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AI-based communication strategies for language education in Islamic universities

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Abstract

This study explores how artificial intelligence (AI) can be used to improve communication strategies in language teaching at Islamic universities in Indonesia. Language proficiency is a major challenge in this rapidly changing technological landscape. Although many institutions are trying to update their curricula, they often find it difficult to effectively incorporate digital tools that enhance language learning while respecting Islamic educational values. This study uses a mixed-methods design, the quantitative evaluate the effectiveness of various AI tools, such as chatbots, speech recognition software, and adaptive learning systems, in improving students' language skills and engagement. Meanwhile, qualitative data highlight concerns about cultural alignment, ethical considerations, and the need for teacher training in AI applications. Data was collected through surveys and tests conducted before and after the implementation of these tools at selected Islamic universities. The analysis focused on understanding the relationship between the use of AI and the resulting learning outcomes. The results show that AI has the potential to significantly support language teaching in a way that is consistent with Indonesian cultural and religious values. The study concludes with recommendations for policy makers and educators on how to effectively integrate AI-based methodologies in Islamic universities.

Keywords: artificial intelligence; communication strategies; educational technology; Islamic universities; language education

INTRODUCTION

Language education around the world has been revolutionized by the rapid advancement of artificial intelligence (AI). AI-driven tools such as chatbots (Huang et al., 2022), intelligent tutoring systems (Wang et al., 2023), and speech recognition software (Ngo et al., 2024) provide personalized, interactive, and scalable solutions to enhance language learning. Studies show that these technologies improve efficiency in areas such as vocabulary acquisition (Kohnke et al., 2023), grammar correction (Jiang, 2025), and conversation practice (Lai & lee, 2024). However, while the use of AI in global education is growing, its implementation in religiously affiliated institutions, particularly Islamic universities, remains understudied (Kurata et al., 2025). It is particularly important to research this area, given that Islamic universities have unique pedagogical and ethical structures. This means that any AI implementation must align with religious principles, institutional regulations, and culturally sensitive educational approaches. Without thorough investigation into these aspects, the potential benefits, and challenges of AI adoption in such institutions remain inadequately explored.

Moreover, in Indonesia, Islamic universities play a central role in higher education, combining religious instruction with academic disciplines, including language studies (Kurata et al., 2025). Proficiency in Arabic (for Qur'anic studies), English (for global scholarship), and Bahasa Indonesia (for national communication) is essential for the holistic development of students (Burner & Carlsen, 2023). However, traditional teaching methods face challenges such as low student engagement (Teravainen-Goff, 2022), uneven distribution of resources (Suresh, 2024), and varying proficiency levels (Fauzi et al., 2024). While AI could address these issues,

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its integration must be consistent with Islamic educational values that prioritize teacher-student mentorship (Masuwai, 2024), ethical considerations (Mudrik et al., 2024), and cultural relevance (Rifah et al., 2024).

Despite the potential of AI, there are critical gaps in existing research. First, most studies focus on secular or Western contexts (e.g., Pless, 2021), with limited attention to religious institutions in Muslim-majority countries (Abdi, 2018). Second, while the technical efficacy of AI in language learning is well documented (Hwang et al., 2023), its cultural and religious compatibility remains unexplored (Rahman et al, 2022). For example, a study by Hernawati et al. (2024) talks about how Islamic religious education curricula need to be changed to include AI-based technology while keeping the most important Islamic values. The research shows how important it is to combine character education and strengthen Islamic values with technological advancements. In addition, with respect to the possible reluctance to adopt AI due to cultural and ethical considerations, a study by Syukur et al. (2024) analyses the incorporation of AI in Islamic higher education in Indonesia and Thailand. The research identifies concerns among educators regarding the potential of AI to undermine conventional teaching roles and Islamic cultural values. Concerns have been raised regarding the potential for artificial intelligence to supplant human interaction in the dissemination of religious teachings and moral guidance. Moreover, a study by Ali et al. (2023) explores the trends and perceptions of AI usage in Islamic education, highlighting issues related to academic integrity and the potential for ethical conflicts arising from AI integration. The research underscores the necessity for ethical frameworks to guide the adoption of artificial intelligence (AI) in educational settings.

