

The Impact of Chatbot-Driven Artificial Intelligence in Improving Students' Vocabulary

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Abstract: *This study explores how effective AI chatbots enhance students' vocabulary skills at Nommensen University in Pematangsiantar. Emphasizing the importance of vocabulary in English education, this study uses qualitative methods, including interviews and student documentation, with 25 participants from a third-semester English Vocabulary class. To analyze the data, the authors apply thematic analysis to identify patterns and themes within the interview responses and a 5-point Likert scale to gauge students' perceptions. The findings reveal that AI chatbots significantly enhance students' English vocabulary learning experience. Students enjoyed the process and found it easier to acquire new words, which they eagerly applied in their diary entries and essays. The researchers strongly advocate for English teachers to incorporate AI chatbots into their lessons, as this approach can significantly improve students' understanding of word meanings. Additionally, they urge future researchers to delve into a wider array of language skills to enrich the learning journey further. Overall, the results indicate that AI positively affects vocabulary improvement among students. Participants were enthusiastic and motivated since the application was new to them. They also recognized its usefulness, allowing them to learn independently anytime and anywhere.*

Keywords: *artificial intelligence, chatbot-driven, students' vocabulary*

INTRODUCTION

The advancement of artificial intelligence (AI) technology offers exciting opportunities for enhancing the learning of English as a foreign language, particularly in improving vocabulary. Integrating media theory, particularly Media Richness Theory (Daft & Lengel, 1984, 1986 in Sheer, 2020) and Social Presence Theory (Short et al., 1976 in Kreijns et al., 2024), would contextualize these developments and help explain the effectiveness of chatbots as educational tools. Media Richness Theory (MRT) asserts that different communication media have varying abilities to convey information effectively. Richer media are better suited to complex tasks such as language learning. Chatbots exemplify rich media by utilizing natural language processing to simulate human-like interactions, providing



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immediate feedback and personalized engagement (Sheer, 2020). In addition, Social Presence Theory (SPT) emphasizes the importance of feeling socially connected during communication (Kehrwald, 2008). Students' social presence can influence their willingness to participate and communicate effectively in language learning (Satar, 2015). Chatbots can create a sense of social presence by mimicking human interaction through video. This interactive element helps reduce anxiety associated with speaking in a foreign language, as students may feel more comfortable practicing with a non-judgmental AI partner.

In an international context, English functions as the primary medium of communication among nations. Its role as the global language of instruction highlights the importance of effective language acquisition, as noted by Hutauruk et al. (2024). By leveraging AI tools, learners can develop their English skills more efficiently and accessibly, fostering greater understanding and collaboration across cultures. In this era of the 5.0 revolution, a wealth of innovative applications is available to enhance English proficiency, underscoring the significance of this learning journey. The aim is for learners to master English more easily and expand their vocabulary from the basic level. To accomplish this, language teaching in foreign contexts must be interactive, with meaningful exchanges between teachers and students that enhance understanding and create an enjoyable learning experience. The integration of artificial intelligence in education marks a significant advancement, one that can transform English language learning (Amin, 2023; Labadze et al., 2023; Toscu, 2024). This powerful tool enhances media and resources, making language acquisition more efficient and engaging (Shikun et al., 2024; Slamet, 2024). Design of AI systems to create interactive conversations that closely mimic human exchanges through various platforms, including messaging apps and mobile devices. A standout example is the chatbot, which harnesses the power of natural language processing. As noted by Zumstein and Hundertmark (2017), chatbots can replicate human language through sophisticated text-based dialogue, making learning not only more accessible but also more interactive. By incorporating these innovations, we can revolutionize the way we approach language education, ensuring learners have a more dynamic and meaningful learning experience.

Mastering English hinges significantly on vocabulary, which is essential for communication and comprehension. While many students may find vocabulary acquisition straightforward, numerous learners face challenges in memorizing new words. This deterrent often leads to the misconception that English classes are dull or unengaging. To solve this, the role of teachers becomes vital. Effective educators can spark interest by encouraging students to repeat challenging words, thereby enhancing their

speaking abilities. A robust vocabulary is crucial; without it, students struggle to grasp meanings while reading, listening, or articulating their thoughts. On the flip side, those with an extensive vocabulary can communicate more effortlessly and engage with others effectively in English.

