



The Role of Artificial Intelligence in Vocabulary Acquisition among EFL Learners

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Abstract- Artificial Intelligence (AI) has revolutionized education by making rapid strides in the field of language learning. English as a Foreign Language (EFL) teaching and learning is still present in the world and the ability to develop vocabulary is still an essential part of EFL teaching and learning. Many traditional learning processes for learning vocabulary require memorizing and learning using the teacher-centered method; the method has not been able to meet the learners' needs. In contrast, technologies that leverage AI can bring personalized, adaptive and interactive learning opportunities that can truly enrich students' vocabulary development. This research aims at exploring the contribution of Artificial Intelligence to vocabulary learning by English as a foreign language learner. The paper draws on literature from the present and the ongoing educational practices to discuss the roles of AI tools in the outcomes of vocabulary learning, such as intelligent tutoring systems, chatbots, mobile applications, natural language processing technologies, and adaptive learning platforms. The study also explores the pedagogical advantages and issues of the use of AI in EFL settings. Results indicate that AI-based learning improves learner engagement and retention, keeps learners motivated, allows for personalized feedback and learning path, and enhances autonomous learning. But there are issues of technological access, teacher readiness, ethical issues and data privacy that are still major concerns. Based on the context of pedagogically appropriate use and “careful” use, the researcher concludes that AI might be an important component of the vocabulary learning process of EFL learners.

Keywords- Artificial Intelligence, Vocabulary Acquisition, EFL Learners, Language Learning Technology, Adaptive Learning, English Language Teaching.

I. Introduction

It is a well-documented fact that one of the most crucial factors in acquiring a second and foreign language is the knowledge of vocabulary. Without a sufficient vocabulary base, students will not be able to become proficient readers, writers, speakers, and listeners. As Wilkins stated, “Without grammar, little can be conveyed, without vocabulary, nothing can be conveyed” (Wilkins, 1972). This statement highlights the importance of vocabulary in language learning and communication. Acquiring words is one of the most difficult areas in the process of learning English as a Foreign Language (EFL). Pupils often struggle with recalling new words, comprehending words within context, and applying words correctly in communication. Vocabulary knowledge involves understanding word meaning, form, and use, which are essential



components of language competence (Nation, 2022). Traditional methods of vocabulary instruction, such as memorizing words, using dictionaries, and repetitive practice, may not sufficiently meet the varying needs of today's students. Research suggests that meaningful exposure, interaction, and learner-centred approaches are necessary for effective language acquisition (Krashen, 1982). In this regard, research and practice have increasingly focused on finding innovative ways to enhance vocabulary learning and make students' learning experiences more engaging. Artificial Intelligence (AI) has emerged as one of the most transformative technological innovations in education. AI is defined as computer systems capable of performing tasks that normally require human intelligence, including learning, reasoning, problem-solving, and language processing. AI technologies have the potential to support personalized learning, provide continuous assistance, and enhance educational outcomes (Luckin, 2018). Over the last few years, advances in machine learning, Natural Language Processing (NLP), and educational technology have made it possible to use AI-based applications in more advanced ways to support foreign language learning. AI-enabled educational tools can assess learner performance, identify learning gaps, provide targeted feedback, and adapt learning content according to individual learner needs (Zawacki-Richter et al., 2019). AI applications enable interactive and immersive learning experiences that foster learner autonomy and motivation. AI-supported language learning environments can provide individualized instruction and adjust learning content based on learners' proficiency levels and learning progress (Chen et al., 2020). Educators and researchers are increasingly interested in the potential of AI-based learning tools, as demonstrated through the growing popularity of platforms such as Duolingo, Quizlet, ChatGPT, Memrise, and other intelligent learning applications. AI-powered technologies, including intelligent assistants and conversational agents, provide learners with opportunities for language interaction and vocabulary practice in authentic contexts (Godwin-Jones, 2018). Although there is growing interest in AI-supported language education, questions remain regarding its effectiveness in promoting vocabulary development and improving language learning outcomes. Therefore, the aim of this paper is to explore the role of Artificial Intelligence in vocabulary acquisition among EFL learners. In particular, it discusses the theoretical foundations of AI-supported vocabulary learning, examines the advantages and challenges of using AI in education, and explores implications for future pedagogical practices.