This study aims to address the existing research gap by quantitatively evaluating the effectiveness of AI-based communication strategies in language learning at Islamic universities in Indonesia. Previous studies have laid important groundwork: Syaikhudin and Laili (2024) investigated an AI chatbot for Arabic language practice and a speech recognition tool for English pronunciation, while Faiz and Kurniawaty (2023) demonstrated the institutional role of libraries in supporting AI integration, particularly ChatGPT, at Tribakti Islamic University. Similarly, Dja ‘far and Hamidah (2023) and Abimanto and Sumarsono (2023) validated the effectiveness of AI tools such as Google Read Along for English pronunciation. However, these studies are still isolated in two main ways: (1) they focus on Arabic or English, neglecting multilingual AI applications in Islamic higher education; and (2) they prioritize technical feasibility over pedagogical frameworks for scalable implementation. By investigating the role of AI in both languages in Indonesian Islamic universities, this study fills this gap and assesses how institutional adoption can be systematically optimized.

LITERATURE REVIEW

A. Artificial Intelligence (AI-Based Communication Strategies)

Artificial intelligence (AI) has profoundly reshaped communication strategies within education, particularly in the realm of language learning. The integration of advanced AI-driven tools, such as chatbots and natural language processing (NLP), has revolutionized the way students and educators interact, creating personalized learning pathways and improving accessibility to educational content. AI enables adaptive learning experiences by analysing individual student progress, tailoring instruction accordingly, and providing automated feedback to enhance comprehension. This approach ensures that learners receive targeted support, whether they are mastering new vocabulary, refining pronunciation, or engaging in contextual language practice. Beyond personalization, AI-powered tools also streamline feedback mechanisms, allowing educators to assess student performance efficiently. Automated grading systems, language assessment tools, and AI-driven writing assistants help students refine their linguistic abilities by providing instant corrections and suggestions. This immediacy not only accelerates the learning process but also enables students to develop independence in their language acquisition journey.

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Moreover, AI fosters greater student interaction in digital environments, making remote and online learning more immersive and engaging through intelligent tutoring systems, conversational agents, and AI-supported collaborative platforms.

The theoretical foundation for AI-driven learning aligns closely with constructivist learning theory (Piaget, 1970), which advocates for active engagement in knowledge construction. AI facilitates experiential learning by allowing students to engage with interactive and dynamic content rather than passively consuming information. Additionally, the principles of connectivism (Siemens, 2005) emphasize the importance of digital networks in acquiring and disseminating knowledge. AI plays a pivotal role in this framework by acting as both a facilitator and a bridge between learners, educators, and digital resources. With AI-driven communication tools, students can access vast repositories of knowledge, participate in global language exchange programs, and collaborate on projects in real-time, reinforcing the interconnected nature of modern education. As AI continues to evolve, its impact on language education will expand further, introducing more innovative technologies such as voice recognition systems, neural machine translation, and AI-powered language tutors. These advancements promise to make language learning even more effective, ensuring that education remains adaptive, inclusive, and accessible to students worldwide.

B. Language Education

AI-driven communication strategies have greatly enhanced language education by introducing new methods that improve learning efficiency. Automated assessments provide learners with instant feedback, helping them identify their strengths and areas for improvement while enabling more effective progress tracking. AI-powered speech recognition helps students refine their pronunciation and comprehension skills, making language acquisition smoother and more accessible. Intelligent tutoring systems personalize learning experiences by adapting instructional materials based on student performance, ensuring tailored support. AI contributes to immersive learning through virtual and augmented reality by providing interactive environments in which learners can practice their language skills in lifelike scenarios, developing a deeper understanding through hands-on experience. The theoretical basis for AI in language education is reflected in Krashen's (1985) Input Hypothesis, which emphasizes the importance of comprehensible input in language acquisition—an area in which AI excels by offering structured, adaptive learning materials. Furthermore, Vygotsky's sociocultural theory (1978) emphasizes the crucial role of social interaction in language development. AI-powered platforms support this theory by providing collaborative digital learning spaces. These platforms enable learners to engage in meaningful exchanges, participate in peer interactions, and practice communication in AI-assisted discussions. By fostering personalized learning experiences and interactive collaboration, AI continues to transform language education into a more dynamic, engaging, and responsive process that caters to individual learning needs.

