

## EXPLORING THE USE OF AI-BASED APPLICATIONS FOR VOCABULARY LEARNING IN ELEMENTARY CLASSROOMS

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### ABSTRAK

Penelitian ini bertujuan untuk mengeksplorasi penggunaan aplikasi berbasis AI (Artificial Intelligence) dalam pembelajaran kosakata bahasa Inggris di kelas sekolah dasar. Seiring dengan perkembangan teknologi digital, berbagai aplikasi berbasis AI mulai dimanfaatkan dalam proses pembelajaran untuk meningkatkan keterlibatan dan pemahaman siswa. Penelitian ini menggunakan pendekatan kualitatif dengan metode observasi kelas dan wawancara terhadap guru-guru bahasa Inggris di sekolah dasar yang sudah mengimplementasikan aplikasi AI ke dalam pengajaran kosakata Bahasa Inggris. Observasi dilakukan untuk melihat bagaimana aplikasi berbasis AI diimplementasikan dalam kegiatan pembelajaran kosakata, sedangkan wawancara digunakan untuk menggali persepsi guru terhadap penggunaan aplikasi tersebut. Hasil penelitian menunjukkan bahwa aplikasi berbasis AI membantu siswa dalam memahami dan mengingat kosakata baru melalui fitur interaktif, umpan balik langsung, dan tampilan visual yang menarik. Selain itu, guru memandang penggunaan aplikasi AI sebagai media pembelajaran yang efektif dan inovatif, meskipun masih terdapat beberapa kendala seperti keterbatasan fasilitas dan kesiapan teknis. Penelitian ini menyimpulkan bahwa aplikasi berbasis AI memiliki potensi besar dalam mendukung pembelajaran kosakata di sekolah dasar dan dapat menjadi alternatif media pembelajaran yang relevan dengan kebutuhan pembelajaran di era sekarang ini.

**Kata kunci:** Kecerdasan Buatan (AI), aplikasi berbasis AI, pembelajaran kosakata bahasa Inggris, kelas sekolah dasar

### ABSTRACT

*This study aims to explore the use of AI (Artificial Intelligence) based applications in English vocabulary learning in elementary school classrooms. Along with the development of digital technology, various AI-based applications are beginning to be utilized in the learning process to increase student engagement and understanding. This study used a qualitative approach with classroom observations and interviews with English teachers in elementary schools who have implemented AI applications in their English vocabulary teaching. Observations were conducted to observe how AI-based applications are implemented in vocabulary learning activities, while interviews were used to explore teachers' perceptions of their use. The results showed that AI-based applications help students understand and remember new vocabulary through interactive features, direct feedback, and attractive visual displays. In addition, teachers viewed the use of AI applications as an effective and innovative learning medium, although there were still several obstacles such as limited facilities and technical readiness. This study concluded that AI-based applications have great potential in supporting vocabulary learning in elementary schools and can be an alternative learning medium relevant to today's learning needs.*

**Keywords:** Artificial Intelligence (AI), AI-based applications, English vocabulary learning, elementary classroom

### INTRODUCTION

English is a global language that plays a vital role in various aspects of life, such as education, technology, and International communication (Rao, 2019). Therefore, learning English from elementary school is a

strategic step to equip students with basic language skills (Agazzi, 2022). One of the main components of learning English is vocabulary mastery (Tiara et al., 2024). Vocabulary serves as the foundation for other language skills, such as reading, writing, listening, and speaking. Without adequate

vocabulary mastery, students will have difficulty understanding and using English effectively.

However, vocabulary learning in elementary schools still faces various obstacles. Learning methods tend to be conventional, such as memorizing word lists or completing written exercises, which are often inappropriate for the characteristics of elementary school-aged students, especially in this digital era (Quicksand Design Studio, 2021). Students at this age tend to be more interested in visual, interactive, and fun learning (Sathyaseelan, Pettela, M, & Muralikrishnan, 2025). As a result, vocabulary learning becomes less engaging, students easily become bored, and their absorption of the material is less than optimal.

With the advancement of digital technology, children today are increasingly familiar with the use of technological devices and digital applications in their daily lives. This situation opens up opportunities for the world of education to utilize technology as a more innovative learning medium. One technology that is increasingly being used in education is Artificial Intelligence (AI). AI-based applications such as Duolingo, WordWall, Quizizz, Elsa Speak, etc. These applications offer various features such as adaptive learning, immediate feedback, and interactive audio and visual displays (Panagiotidis, 2025). These features enable students to learn at their own pace and create a more engaging learning environment, particularly in English language comprehension.

