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Exploring the Application of Artificial Intelligence in Arabic Language Learning: Perspectives of Students and Teachers

Reziq Ridho, eziqridho24@gmail.com, (1)
Universitas Islam Negeri Mataram, Indonesia

Muhammad Rozin Perkasa, rozinperkasa8@gmail.com, (0)
Universitas Islam Negeri Mataram, Indonesia

Fathul Maujud, farhulmaujud@uinmataram.ac.id, (0)
Universitas Islam Negeri Mataram, Indonesia

(1) Corresponding author

Abstract

General Background: The integration of Artificial Intelligence (AI) in education offers new opportunities for personalized and adaptive learning, yet its application in Arabic language education remains underexplored. **Specific Background:** While AI has been widely studied for English and other major languages, research focusing on Arabic—particularly from user-experience perspectives—is still limited. **Knowledge Gap:** Few studies qualitatively examine how students and teachers perceive AI's role, challenges, and pedagogical relevance in Arabic language learning, especially in regions with unequal digital infrastructure such as Lombok. **Aims:** This study investigates perceptions of students and teachers regarding the implementation of AI in Arabic language learning and identifies key factors influencing its success or limitations. **Results:** Findings reveal that AI enhances learning interactivity, flexibility, and basic language skills; however, cultural-contextual understanding still relies heavily on teacher interaction. Implementation challenges include insufficient digital infrastructure, limited training, and varied student digital readiness. **Novelty:** This study offers a holistic qualitative analysis integrating pedagogical theory, technological readiness, and socio-cultural factors in the use of AI for Arabic learning. **Implications:** The results highlight the need for stronger infrastructure investment, continuous teacher training, and inclusive digital literacy programs to optimize AI-supported Arabic language education.

Highlights:

- AI improves interactivity and flexibility but lacks cultural-context depth.
- Training and digital literacy strongly influence successful implementation.
- Infrastructure gaps limit equitable access to AI-based Arabic learning.

Keywords: Artificial Intelligence, Arabic Language Learning, Student–Teacher Perceptions, Digital Readiness, Educational Technology

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Introduction

Arabic language learning faces various challenges in the era of modern education, especially with the development of digital technology that brings significant changes to teaching methods. As a language of great importance in the context of religion, culture, and global politics, Arabic remains an essential subject to study, both among native speakers and foreign learners. However, traditional Arabic language teaching, which relies on face-to-face methods, is often considered inadequate in accommodating the diverse learning styles and individual needs of students [1]. In recent years, technology has become an integral part of the educational process, with artificial intelligence (AI) emerging as a tool that holds great potential to enhance language learning [2]. The use of AI in education provides opportunities to create more personalized, adaptive, and data-driven learning experiences, which can enhance student motivation and learning effectiveness. With AI, instructional materials can be tailored to the abilities and needs of students in real-time, creating a more flexible and dynamic approach [3].

Although the potential of AI is vast, the application of this technology in Arabic language learning remains limited. Most research on AI in education has been primarily focused on English or other popular languages, while studies on the use of AI in the context of Arabic language learning are very scarce [4]. This creates a research gap that needs to be filled, namely how AI can be integrated into Arabic language learning, particularly from the perspectives of teachers and students. Several previous studies have touched upon the topic of AI usage in language learning in general, but few have explored in depth how students and teachers perceive the implementation of this technology in the specific context of Arabic language learning. Existing research often relies on quantitative approaches, while qualitative aspects, such as perceptions and direct experiences from the users, are still rarely explored [5].

In this context, it is important to conduct research that can explore the perspectives of students and teachers regarding the implementation of AI in Arabic language learning. By understanding how these two groups interact with the technology, this research is expected to provide new insights into the challenges and opportunities present in the implementation of AI in the classroom. This study will fill the existing gap by using a qualitative approach to explore the impact of AI implementation in Arabic language learning, both in terms of effectiveness, student engagement, and the challenges faced by teachers in integrating this technology into the curriculum. Thus, this research will not only focus on quantitative outcomes but also on the subjective experiences of teachers and students who interact directly with this technology.