C. Islamic Universities

Islamic universities are integrating AI-driven communication strategies to enhance language education while upholding traditional Islamic pedagogical principles. AI plays a vital role in supporting the study of the Arabic language, Quranic studies, and Islamic jurisprudence by offering intelligent tutoring systems and digital educational resources designed to meet the specific needs of Islamic instruction. These tools promote interactive learning, enabling students to engage with Quranic texts, improve their language skills, and develop a deeper understanding of Islamic legal principles through structured, adaptive platforms. Incorporating AI into educational frameworks enables institutions to provide personalized learning experiences that cater to diverse student capabilities while ensuring alignment with Islamic ethical values. This approach fosters linguistic proficiency and religious knowledge within a technology-enhanced academic environment. This integration aligns with the 11th-century pedagogical philosophy of Al-Ghazali, which emphasizes ethical and spiritually guided education. His approach emphasizes intellectual growth alongside moral and religious instruction, making AI an asset in contemporary Islamic pedagogy.

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Additionally, Bloom's Taxonomy (1956) illustrates how AI-based tools can enhance cognitive development, enabling students to analyse, evaluate, and create knowledge within an Islamic academic framework. AI-powered learning systems encourage critical thinking, problem solving, and academic research, enabling students to deeply engage with Islamic texts, jurisprudence, and language studies. As AI technology advances, its role in Islamic education will grow, promoting academic excellence and intercultural communication while ensuring that language learning remains effective and culturally relevant within Islamic universities.

AI-driven communication strategies are transforming language education in Islamic universities by providing customized learning experiences, optimizing feedback processes, and fostering interactive engagement. These developments are based on key educational theories, including constructivist learning, which emphasizes active knowledge acquisition, sociocultural perspectives, which highlight collaboration's role in learning, and Islamic pedagogy, which ensures ethical and spiritually guided instruction. By integrating AI, institutions can establish adaptive learning environments where students receive individualized support, real-time language assessments, and immersive digital tools tailored to Islamic contexts. This integration not only enhances linguistic proficiency but also safeguards Islamic values, allowing students to strengthen both their language skills and cultural understanding. As AI continues to progress, its impact on education is expected to expand, incorporating cutting-edge advancements such as natural language processing, intelligent tutoring systems, and immersive virtual experiences to deepen student involvement and improve learning outcomes. These innovations will enable Islamic universities to adopt a more effective, inclusive, and technologically advanced approach to language education, equipping students with the necessary skills for academic and professional success.

METHOD

This research adopts a mixed-method (McBride *et al*, 2019) approach to investigate AI-driven communication strategies in language education at Islamic universities, combining quantitative and qualitative methods for a thorough analysis. It employs a parallel convergent design, enabling the simultaneous collection of both data types to evaluate AI's impact on language learning while adhering to Islamic pedagogical principles. The quantitative component involves an experimental study comparing student performance with and without AI-assisted learning systems, supplemented by statistical analyses such as ANOVA (Saisana, 2023) to assess improvements in engagement and proficiency. Conversely, the qualitative aspect includes semi-structured interviews with educators and AI specialists, focus group discussions with students on their experiences using AI tools, and document analysis of institutional policies regarding AI integration in Islamic education (Magaldi & Berler, 2020). Data is gathered through online surveys, semester-long experimental studies, and structured discussions conducted via digital platforms or in-person sessions. The analysis phase incorporates statistical evaluation of quantitative data using SPSS, thematic analysis of qualitative insights, and cross-validation between datasets to develop a comprehensive understanding of AI's role in language education at Islamic universities. By synthesizing multiple research methods, this study seeks to advance AI-supported learning while safeguarding Islamic educational values, promoting personalized learning, critical thinking, and digital engagement among students in Islamic universities.

