language (EFL) students from secondary schools and universities participated in the study. The participating students ranged in age from 15 to 21 years old. The participating students were divided into two groups: experimental group – 25 students;

control group – 25 students. Both groups demonstrated similar English proficiency levels according to placement test results.

Participants in the experimental group received language training using AI-powered mnemonic techniques for six weeks. In instructional process, students used AI tools to generate images representing difficult English words. For example, abstract words such as “resilient” or “melancholy” were connected with emotionally meaningful visual scenes. Artificial intelligence generated short stories connecting target vocabulary items with students’ interests, hobbies, and personal experiences. AI-based flashcard applications analyzed learners’ memory performance and automatically scheduled vocabulary review sessions. Students practiced newly learned vocabulary through interactive conversations with AI chatbots. Artificial intelligence generated contextual examples, dialogues, and situational tasks using target vocabulary.

The control group learned the same vocabulary items through traditional methods including translation, dictionary memorization, and repetition exercises.

Results

The findings showed significant differences between the experimental and control groups.

The experimental group scored higher than the control group in vocabulary retention rates. According to post-test results, students who used the AI-powered mnemonic techniques had 30% higher retention levels. Students in the control group recalled the learned words more quickly in both oral and written tasks. Students who participated in the AI-assisted mnemonic instruction training showed significant improvements in word accuracy on multiple measures. Questionnaire responses showed that students found AI-assisted activities more interesting, useful, and engaging than traditional learning.

Many learners reported that AI-generated stories made vocabulary memorable, visual imagery reduced boredom,

chatbot interaction increased speaking confidence and personalized learning improved motivation.

Classroom observations revealed that students in the experimental group increased collaboration, active participation, and reduced anxiety.

Discussion

These results support previous studies that have demonstrated the cognitive benefits of mnemonics and artificial intelligence for learning.

One of the most significant advantages observed in this study was personalization. Artificial intelligence-based programs adapt language learning according to learners’ memory performance, interests, and cognitive needs. This personalized approach has been proven to increase motivation and retention.

The effectiveness of mnemonic learning can also be explained by the principles of learning psychology. According to Dual Coding Theory, the integration of verbal and visual processing improves long-term memory (Paivio, 1986; 70). Thus, AI-generated visual images and storytelling generated by artificial intelligence improve word retention.

Moreover, emotional interest plays an important role in learning. Memorizing vocabulary in traditional ways can be difficult and stressful, but artificial intelligence-based memorization activities create an interactive and emotionally engaging learning environment. Another important factor was spaced repetition. AI systems optimized repetition intervals scientifically, helping learners review vocabulary before forgetting occurred. This process significantly improved memory consolidation.

The study also highlights the importance of educational technology in modern pedagogy. Artificial intelligence cannot replace teachers. Instead, it should be a helpful teaching tool that supports student-centered learning.

However, some limitations must be acknowledged. This study had a small sample

size and a short observation period. More research is needed to examine the long-term impact of artificial intelligence on education, moral considerations, and effectiveness of specific artificial intelligence programs.

Conclusion

This study explored the effectiveness of English language teaching using AI-based mnemonic strategies to learn English as a foreign language learner. Research has shown that combining AI with cognitive learning approaches significantly improves vocabulary retention, student engagement, comprehension, classroom participation, and

quick recall. AI-powered memory techniques turn language learning into a more relevant, interactive, and contextual experience. Combining AI with cognitive learning approaches opens up new possibilities for teaching modern English. Therefore, English teachers should be encouraged to use AI and mnemonic learning strategies to enhance their knowledge and engage students. Future educational practices may increasingly depend on intelligent learning environments that combine artificial intelligence, cognitive psychology, and language pedagogy.

References:

1. Chen, Y. (2023). Visual storytelling and AI-assisted vocabulary acquisition. *International Journal of Applied Linguistics*, 18(4), 301–315.
2. Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences*. New York, NY: Basic Books.
3. Holmes, W. (2019). *Artificial intelligence in education*. Paris, Fransiya: UNESCO Publishing.
4. Oxford, R. (1990). *Language learning strategies: What every teacher should know*. Boston, MA: Heinle & Heinle.
5. Paivio, A. (1986). *Mental representations: A dual coding approach*. Oxford, Angliya: Oxford University Press.
6. Sweller, J. (1988). Cognitive load during problem solving. *Cognitive Science*, 12(2), 257–285.
7. Wang, L. (2022). Artificial intelligence and vocabulary retention in EFL learning. *Journal of Educational Technology*, 15(2), 114–126.
8. Wilkins, D. (1972). *Linguistics in language teaching*. London, Angliya: Edward Arnold.