Research Objectives

The following objectives are used as a guide for the study:

- To explore the function of Artificial Intelligence in vocabulary learning of EFL learners.
- To recognize vocabulary learning benefits from AI-based tools.
- To investigate problems of applying AI technologies in EFL classrooms.
- To provide pedagogical recommendations for effective AI integration in vocabulary instruction.



Research Questions

- How can Artificial Intelligence aid EFL learners in vocabulary learning?
- What role does the Artificial Intelligence play in the EFL learners' vocabulary acquisition?
- What are some of the issues and restrictions that are faced in teaching EFL vocabulary by using AI?
- What are some of the issues and restrictions of using AI for the teaching of EFL vocabulary?

II. Review of Literature

Vocabulary acquisition is the learning of word meanings, forms, and patterns of use. Nation considers vocabulary knowledge to include both receptive and productive dimensions, meaning that learners must identify and comprehend words as well as use them appropriately in different contexts (Nation, 2022). There has been a long history of research showing a strong connection between vocabulary size and overall language proficiency. Learners with greater vocabulary knowledge generally perform better in reading comprehension, writing quality, oral communication, and listening comprehension (Nation, 2022). Thus, vocabulary instruction has continued to be one of the major concerns in EFL teaching. Typical methods of vocabulary learning include explicit instruction, vocabulary lists, flashcards, and memory techniques. Although these methods can help with short-term retention, they do not always support meaningful language acquisition or the practical use of vocabulary in different communicative contexts. Effective language learning requires meaningful input, interaction, and exposure to language use (Krashen, 1982). Therefore, in recent years, teachers have increasingly focused on technology-based strategies for vocabulary instruction. The application of Artificial Intelligence in education has become a significant focus of educational research due to its potential to enhance learning outcomes and customize learning experiences. AI systems can process large amounts of learner data and create personalized learning pathways according to individual needs (Zawacki-Richter et al., 2019). Luckin (2018) explains that AI can complement human teachers by providing personalized assistance, continuous monitoring, and individualized feedback. AI technologies are not designed to replace teachers but rather to support and improve the teaching and learning process. AI has various applications in education, including intelligent tutoring systems, learning analytics, automated assessment tools, virtual assistants, and adaptive learning platforms. These technologies provide learners with opportunities to interact with educational materials in more dynamic and personalized ways (Pikhart, 2021). The use of AI in language learning has grown significantly in recent years. The development of advanced technologies has made it possible to create sophisticated language learning systems that provide instant feedback, speech recognition, grammar correction, and vocabulary instruction (Godwin-Jones, 2018). AI systems can interpret and generate human language through Natural Language Processing (NLP). These abilities have been



applied to develop chatbots and conversational agents that simulate human-like language interaction and provide learners with opportunities for communication practice (Godwin-Jones, 2018). AI-supported language learning environments can foster learner autonomy, engagement, and individualized instruction by adjusting learning content according to learners' proficiency levels. These features are particularly useful in EFL contexts where exposure to authentic language use may be limited (Chen et al., 2020). Several AI-driven applications have been developed to support vocabulary acquisition. These tools provide personalized practice, adaptive feedback, and interactive learning opportunities that contribute to vocabulary development (Zou et al., 2018). Intelligent Tutoring Systems (ITS) are systems that provide customized instruction and feedback through AI algorithms. These systems monitor learners' progress and adapt instruction according to learner performance (Pikhart, 2021). Research indicates that ITS can support vocabulary learning by providing adaptive vocabulary practice and review activities. Individualized support helps address learners' weaknesses, learning preferences, and personal needs (Zawacki-Richter et al., 2019). Chatbots can facilitate interaction with students by providing opportunities to experience vocabulary in meaningful contexts and use language actively. AI-based conversational agents allow learners to practice vocabulary through simulated communication (Godwin-Jones, 2018). The environment created by conversational agents is often supportive for language practice because it encourages active participation and reduces communication anxiety. Moreover, chatbots can provide immediate corrective feedback, which supports vocabulary improvement (Chen et al., 2020). Adaptive learning platforms are based on machine learning algorithms that personalize vocabulary learning experiences. These systems monitor learners' behaviour and automatically adjust learning content according to individual progress (Zou et al., 2018). Adaptive learning applications, such as Duolingo and similar platforms, use personalized practice schedules and spaced repetition strategies to improve vocabulary retention. Through individualized learning processes, new vocabulary items can be learned and remembered more effectively (Pikhart, 2021). Vocabulary learning has expanded through the use of mobile learning applications. AI-powered mobile platforms include interactive activities, gamification, and real-time feedback that support learner motivation and engagement (Chen et al., 2020). Research has shown that mobile-assisted vocabulary learning can improve learners' motivation, involvement, and autonomous learning abilities (Zou et al., 2018). AI-supported vocabulary learning is based on several important learning theories that explain how technology can improve the learning process. According to constructivist learning theory, learners actively construct knowledge through interaction and experience. AI technologies support constructivist principles because they provide interactive, personalized, and learner-centered experiences (Pikhart, 2021). Through AI-based learning environments, learners actively explore, experiment with, and practice vocabulary in meaningful contexts rather than simply memorizing words. The socio-cultural theory proposed by Vygotsky emphasizes the importance of social interaction in learning. Learning occurs through communication, collaboration, and guided support from others (Vygotsky, 1978). AI chatbots and virtual assistants enhance