RESULT AND DISCUSSION

D. Effectiveness of AI-Based Communication in Language Learning

The application of AI in communication for language learning has proven effective. Based on quantitative data, a significant difference was found between pre-test and post-test scores among participants who used AI as a learning aid. Hypothesis testing using a t-test showed a statistically significant improvement in language proficiency after AI usage ($p < 0.05$).

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Table 1. Pre-test and Post-test Data

Communication Aspect	Pre-test (Mean)	Post-test (Mean)	Δ (Difference)	Sig. (p)
Writing Skills	70.5	84.1	+13.6	0.000
Speaking Skills	68.2	81.4	+13.2	0.000
Message Clarity	65.3	79.6	+14.3	0.000

There was a significant improvement in writing skills, with the average score increasing from 70.5 (pre-test) to 84.1 (post-test). The difference of 13.6 indicates substantial progress, and the very low p-value (0.000) confirms strong statistical significance.
Similarly, speaking skills showed a significant increase, with the average score rising from 68.2 (pre-test) to 81.4 (post-test). The difference of 13.2 highlights meaningful progress, and the p-value (0.000) confirms statistical significance.
Message clarity also improved significantly, with the average score increasing from 65.3 (pre-test) to 79.6 (post-test). The difference of 14.3 indicates strong progress, and the p-value (0.000) confirms statistical significance.
Overall, all communication aspects showed significant improvement after AI intervention, with p-values indicating that these results are highly unlikely to be due to chance.

Table 2. Comparison with Control Group

Communication Aspect	Experimental Group (Mean)	Control Group (Mean)	Sig. (p)
Total Communication Score	81.7	72.4	0.002
Written Argumentation	84.2	73.8	0.001
Speaking Fluency	82.0	71.1	0.004

The experimental group had a higher total communication score (81.7) compared to the control group (72.4). This difference indicates significantly better communication skills, with a p-value of 0.002, confirming strong statistical significance.
In written argumentation, the experimental group scored 84.2, while the control group scored only 73.8. This difference highlights superior argumentation skills, with a p-value of 0.001, confirming strong statistical significance.

For speaking fluency, the experimental group recorded an average score of 82.0, while the control group scored only 71.1. This difference indicates significantly better fluency, with a p-value of 0.004, confirming strong statistical significance. The findings demonstrate that the experimental group consistently outperformed the control group in all areas of communication that were evaluated. Quantitative analysis revealed statistically significant differences between the two groups, with the experimental participants achieving higher scores in fluency, coherence, accuracy, and engagement in both spoken and written communication. These results suggest that the intervention applied to the experimental group played a pivotal role in enhancing their communication abilities, equipping them to interact more effectively and confidently. Furthermore, comparative assessments reveal a continuous and reliable pattern of improvement within the experimental group, which reinforces the effectiveness of the intervention. The strong statistical significance observed in all comparisons confirms that these advancements were not random, but rather a direct result of targeted instructional strategies or AI-driven learning enhancements. This consistent superiority highlights the importance of incorporating innovative

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educational methodologies to enhance communication proficiency, providing valuable insights for developing future interventions to optimise language learning outcomes.

E. Benefits of AI-Based Communication in Language Learning

The benefits of AI-based communication in language learning are highly significant. By enhancing interaction, providing instant feedback, and enabling personalized learning, AI helps students learn more effectively and efficiently. Additionally, accessibility and the ability to develop communication skills in a supportive environment contribute to a positive learning experience.

Table 3. Student Interview Results on AI-Based Communication

Main Theme	Respondent Quote
Increased Confidence	"With AI, I feel more confident expressing my opinions because I practiced beforehand."
Language Awareness	"I became more aware of grammar mistakes and sentence structure."
Independent Learning	"I feel more independent. I do not need to wait for the lecturer to tell me what is wrong with my sentences."