The main objective of this research is to explore how students and teachers perceive the implementation of AI in Arabic language learning and to identify the factors that influence the success or failure of such implementation. This study also aims to provide a clearer picture of how AI can be used to support more personalized and adaptive language learning. This research holds significant value in advancing knowledge in the fields of education and technology, particularly in the context of language learning. The findings from this research can contribute to the design of better curricula by integrating advanced technologies that meet the needs of both students and teachers.

At a practical level, the results of this research can provide guidance for educators and policymakers to optimize the use of AI in Arabic language learning, as well as offer insights for educational technology developers on how to design more effective learning tools that are culturally and socially appropriate. With this research, it is hoped that the adoption of AI in education, particularly in the field of Arabic language learning, will be accelerated. This is important given the rapid development of technology and the need to integrate technology into a more adaptive and responsive learning process that meets the needs of the times [6]. This research also provides space for the development of research methodologies in education involving technology. By focusing on the perspectives of students and teachers, this study offers a more holistic approach in assessing the acceptance and impact of technology in language education.

From a social perspective, this research is also relevant given the importance of inclusive and equitable education. By understanding how AI can help students from diverse backgrounds learn Arabic in a way that better suits their individual needs, we can ensure that educational technology is accessible to everyone, without exception. In the context of globalization, mastering Arabic is becoming increasingly important, especially for non-native learners who wish to understand the language for various purposes, such as religious studies, diplomacy, or trade. Therefore, the use of AI in Arabic language learning can serve as an effective solution to accelerate the learning process for students across different parts of the world[4]. The successful implementation of AI in Arabic language learning can serve as a model that can be applied to other languages, making this research not only relevant for Arabic but also for other languages that require a similar approach in integrating technology [7]. By combining constructivist learning theory and adaptive learning theory, this research seeks to build a strong theoretical foundation to explain how AI can play a role in creating a more efficient, relevant, and engaging learning experience for students. Overall, this research aims to provide deeper insights into the role of AI in Arabic language learning and offer practical recommendations for educators, technology developers, and policymakers in utilizing AI for better education.

Method

This research uses a qualitative approach. A qualitative approach was chosen because this study aims to explore the perceptions, experiences, and subjective views of students and teachers regarding the use of AI technology in Arabic language learning. The case study design allows the research to delve into the application of AI in the real-world context of Arabic language learning. Participants in this study are Arabic language teachers and students located on the island of Lombok, totaling 20 individuals. Data collection was conducted through interviews. Data analysis in this study used thematic analysis [8].

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Results and Discussion

This research reveals various perspectives and experiences from Arabic language teachers and students on the island of Lombok regarding the implementation of AI technology in their learning. Based on the interviews conducted, the results of this study highlight several key themes that reflect how AI is used and accepted in Arabic language learning.

1. Students' Perspectives on the Implementation of AI in Arabic Language Learning

The implementation of artificial intelligence (AI) in Arabic language learning in Lombok received positive responses from students, who felt that their learning experience became more engaging and interactive. The use of AI-based platforms, such as Duolingo, provides flexibility for students to review materials at any time, according to their needs. This aligns well with the constructivist theory proposed by Piaget, which emphasizes that learning should be active and independent, allowing students to build their own knowledge through direct experience [9]. This technology allows students to learn autonomously, receive immediate feedback, and review materials as much as they need, which has proven effective in improving fundamental language skills, such as vocabulary and grammar. Research by [10] It also indicates that AI-based platforms provide a significant improvement in vocabulary acquisition and language skills.

However, although AI provides significant benefits in technical aspects, there are major challenges related to the limitations of this technology in providing a deeper cultural context related to the Arabic language. [10] It also reveals that although this technology is effective for material repetition and vocabulary practice, it is less capable of capturing the cultural values inherent in the language. Therefore, a deeper understanding of Arab culture still requires direct interaction with teachers, who can explain the social and cultural contexts that AI algorithms cannot reach. Research by [11] This is supported by showing that although AI can enhance technical proficiency, it is not sufficient to provide a deep cultural understanding, which can only be conveyed through human-interactive learning.