communicative interactions that support vocabulary development. Such technologies can provide scaffolding within the learner's zone of proximal development by offering support until learners become capable of independent performance (Vygotsky, 1978). According to Mayer's Cognitive Theory of Multimedia Learning, students learn more effectively when information is presented through a combination of verbal and visual representations (Mayer, 2021). AI-based applications often present vocabulary through multiple cognitive channels, including images, audio, videos, and interactive activities. These multimedia features help learner's process information more effectively and improve vocabulary acquisition (Mayer, 2021).

III. Methodology

This study employs the research design of qualitative review based. The research is aimed to provide a synthesis of literature that covers the current studies that have been conducted on Artificial Intelligence and vocabulary acquisition of EFL learners. Key themes and trends were identified through a systematic review of peer reviewed journal articles, conference papers, books and educational reports. Data were collected from reputable academic databases. Research in relevant field published from 2015-2025 was reviewed in order to ensure up to date coverage of the developments in the field of AI in language learning. The following criteria were used for the studies to be considered for review: Targeted at the use of Artificial Intelligence in language learning; Analyzed vocabulary learning results; Engaged EFL/EISSL students; Appeared in peer-reviewed scholarly articles. To identify the common patterns and themes across the selected studies, thematic analysis was used. Findings were categorized into: The advantages of AI to learn vocabulary; AI technologies used in language learning; Challenges and limitations; Pedagogical implications. This analytical framework enabled a comprehensive examination of AI's role in EFL vocabulary development.

IV. Results and Findings

The study of recent publications shows that AI has become a very successful means for improving vocabulary learning of EFL learners. A number of common features emerged among the various studies reviewed, which included personalized learning, engagement, vocabulary retention, immediate feedback, autonomous learning and contextualized language exposure.

Personalized Vocabulary Learning

AI's key roles in vocabulary development include the customization of learning experiences. Instruction subject matter in traditional classrooms is generally offered in a uniform and rigid way which may be inappropriate for the particular needs of each student. AI systems, on the other hand, use a model to study the learner performance and customize instructional material based on their findings. The machine learning algorithms in adaptive learning environments determine the strengths and weaknesses



of students. These analyses then inform the systems to provide customized vocabulary suggestions, review frequency and course review activities to all learning profiles. This approach to personalization enables learners to dedicate efforts to learning what they need to improve as opposed to covering what they've already mastered. Evidence always suggests that personalized learning environments lead to better achievement and satisfaction among learners. The targeted instruction of different levels of learners, learning styles, learning speed benefits learners.

Enhanced Learner Engagement and Motivation

Motivation is essential in vocabulary learning. Traditional vocabulary learning activities are repetitive and may not be appealing for some learners, but using the interactive features and game features of AI-based applications can solve this problem. Systems, badges, leaderboards, and points are some of the features used in applications like Duolingo and Memrise. The features will naturally trick students into doing things on a frequent and ongoing basis that will allow them to engage in vocabulary learning activities as well as committing to language learning goals for the long-term. Overall, literature reviewed indicates a positive perceived enjoyment of the AI-assisted vocabulary learning among the learners. Use of interactive interfaces, personalized challenges, and the like, provide a more engaging learning setting than may be traditional instructional methods. An AI chatbot also allows students to talk to it, and interact with it as if they were interacting with a person. Students communicate with chatbot without the words being meaningless.