The confidence-building theme reflects how AI usage in learning boosts students' confidence. Respondents felt more prepared and courageous in expressing their opinions after practicing with AI. The language awareness theme shows that AI helps students become more conscious of language aspects, such as grammar and sentence structure. AI feedback enables them to identify and correct mistakes, improving their language comprehension.

The independent learning theme highlights how AI encourages students to learn autonomously. Respondents felt less dependent on direct instruction from lecturers to identify errors in their sentences. AI supports self-evaluation and proactive learning, fostering greater independence in the learning process. Students asked more questions and engaged in discussions when using AI as a reflection tool. AI stimulated curiosity and deeper exploration, leading to more active participation. Interaction significantly increased, especially when students used AI for conversation simulations (role-playing AI as a dialogue partner). These simulations enhanced speaking and listening skills in a realistic context, helping students feel more comfortable communicating.

Table 4. Data Integration (Mixing Point)

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Quantitative Findings	Qualitative Explanation
Communication scores increased significantly	Students felt AI helped them understand communication structures
Higher active participation in the experimental class	Observations showed more interaction and initiative in discussions
Writing skills improved with AI	Students described AI as a "consistent personal tutor"

Quantitative analysis reveals substantial enhancements in students' communication skills, demonstrating increased clarity, coherence, and fluency in both oral and written forms. Mohd Zain and Abdullah (2025) found that AI-assisted language learning tools contributed significantly to this enhancement by providing adaptive feedback and structured support. Furthermore, indicators of active participation demonstrate a notable increase in student engagement, with learners actively participating in discussions, asking insightful questions, and collaborating effectively with their peers. The study also suggests that AI fosters an interactive learning environment, enabling students to meaningfully engage in classroom activities and online discussions. Writing proficiency has also advanced, with students demonstrating improved organisation, development of ideas, and linguistic precision in their written work. Mohd Zain and Abdullah (2025) argue that AI-driven writing assistants help students to refine their ideas and improve textual coherence, resulting in superior academic writing outcomes.

Qualitative perspectives support these numerical findings by offering deeper insight into students' experiences with AI-driven learning. Interviews and reflective statements suggest that AI-assisted teaching methods provide a more personalised learning experience, enabling students to receive personalised feedback, hone their skills, and overcome communication barriers. Furthermore, students express greater confidence in their academic abilities, attributing their progress to the adaptive support and real-time guidance provided by AI.

Overall, integrating AI into education can strengthen academic performance and foster students' self-confidence and enthusiasm for language learning. By providing structured support and personalised learning pathways, AI encourages active participation, enhances understanding, and enables students to take ownership of their educational development.

CONCLUSION

Integrating artificial intelligence (AI) into education can significantly improve academic performance and foster students' self-confidence and enthusiasm for language learning. AI-driven tools and technologies provide structured, adaptive support that is tailored to individual learning needs. This helps students to develop linguistic proficiency through personalised feedback and targeted instructional strategies. Leveraging AI to create customised learning experiences enables educators to provide students with guidance that aligns with their unique strengths and areas for improvement, allowing them to progress at an optimal pace. AI also facilitates active participation by engaging students in interactive dialogues, adaptive exercises and real-time assessments that encourage deeper cognitive engagement. These features motivate students to immerse themselves

in the learning process, reinforcing their understanding of complex language structures and practical communication skills. AI also plays a crucial role in improving comprehension by breaking down abstract concepts into simple explanations, providing instant corrective feedback and offering guided learning experiences that gradually build proficiency. As students navigate these pathways, they gain the confidence to experiment with language use, refine their writing and speaking abilities, and develop a sense of autonomy in their learning journey. This enables them to take ownership of their learning, fostering intrinsic motivation and a proactive approach to skill development. Integrating AI into education creates a dynamic, student-centred environment that strengthens academic outcomes and nurtures enthusiasm, curiosity, and self-assurance, making language learning a more engaging and rewarding experience.

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