Moreover, observations reveal that during interactive sessions, students exhibit significant anxiety and reluctance to speak English with their peers, indicating a lack of confidence (Agustin et al., 2021; Mandasari & Aminatun, 2020; Satiti et al., 2024). This hesitation stems partly from their limited vocabulary, which confines their ability to share ideas. Additionally, many students demonstrate low enthusiasm for speaking in English, which is a pressing concern. The solution lies not only in encouragement but also in fostering a genuine desire for learning. Educators actively inspire students to seek knowledge and engage in practical learning experiences.

Teachers and students highly valued the application of chatbots in English learning. It offers tailored feedback, adaptable learning paths, and opportunities for authentic language practices, all of which help to keep learners engaged (Kuhail et al., 2023). By utilizing a chatbot, students can enhance their interest in English and expand their vocabulary while enjoying authentic conversation practice.

Chatbots are artificial intelligence that helps people talk and connect better. They make conversations easier and improve the way users interact, whether through audio or text. This new technology helps simplify communication and an enjoyable experience for everyone (Holmes et al., 2019). Zemčik (2019) added that designing a chatbot aims to imitate human interaction. As the Internet and social media have grown, chatbots have increasingly found applications in customer service, marketing, advertising, entertainment, and technical support, enhancing user experience and streamlining business operations. The use of technology in the classroom offers many opportunities for student discussions (AIWazzan, 2024).

Chatbots can further enrich these discussions and serve as fundamental teaching tools. Notable examples include CIRCSIM (Evens & Michael, 2005), AutoTutor (Holmes et al., 2019), and Watson Tutor (Ventura et al., 2018), which facilitate educational dialogue and personalized learning experiences. Researchers are exploring interactive chatbots that utilize everyday language, motivating students to ask questions and consider various perspectives (Al-Amri, 2019). Chatbots also contribute to a supportive learning environment, and students develop essential 21st-century skills. Wegerif and Major (2019) observed that technology broadens the conversational space among learners, enabling them to share different viewpoints. Furthermore, studies indicate that instructors' experience does

not significantly influence their digital learning skills (Al-Mujallad, 2011; Mamkegh, 2021).

Abdel Wakil and Musharak (2019) highlighted the crucial role of chatbots in performing particular tasks in various domains, such as education. Utilizing chatbots can significantly enhance educational outcomes, particularly in developing communication skills. Issa (2020) noted that integrating AI-based applications, such as chatbots, creates adaptive mobile learning environments tailored to diverse learning styles, addressing individual characteristics and needs. Based on student personality, interests, and performance, adaptive environments offer personalized experiences to facilitate academic success (Monova-Zheleva, 2005). Research indicates that chatbots can improve academic performance and foster interaction among students, serving as effective virtual teaching assistants (Essel et al., 2022). There have been studies into the potential benefits of chatbots in education. Al-Amri's research (2019) showed that chatbots enhance learning outcomes in science courses, while Al-Najar and Habib (2021) found positive effects on cognitive and performance skills in e-learning environments, further demonstrating their value in education.

In 21st-century education, teachers must be skilled in creating and using Information and Communication Technology (ICT) resources for effective teaching (Vijayalaksmi, 2021). ICT tools help educators and students explore the English language more effectively. Chatbots are artificial intelligence (AI) programs that enable interactive conversations through messaging apps, websites, or phone calls. Engaging with chatbots can spark students' interest in learning English and enhance their vocabulary.

With the above information, the researchers intend to utilize an AI chatbot for first-semester students enrolled in the Vocabulary and Pronunciation Practice course at Nommensen University in Pematangsiantar. The design of this innovative tool enhances students' English vocabulary and their language skills, thereby building confidence in their communication abilities.

METHODS

The researcher implemented qualitative methods, concentrating on both the process and the outcomes of the study. The goal of a qualitative descriptive approach is to accurately describe a location and the characteristics of the community. This method is essential for effectively gathering and evaluating data. Understanding the results, context, and

meaning is more important in qualitative research than simply computing data (Moleong, 2009).

Natural environments serve as valuable sources of data for qualitative research, as highlighted by Sugiyono (2010). In this context, the researcher functions as a key instrument, primarily gathering information through words and images rather than numerical data. The concept of "purpose" is essential; it emphasizes the analysis of data, prioritizes processes over outcomes, and underscores the importance of "meaning." This qualitative research approach reveals insights that quantitative methods might miss. The researcher focused on the third-semester students from the English department to investigate the impact of artificial intelligence, specifically through chatbots, on vocabulary enhancement. This study involved 25 students selected from a total of 50 across two classes at Nommensen University in Pematangsiantar during the 2023/2024 academic year, ensuring a representative sample.