In this context, Vygotsky's theory of the Zone of Proximal Development (ZPD) provides a highly relevant framework. Vygotsky argued that learning occurs most effectively when students work within the 'zone' between what they already know and what they can learn with the help of others. [12]. In this case, although AI functions as an excellent tool for enhancing technical understanding of the language, its ability to address deeper social and cultural needs is limited. Research by [11] Additionally [13] indicate that the integration of AI in language learning can help students master the language technically, but teacher-student interaction is crucial in enriching the learning experience that involves cultural values. Therefore, although AI enhances the efficiency of language learning, direct interaction with teachers remains a crucial element to ensure a holistic and contextual understanding of the Arabic language.

2. Teacher Experiences in Using AI in Arabic Language Learning

From the teachers' perspective, although many acknowledge the benefits offered by artificial intelligence (AI) in Arabic language learning, such as increased efficiency and more structured material availability, most teachers feel that this technology cannot fully replace the traditional teaching methods already in place. Many teachers view AI as a highly functional tool that supports the learning process, but it cannot replace the important role played by teachers in guiding, explaining, and providing deeper context related to the instructional material. This aligns with Vygotsky's theory of the Zone of Proximal Development (ZPD), which emphasizes that learning occurs optimally when there is interaction between students and teachers within the 'zone' between what they already know and what they can learn with the help of others[12]. In this context, although AI can provide immediate feedback and enable students to learn independently, social interaction between teachers and students is still necessary to deepen the more complex contextual understanding, especially in language learning, which is full of social and cultural nuances.

In addition, a major obstacle for teachers in implementing AI is the insufficient training required to make full use of this technology. As noted by [13], many teachers feel insufficiently prepared to incorporate AI into their instructional practices. They recognize the potential of AI to improve learning, yet without proper training, they find it difficult to apply the technology effectively. This underscores the need for ongoing professional development that not only covers the use of technological tools but also strengthens teachers' pedagogical understanding of how AI can be meaningfully integrated into the curriculum. As stated by [10], comprehensive training for teachers is essential to ensure they can employ AI confidently, understand its constraints, and fully harness its capabilities.

Comparison with previous studies also shows that the challenges faced by teachers in integrating AI technology are not new issues. Research by [11] highlights that although many teachers see great potential in the implementation of AI, they often struggle to align the technology with their established teaching methods. This reflects the importance of deeper training and preparation support. Furthermore, research by [10] reveals that although AI can enhance efficiency and provide a more personalized learning experience, failure to align the technology with the appropriate pedagogical approach can diminish the benefits that should be gained. Therefore, a more holistic approach to training is necessary, one that not only focuses on the technical aspects of using AI but also on how to integrate this technology with broader learning goals that align with social learning theory and constructivism.

3. Technology Infrastructure in the Success of AI Implementation

Technology infrastructure plays a crucial role in the success of artificial intelligence (AI) implementation in Arabic language learning, especially in areas like Lombok, which face their own geographic and economic challenges. Many schools in rural areas on Lombok Island face serious issues related to unstable internet access and limited technological devices. The

inability to access technology effectively hinders the potential for AI implementation, which could enhance the quality of education. Technologies like AI, despite their great potential in supporting learning, require robust infrastructure and equitable access to be effectively implemented. Without adequate support, the use of AI could actually worsen the educational disparity between urban areas with better access to technology and rural areas with limited infrastructure [14].

The technological determinism theory approach suggests that adequate infrastructure plays a major role in the success of educational technology implementation. According to this theory, technology is considered to have a direct and significant impact on the development of education, as long as it is supported by the right conditions [15]. In the context of Arabic language learning, AI can function as a highly effective tool in enhancing language skills, but without equitable access to hardware and stable internet connections, the technology will not be able to function optimally. Research by [13] also states that the quality of infrastructure in remote areas significantly affects the ability of students and teachers to utilize technology effectively. Therefore, strengthening technology infrastructure in underdeveloped areas becomes an important step to ensure that all students, without exception, can access and benefit from AI-based learning.