Several previous studies have shown that the use of AI-based applications in vocabulary learning can increase student engagement, aid vocabulary comprehension, and support a more effective learning process, as stated by (Jomaa, Attamimi, & Al Mahri, 2025) Furthermore, teachers also have a positive perception of the use of AI-based applications as learning support media. However, challenges remain in their implementation, such as limited facilities, teacher readiness, and classroom learning management in several school in Indonesia. Therefore, further research is needed to understand how AI-based applications are used in vocabulary learning in elementary school classrooms and how teachers perceive their use.

Based on this background, this study aims to explore the use of AI-based applications in English vocabulary learning in elementary school classrooms and to determine teachers' perceptions of their use. The results are expected to provide insight into the role of AI-based applications as supporting media for vocabulary learning that are relevant to the needs of learning in the digital era.

#### **METHOD**

This study employed a descriptive qualitative research design with a case study approach. This design was chosen because the study aimed to describe in-depth and contextually the use of Artificial Intelligence (AI)-based applications in English vocabulary learning in elementary schools and to understand teachers' perceptions of their use in real-life learning situations. The case study approach was deemed appropriate because this research focused on a specific phenomenon occurring in a real-life context and was limited by space, time, and specific participants. Yin (2018) explained that case studies are appropriate when researchers want to explore a phenomenon in depth in a real-life context, especially when the boundaries between phenomenon and context are not clearly visible. Furthermore, Creswell (2014) stated that case studies allow researchers to examine a bounded system through in-depth data collection from various sources. Therefore, a descriptive case study design is deemed relevant to describe AI-based vocabulary learning practices without manipulating the research variables.

The participants in this study consisted of three elementary school English teachers from three different elementary schools. The first teacher taught at a private elementary school in Bogor city, the second teacher taught at a private elementary school in Bogor district, and the last teacher taught at a public elementary school in Bekasi district. The participants were selected purposively, considering that all three teachers had experience using AI-based applications in English vocabulary learning. These schools were chosen because they have implemented digital technology in English learning and provide teachers with access to integrate AI-based applications in the classroom. Data collection at three different schools aimed to obtain a more diverse

picture of learning practices and to increase the credibility of the data through comparisons of learning contexts.

Data collection was conducted through classroom observations and teacher interviews. The observations aimed to obtain data on the English vocabulary learning process using AI-based applications directly in the classroom, specifically regarding how teachers integrate AI applications and student responses during the learning process. Observations were conducted directly (offline) using non-participant observation techniques, in which the researcher acted as an observer without being involved in the learning activities. Observations were conducted three times, once at each school, with each meeting lasting approximately 60 minutes from pre-teaching until closing teaching. The observations took place in January – February 2026. The focus of the observations covered three learning stages: pre-teaching, while-teaching, and closing-teaching. The results of the observations were recorded in the form of field notes for further analysis.

In addition to observations, interviews were conducted to obtain data on teachers' perceptions of the use of AI-based applications in English vocabulary learning. The interviews aimed to explore teachers' views on the benefits, challenges, and effectiveness of AI applications as learning support media. Interviews were conducted with three teachers, the same teachers as the observation. The interviews were semi-structured to provide a guide for the researchers' questions and to provide space for the teachers to share their experiences and perspectives in greater depth (Mashuri et al., 2022). Interviews were conducted face-to-face (offline) at each school in January – February 2026, with a duration of approximately 20–30 minutes for each participant. The main themes of the interviews included teachers' experiences using AI-based applications, perceptions of their impact on student motivation and engagement, obstacles encountered in implementing AI applications, and teachers' views on the role of AI in vocabulary learning in elementary schools. All interviews using Indonesian to obtain more accurate data, all interviews were recorded with the participants' permission and transcribed using English for data analysis purposes.

Data analysis in this study was conducted using the interactive analysis model proposed by Miles and Huberman (1994), which includes the stages of data reduction, data presentation, and conclusion drawing. Data from observations and interviews were reduced by selecting and simplifying information relevant to the research focus. Next, the data were presented in narrative descriptions to facilitate understanding of the research findings. The final stage was drawing conclusions based on a comprehensive interpretation of the data to answer the research questions.

## **RESULTS AND DISCUSSION**

This section presents research findings obtained from classroom observations and interviews with three elementary school English teachers in three different schools, along with a discussion based on theory and previous research. The research focuses on the use of Artificial Intelligence (AI)-based applications in English vocabulary learning and teachers' perceptions of their use in the classroom.

