

Utilization of Artificial Intelligence in Islamic Religious Education: A Case Study of Darul Hikmah Islamic Boarding School

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ABSTRACT

The development of information and communication technology (ICT) has brought significant changes in the world of education, especially with the presence of Artificial Intelligence (AI). Intelligence (AI). This study aims to identify opportunities and challenges of implementing AI in Islamic religious education at the Darul Hikmah Kyai Abdan Islamic Boarding School, and to formulate strategies to overcome existing obstacles. The research method used is qualitative with a case study approach and library research, complemented by interviews and observations. The results of the study indicate that AI has great potential in personalizing learning, interactive evaluation, analyzing learning patterns, and increasing the efficiency of Islamic boarding school administration. At the Darul Hikmah Kyai Abdan Islamic Boarding School, AI has been implemented in teaching the Qur'an and hadith , as well as managing administration. However, this implementation faces challenges such as limited technological infrastructure, readiness of teaching staff, financial resources, and lack of AI content relevant to Islamic education. This study recommends solutions such as providing technological infrastructure, training of teaching staff, alternative funding, and developing AI content based on Islamic values. With the right strategy, AI can be optimized to improve the quality of Islamic religious education in Islamic boarding schools.

Keywords: *Artificial Intelligence, Learning, Islamic Religious Education.*

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INTRODUCTION

The rapid development of information and communication technology (ICT) has significantly transformed various sectors, including education. Among the most impactful innovations in this domain is Artificial Intelligence (AI), which refers to computer systems capable of emulating human cognitive functions such as learning, reasoning, and problem-solving. In recent years, AI has emerged as a powerful tool to enhance the quality of education, offering interactive, adaptive, and personalized learning experiences. This is particularly essential in today's digital era, where technology is deeply embedded in students' daily lives (Hermanto et al., 2024).

AI is commonly categorized into three main types: Artificial Narrow Intelligence (ANI), which is designed to perform specific tasks; Artificial General Intelligence (AGI), which aims to replicate human intelligence across a wide range of functions but is still under development; and Artificial Super Intelligence (ASI), a theoretical form of AI that surpasses human cognitive capabilities (Gleneagles et al., 2024). As these technologies continue to evolve, they contribute to making education more inclusive and accessible, providing learners from diverse backgrounds with greater opportunities for academic and personal growth (Ummah et al., 2024).

Islamic boarding schools, or *pondok boarding school*, have long been vital institutions in nurturing morally upright Muslim generations with strong foundations in Islamic teachings.

As technology increasingly permeates all aspects of life, boarding schools are also beginning to explore its integration into religious education. AI, as one of the most advanced and rapidly evolving technologies, offers significant advantages for Islamic learning (Rahman & Aziz, 2020).

The emergence of AI is closely linked to advancements in computing power and machine learning, presenting both opportunities and challenges in educational management, pedagogy, and administration (Oktavian et al., 2023). In the context of Islamic education, the integration of AI is increasingly viewed as a strategic approach to improve learning effectiveness. AI can support interactive content delivery, provide personalized assistance, and optimize data-driven teaching strategies (Munir, 2022). This study explores the implementation of AI at Darul Hikmah Kyai Abdan boarding school, focusing on both its potential and the obstacles to its integration.

As faith-based institutions, boarding school often face difficulties in adapting to rapid technological advancements, continuing to rely heavily on traditional teaching methods such as lectures and rote memorization. While these methods remain effective in certain contexts, they may not adequately address the diverse learning needs of students (Nasir, 2022). AI has the potential to bridge this gap by fostering more adaptive and student-centered learning environments.

One practical application of AI in Islamic education is the use of chatbots to answer questions related to Islamic law and jurisprudence. These systems enable students to access accurate and timely information derived from authoritative religious sources (Syaifudin, 2021). Additionally, technologies such as text-to-speech and speech-to-text are beneficial for Qur'an learning, helping students improve their recitation (tajwid) and pronunciation (makhraj) (Hasan, 2019).

AI also contributes to educational administration by analyzing students' learning patterns, monitoring academic progress, and offering personalized interventions (Zainuddin, 2021). Furthermore, it enhances administrative efficiency in areas such as attendance tracking, scheduling, and digital management of learning materials (Fauzan, 2021).

Despite these benefits, boarding school face several barriers to AI adoption. Major challenges include limited technological infrastructure, insufficient internet connectivity, and the lack of personal digital devices among students and teachers (Ibrahim, 2020). Moreover, low digital literacy among educators poses a significant hurdle to the effective integration of AI into teaching practices (Hidayatullah, 2020).

Ethical considerations also play a vital role in AI integration. The credibility and religious authenticity of AI-generated content must be thoroughly evaluated, as Islamic education is rooted in authoritative and trustworthy sources of knowledge. Thus, it is essential to establish robust oversight mechanisms to ensure that AI systems align with Islamic principles and values (Rahman & Aziz, 2020).

Nevertheless, the potential of AI to enhance the quality of Islamic education in boarding school is undeniable. With strategic planning and thoughtful implementation, boarding school can harness AI to create more engaging, adaptive, and effective learning experiences while upholding their religious traditions (Munir, 2022). This study aims to identify the opportunities and challenges associated with AI implementation at Boarding school Darul Hikmah Kyai Abdan and to formulate actionable strategies for its successful integration.

As an initial step, the study will examine the application of AI in Islamic educational institutions across various countries and evaluate their effectiveness. The insights gained from this analysis will inform the development of contextually relevant recommendations to optimize AI integration in boarding school education (Nasir, 2022).