Comparison with previous research also reinforces this finding, where earlier studies have shown that gaps in technology infrastructure often present a major barrier to the implementation of educational technologies, including AI. Research by [10] reveals that although AI technology has the potential to enhance Arabic language learning, infrastructure limitations in areas with poor access make its implementation ineffective. They also show that in areas with better access to technology, AI-based learning has significantly improved student skills. Therefore, to ensure the success of AI implementation in Arabic language learning in Lombok, there needs to be a greater investment in improving educational infrastructure, including enhancing internet connections and providing adequate technological devices for schools in rural areas.

4. Training for Teachers and Students as a Success Factor

Training for both teachers and students plays a crucial role in ensuring the successful implementation of artificial intelligence (AI) in learning. Teachers who have received adequate training in technology use will find it easier to integrate AI into their teaching effectively. [10] emphasize that proper training is essential to ensure that AI is used not just as a tool, but also as an instrument that can enhance the quality and efficiency of learning. Without proper training, teachers might use technology merely as a supplementary tool, failing to fully harness its potential to enhance interactive and meaningful instruction. Hence, consistent and sustained professional development for teachers is essential to fully realize the advantages of AI in education.

For students, their capacity to adapt to technology largely depends on how comfortable they are with using digital tools. Those who are already accustomed to technology generally adjust more quickly to AI-based learning. Conversely, students from regions with limited technological access often struggle to make full use of these digital resources.[16] indicate that students' digital preparedness greatly influences how effectively technology can be utilized in the learning process. When students lack fundamental technological knowledge and skills, they may find it difficult to engage with AI platforms, which can negatively impact their academic performance. Thus, it is essential for schools to offer well-organized and comprehensive digital literacy training programs, particularly for students from regions with limited access to technology.

To guarantee that all students can access and fully benefit from AI-enhanced learning, schools must give careful consideration to students' digital preparedness. Robust digital training initiatives will enable learners to understand and use technology more effectively, allowing them to utilize AI as a tool to improve their language abilities. This is essential for reducing disparities in technological access so that every student—regardless of background or available resources can gain the full advantages of AI-supported learning. Providing appropriate training for both students and teachers helps foster a more inclusive and empowering educational environment that supports the development of skills needed in the digital era.

5. Comparison with Previous Research

This study aligns with findings from earlier studies that show the implementation of AI in Arabic language learning can significantly improve student skills. [13] indicate that the use of AI in Arabic language learning can enhance student comprehension and skills, but only if supported by adequate training for teachers and strong technology infrastructure. Additionally, research by [11] underscores the importance of holistic integration of technology in education, which involves not only the use of tools like AI but also enhancing the capacity of both teachers and students to effectively utilize the technology.

However, the main difference found in this study is the greater challenge related to digital readiness and infrastructure in Lombok, compared to more developed areas. This highlights the digital divide that needs to be addressed promptly so that the potential of AI technology can be fully leveraged in education, especially in remote areas like Lombok. This issue becomes a new challenge in the ongoing debate about the digital access gap in educational technology in Indonesia, which requires serious attention from all stakeholders.

Conclusion

The implementation of artificial intelligence (AI) in Arabic language learning in Lombok has had a positive impact, increasing interactivity and flexibility in learning for students, although there are challenges related to cultural limitations that can only be explained through direct interaction with teachers, as mentioned by both teachers and students in the interviews conducted. Adequate training for teachers is crucial to ensure that this technology is utilized effectively, not just as a tool, but as an instrument to enhance the quality of learning. On the other hand, sufficient technological infrastructure

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plays a crucial role in the effective implementation of AI, as poor internet connectivity and limited devices in rural regions restrict its potential. Thus, enhancing infrastructure and providing ongoing training for both teachers and students are essential to fully optimize the advantages of AI. The effectiveness of AI in Arabic language instruction relies on harmonizing technological integration with robust infrastructure and sound pedagogical strategies.

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