Based on observations in the three schools, it was found that AI-based applications were used as supporting media in English vocabulary learning and were integrated into three learning stages: pre-teaching, while-teaching, and closing-teaching. In the pre-teaching stage, the teacher carries out warm-up activities by utilizing Artificial Intelligence (AI) based applications, such as displaying images, illustrations, or AI-based interactive questions to activate students' prior knowledge, then introducing vocabulary topics and conveying learning objectives.

During the while-teaching phase, teachers use AI-based applications such as Wordwall and Quizizz to help students recognize, practice, and review English vocabulary. These applications are used to display images, vocabulary pronunciation, and practice in the form of quizzes and interactive games. Observations indicate that students appear more enthusiastic, active, and focused during the learning process. Students demonstrate a strong interest in game-based activities and are willing to try answering questions posed in the applications. Despite limited facilities, such as the number of devices being disproportionate to the number of students, teachers are still able to manage

the learning effectively through group work and alternating application use.

During the closing-teaching phase, teachers review the vocabulary learned through short discussions or closing quizzes using AI applications. Teachers also provide reinforcement and feedback on students' learning outcomes before concluding the lesson. This phase helps students recall the vocabulary learned and more clearly understand the learning objectives.

Interviews with the three teachers revealed that they generally had a positive perception of the use of AI-based applications in English vocabulary learning. Teachers stated that AI applications help create a more enjoyable and less boring learning environment, especially for elementary school students. The visual, audio, and game features within the applications were deemed effective in increasing student motivation and engagement during learning. Furthermore, teachers found the AI applications helpful because they provided varied exercises and immediate feedback, allowing students to quickly identify their mistakes.

However, teachers also identified several challenges in using AI-based applications. The main challenges identified were limited technological resources, such as device availability and internet access, and the need for extra supervision to prevent students from becoming too focused on the gameplay. Therefore, teachers emphasized that the teacher's role remains crucial in guiding the use of applications to ensure they align with learning objectives.

The findings of this study indicate that the use of AI-based applications can support English vocabulary learning in elementary schools by creating more interactive and learner-centered learning. These results align with the findings of Philp, Oliver, and Mackey (2008), who stated that elementary school-aged students understand vocabulary more easily through visual and interactive activities. Furthermore, these findings support the research of Wen et al. (2024), who demonstrated that AI applications can help students learn vocabulary more effectively through adaptive features and repeated practice.

Teachers' positive perceptions of the use of AI-based applications also align with research by (Jomaa et al., 2025), who stated that teachers view AI as a supporting medium

that can increase student motivation and participation. However, as found in this study, AI applications cannot completely replace the role of teachers. Teachers still play a primary role in managing the classroom, directing learning activities, and ensuring that technology use aligns with learning objectives. This aligns with the opinion of Ngongpah & Oni (2025), who emphasized the importance of teacher readiness and classroom management in implementing AI-based technology in schools.

Overall, the results and discussion indicate that AI-based applications can be an effective support tool for English vocabulary learning in elementary schools when used in a well-planned and integrated manner. The use of AI applications can increase student engagement and motivation, while the teacher's role remains a key factor in successful learning.

## CONCLUSION

This study aims to explore the use of Artificial Intelligence (AI)-based applications in English vocabulary learning in elementary schools and to explore teachers' perceptions of their use. Based on observations and interviews with three teachers in three different elementary schools, it can be concluded that AI-based applications are used as learning support media and are integrated into the pre-teaching, during-teaching, and closing-teaching stages. The use of applications such as Wordwall and Quizizz helps create more interactive vocabulary learning through visual, audio, and game features, thereby increasing student motivation, engagement, and focus throughout the learning process.

The research results also indicate that teachers have a positive perception of the use of AI-based applications in English vocabulary learning. Teachers view AI applications as an effective medium for supporting learning, particularly in creating a fun learning environment and encouraging active student participation. However, this study identified challenges in the form of limited technological facilities and the need for supervision to ensure students do not focus solely on the game elements. Therefore, the teacher's role remains a key factor in guiding the use of AI applications to align with learning objectives.

The implications of this research indicate that AI-based applications can be utilized as relevant supporting media in English vocabulary learning in elementary schools, particularly to increase student motivation and engagement. These findings provide practical implications for teachers to be more creative and planned in integrating AI technology into learning, and for schools to ensure adequate technological facilities are available. Furthermore, theoretically, this research reinforces the view that the use of AI-based technology can support student-centered vocabulary learning.

The findings of this study can be developed into further research involving a wider number of participants and schools, as well as exploring other types of AI-based applications. Further research could also focus on the impact of AI application use on quantitative vocabulary learning outcomes or other language skills, such as reading and speaking, allowing for a more comprehensive study of the use of AI in English learning in elementary schools.

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