Improved Vocabulary Retention

The retention of basic words continues to be a recurrent difficulty in EFL learning. When opportunities for word learning and word use are brief, many learners forget the word they have just learned after only a short time. The problem is solved by AI systems using spaced repetition strategies. Spaced repetition: Taking words to be reviewed at specific intervals according to cognitive principles of memory maintenance. Personalized review schedules are scheduled via AI algorithms that are based on personal learner performance. Studies show that auto-generated spacing repetition is very helpful at retaining a vocabulary. Dr. Taxiarchos's method of inputting the words is refreshing in delivering them before the student loses interest. In addition, AI technologies enable multimodal learning experiences, including visual, auditory, and contextual. A range of inputs promotes more complex cognitive processing and allow for better remembering of vocabulary words.

Immediate and Individualized Feedback

If a learner is to learn an effective language, feedback is a must. Classroom settings sometimes mean there is a delay between what is taught and what is assessed. Sometimes, students may not get immediate corrective feedback in class because of time constraints or possibly large class size. AI-based learning platforms deliver real-time response feedback to vocabulary, quiz and pronunciation tasks, and conversations. This stopgap mechanism of immediate feedback helps the learners to identify and



rectify mistakes made in writing before they become regular. Moreover, AI systems are able to give personalized explanations and suggestions. Some platforms not only provide feedback on the correct and incorrect answers but also offer explanations for the errors and tips for enhancing past practice. The literature supports the claim that immediate feedback plays a crucial role in vocabulary acquisition by acting in two ways: (1) it makes the learner aware of the need for revision and enables the corrections of lexical errors, and (2) it speeds up the erasure of lexical errors.

Promotion of Autonomous Learning

Another key discovery is related to learner autonomy. Artificial Intelligence technologies promote student autonomy as they are able to use learning material anywhere and anytime. Continuous opportunities for vocabulary practice outside of school with the use of mobile learning applications and cloud-based platforms. Students will be able to learn at their own pace and in their own way. In EFL settings where the amount of exposure to English in the classroom is limited, autonomous learning becomes instrumental. AI tools enhance and supplement learning experiences and vocabulary enhancement. AI-enabled vocabulary programs have been shown to increase students' self-management and self-regulated learning abilities, which in turn builds self-regulation, responsibility, and confidence in language learning.

Contextualized Vocabulary Learning

It's not all about learning word definitions. It is essential for learners to have an awareness of the meaning of words in functional communicative situations. AI technologies enable contextualized instruction via natural language processing and dialogue. The use of Chatbots, virtual assistants, and AI Generative systems presents vocabulary in meaningful sentences, dialogues, and scenarios. Enhanced comprehension and appropriate vocabulary use is the goal of contextualization. Learners gain in knowledge about collocations, idiomatic expressions and pragmatics. The reviewed studies have proven that contextualized exposure has a significant impact on boosting students' capacity to transfer what they've learned in the controlled context to the real communication context.

V. Discussion

The results show that AI has great potential in assisting EFL language learners in their vocabulary learning process. AI technologies can overcome some of the constraints of traditional learning methods and unlock new options for learning today that met today's educational needs.

AI as a Facilitator of Personalized Learning

One of the most significant benefits of AI is its ability to offer personalized education experiences. While the focus of traditional schools is placed on delivering education for the majority of students, the challenge they face is to cater for the heterodoxy of learners with inadequate instructional provision and high enrolment. Platforms



powered by AI solve these issues by tracking learner behavior and tailoring teaching methods to optimize learning. This is an adaptive capacity that is a reflection of the current understanding of differentiated instruction and learner centered education. The results corroborate earlier studies that found that personalized learning has a positive impact on educational outcomes. AI systems can customize content to address personal needs, promoting more efficient and effective learning.