The research examines the students' handwriting in personal letters, which directly informs the formulation of research questions and the study design. In this descriptive qualitative study, the researcher employed questionnaires to gather data on the role chatbots play in vocabulary learning. In this section, the researcher utilized a questionnaire created with Google Forms to collect data. During the analysis, we used a Likert scale to determine whether artificial intelligence can improve vocabulary. This approach captures attitudes and perceptions regarding social phenomena through a combination of positive statements that reflect enthusiasm and negative statements that indicate concerns.

Researchers sought to evaluate students' perceptions of chatbots as effective learning aids through an experimental questionnaire. They designed a web-based questionnaire with a five-point Likert scale ranging from strongly disagree to strongly agree. This comprehensive survey included twenty items grouped into four key areas: convenience, lexical precision, evaluation and comments, and advantages. We used five items to assess the ease and convenience of using the chatbot. To improve language learning, we added five items to address linguistic accuracy and examine students' views on the potential of chatbots. Three items in the evaluation and feedback area revealed the students' opinions about chatbots giving timely feedback. Lastly, seven items highlighted the strengths and advantages of chatbots. The primary objective was to understand how students perceive the support provided by chatbots in improving their English language proficiency, their overall satisfaction with the tool, and their willingness to recommend it as a teaching resource.

Before starting the study, all participants received instructions on how to use the chatbot software. This instruction aims to ensure they were familiar with and could provide accurate feedback. This preparation aimed to enhance the reliability of the information collected for the analysis phase.

RESULTS

Data collection through Google Forms to 25 third-semester students at Nommensen University, Pematangsiantar. The questionnaire comprised 20 statements evaluating the effectiveness of chatbots in English classes, with responses measured on a Likert scale ranging from "strongly agree" to "strongly disagree." Below are the calculations for the scores.

$$\text{Final Score} = \frac{SA + A + U + D + SD}{\text{Total Scale Score} \times \text{Total Participant}} \times 100$$

The findings indicate that a majority of learners are strongly motivated to learn English by utilizing AI chatbots for vocabulary enhancement. They consider chatbots to be user-friendly, practical, effective, efficient, and significantly beneficial to their learning experience. Embracing this technology has the potential to transform their language acquisition journey.

Discussion

In terms of engagement and motivation, students prefer to enjoy learning English vocabulary through Chatbots. Chatbots are perceived to motivate students and enhance their understanding of new words, meanings, synonyms, and lexical nuances through immediate feedback. According to earlier research, students who learn online are more motivated to study and finish projects quickly, which is consistent with our findings (Chuah & Kabilan, 2021; Deng & Yu, 2023; Mohammed & Alian, 2023). The convenience of being able to study anytime and anywhere added to its appeal (Darmayanti & Lestari, 2022).

Furthermore, the results also showed positive feedback on functionality. Students responded that chatbots provided feedback and valuable opportunities, which enhanced their engagement in the learning process. Hidayat et al. (2022) also supported the results by saying that the chatbots were noted for integrating various functions well, allowing users to navigate and utilize them without needing external assistance. However, the lack of strong agreement on certain statements suggested that there might be aspects of chatbot functionality that required enhancement or further investigation to meet students' expectations.

Although Chatbots can expand social presence, there are still concerns about their accuracy in providing corrective feedback, academic freedom, and critical inquiry (Chuah & Kabilan, 2021; Kim, 2017; Popenici & Kerr, 2017; Vera, 2023). Therefore, teachers are encouraged to explore diverse applications (Hsu et al., 2023; Meylani, 2024; Vera, 2023), seek collaborative opportunities (Amin, 2023; Mohammed & Alian, 2023), and involve students actively in the learning process to enhance overall educational experiences (Vera, 2023).

CONCLUSION

Artificial intelligence serves as a powerful tool that motivates students to excel in the English language, particularly in vocabulary acquisition. Chatbots have proven to be effective in enhancing vocabulary skills, and many students find them enjoyable and engaging. These interactive systems offer a range of valuable features, structured challenges, and feedback that complement traditional English teaching methods. Focusing on vocabulary, grammar, and pronunciation is essential in language learning, and incorporating advanced tools and chatbots can significantly enhance the overall experience. However, there are some concerns about the use of this tool, such as the accuracy in providing corrective feedback and the risk to academic freedom and critical inquiry.

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