Supporting Vocabulary Acquisition through Meaningful Interaction

The meaningful communicative context is the most effective place for students to learn vocabulary. AI chatbots and conversational agents open up opportunities of real language use which are not found in many EFL contexts. These technology opportunities enhance vocabulary development through the use of tools that promote active engagement with the language – not simply memorizing definitions. The learners use target words in an interactive, negotiated meaning and contextualized communication in the process of learning. The socio-cultural perspective suggests that AI applications can be used as mediational devices that can help these children develop language. While AI can't replace human interaction, it offers great practice and feedback opportunities.

AI and Learner Motivation

Motivation to learn a foreign language is generally acknowledged as one of the essential factors that influences foreign language learning success. The overarching results suggest that the incorporation of AI in the learning process encourages motivation through personalization, gamification, and interactive approaches. In the case of vocabulary instruction, especially, repetition is vital to mastery, and the benefits of AI can be motivational. A gamified learning experience is one in which activities, often dull and difficult, become interesting over the long haul and hold the learner's attention. Moreover, AI technologies contribute to a feeling of achievement by offering real-time progress monitoring and performance feedback. These features are associated with positive learning experiences, and can provide encouragement to remain persistent.

Challenges and Limitations

While it offers many benefits, AI tools also have potential drawbacks when it comes to vocabulary learning.

Technological Accessibility

Adoption of AI technologies continues to be uneven in education settings. There might be problems in developing countries with internet access and with having the right device and financial resources. Glass ceiling effect of learning disparities can hinder effectiveness of AI-related interventions and further deepen pre-existing disparities in language learning.



Teacher Preparedness

The implementation of AI demands educators to have competencies in the technological field. There might be a lack of teachers who have been trained to effectively use AI in teaching. There may be a lack of teachers trained in the application of AI in teaching. Professional learning opportunities are thus critical to enable teachers to make pedagogically/ethically appropriate use of AI technologies.

Ethical and Privacy Concerns

AI systems typically need a lot of data to be collected and analyzed. Thus, there are growing concerns about data privacy, data security, and ethical usage of learner data. Educational institutions and technology developers need to have clear and open policies that outline their actions concerning data collection, storage, and use. Learner privacy protection must be fundamental in education fueled by Artificial Intelligence.

Risk of Overreliance on Technology

Over-reliance on AI technologies is another worry. AI can offer support to enhance the learning but should not supplant the role of a teacher or enrich social interaction. Language learning is a process that has an emotional, cultural, and interpersonal aspect which can be difficult to reproduce with artificial systems. Technology and human resources should be integrated in an appropriate way to build the proper balance for effective teaching and learning practice.

Pedagogical Implications

Several implications for language educators and language policymakers are suggested from the findings. First of all, AI technologies should not replace current instruction; however, they can be used to augment it. Teachers remain pivotal in providing learning, emotional support and thinking capabilities. Secondly, professional development opportunities for teachers that deliver skills around AI need to be pursued. The learning tasks require the skill of educators in choosing and testing technologies and adapting them to a classroom context and implementation. Thirdly, AI-integrated word-learning tasks should be integrated to encourage autonomous approaches to language use while teaching the vocabulary. Last but not the least, accessibility and equity in using AI to enhance learning opportunities should be discussed to ensure that everyone can learn from the use of AI.

V. Conclusion

Artificial Intelligence has become a paradigm that impacts language learning and building word skills. Based on the results of this study, the main contribution of AI-empowered technologies for vocabulary learning of EFL learners has been observed to be: offers personalized and individualized teaching instructions, offers instant feedback, offers adaptive learning paths, and creates interesting learning experiences. Intelligent tutoring systems and chatbots, adaptive learning platforms and mobile learning applications make use of AI to improve learner motivation and retention,



learner autonomy and language being used in context. The advantages are consistent with today's educational ideals that focus on student-centered and technology-based learning. However, key issues of affordability of technology, readiness of teachers, ethical issues and technology dependency should be considered with great attention. The pedagogical planning and proper use of human and technological resources should breathe a balance in the implementation. The use of AI in Vocabulary acquisition is expected to increase further as AI technologies evolve. Research directions might include long-term learning impacts, comparisons of effectiveness in educational contexts and innovative applications in language education with generative AI. Last, but not least, AI can be helpful in sounding out foreign terms such as in the English language. To sum up, AI is a powerful tool which can be used to aid students in their vocabulary learning process in a second language class, like EFL. With careful and intentional use, AI can be a part of language learning in the 21st century that is more effective, more inclusive and more engaging.

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