METHOD

This study employs a qualitative research design using a case study approach complemented by library research (Creswell, 2018). The integration of these two methods

allows for a comprehensive and contextual analysis of the implementation of Artificial Intelligence (AI) in Islamic religious education at Darul Hikmah Kyai Abdan Boarding School.

The library research phase involved a critical review of a wide range of scholarly sources, including books, peer-reviewed journals, and academic articles, to develop an in-depth understanding of AI within the framework of Islamic education. This phase aimed to explore global trends in AI integration, examine previous research findings, and identify the role of AI in key areas such as Qur'anic learning, Islamic jurisprudence (fiqh), and technology-based administrative systems in *boarding school* (Hasan, 2019). This stage provided a robust theoretical foundation for understanding both the development and the challenges of AI implementation in the Islamic educational context (Miles et al., 2014).

The case study approach was employed to investigate the specific application of AI at Darul Hikmah Kyai Abdan Boarding School. It focused on AI utilization in instructional practices, administrative functions, and the dynamics of student-teacher interaction within an AI-integrated learning environment (Denzin & Lincoln, 2011). This approach enabled a nuanced exploration of both the benefits and limitations experienced during the integration of AI in the boarding school context (Munir, 2022).

To gather rich qualitative data, semi-structured interviews were conducted with key informants, including teachers, students, and school administrators. These interviews aimed to elicit their perceptions of the use of AI in Islamic religious education (Braun & Clarke, 2006). The collected insights highlighted perceived advantages, ongoing challenges, and future expectations regarding AI development in the boarding school setting (Syaifudin, 2021). Participants were selected purposively, focusing on individuals with direct experience and in-depth knowledge, particularly leadership and management personnel, to ensure the data captured a broad yet detailed perspective on the impact of AI.

Additionally, non-participant observations were carried out to directly observe the implementation of AI in the teaching and learning processes within Darul Hikmah Kyai Abdan Boarding School (Creswell, 2018). These observations concentrated on the application of AI in Qur'anic instruction, AI-based assessment systems, and student interaction with educational technologies (Hasan, 2019). Observational data also provided insight into the technical and pedagogical challenges encountered and the strategies employed by the institution to address them (Munir, 2022). As a non-participant, the researcher documented phenomena without intervening in the observed activities.

By combining library research, case study analysis, interviews, and observations, this study offers a holistic and in-depth exploration of AI innovation in Islamic religious education at Darul Hikmah Kyai Abdan Boarding School. This multi-method approach not only enriches the theoretical and conceptual understanding of AI but also uncovers its practical application within the boarding school environment (Denzin & Lincoln, 2011).

FINDINGS AND DISCUSSION

Implementation of AI in Islamic Education

Artificial Intelligence (AI) plays a vital role in personalizing learning by collecting and analyzing data related to students' needs, preferences, and individual development. Through such data analysis, AI can tailor learning experiences to align more closely with each student's unique requirements, thereby enhancing the effectiveness of the educational process (Lukman et al., 2023).

In today's rapidly evolving digital era, technology has become an inseparable part of human life. One of the most transformative advancements is Artificial Intelligence, which refers to a machine's ability to perform tasks that typically require human intelligence—such as learning, reasoning, and pattern recognition (Fauziyati, 2023). In the context of Islamic education, AI has witnessed significant development over the past few years, particularly in enhancing the effectiveness and efficiency of the teaching and learning process.

AI tools have made Islamic learning more interactive and personalized. Recent studies have shown that AI can assist students in understanding religious content through dynamic and engaging methods. For example, AI-powered systems have been developed to support Qur'an memorization. These systems utilize voice recognition technology to provide automatic feedback on students' recitations, including tajwid (rules of pronunciation) and *makharijul huruf* (articulation points). This helps improve students' reading accuracy without the need for constant teacher supervision.

Moreover, AI is also employed in chatbot-based question-and-answer systems capable of responding to student inquiries about Islamic studies. These chatbots are equipped with extensive databases covering tafsir (Qur'anic interpretation), Fiqh (Islamic jurisprudence), and hadith (Prophetic traditions), enabling students to access accurate and immediate answers at any time. This not only enhances the learning experience but also supports teachers (*ustadz*) in managing repetitive questions more efficiently (Rubini & Herwinsyah, 2023).

AI technology can also analyze students' learning patterns and recommend suitable teaching methods based on the results. In Islamic boarding schools, this means AI can identify areas where students struggle and automatically provide supplemental materials to strengthen their understanding. Such adaptive learning fosters a more personalized educational environment, allowing each student to progress at their own pace.

Creating engaging and effective lessons is a continual challenge for educators. AI provides an innovative solution by enabling educators to design interactive and enjoyable learning experiences that are easier for students to comprehend (Bakati & Cahyadi, 2024). Beyond academic applications, AI is increasingly used to improve administrative efficiency in Islamic boarding schools. AI-based systems assist in managing student data, such as attendance records, academic grading, and curriculum planning, all of which can now be performed more accurately and efficiently through data-driven insights. In addition, AI platforms can offer interactive learning content such as video lessons, simulations of classical texts, and automated quizzes—resources that are accessible anytime, facilitating continuous learning outside traditional classroom hours.

The integration of AI in Islamic education introduces a more dynamic and modern approach to learning in boarding school environments. However, this transition is not without challenges. Key issues include the availability of technological infrastructure and resistance to change among some educators. Therefore, it is essential for Islamic boarding schools to adopt strategic and thoughtful approaches to AI implementation—ensuring that technological innovation supports, rather than replaces, the spiritual and traditional values that are fundamental to Islamic education.

Case Study: AI Implementation in Darul Hikmah Islamic Boarding School

The rise of digital activities inevitably demands a balance between real life and the digital world. Artificial Intelligence (AI), in this regard, is merely a tool—it can either construct or destruct depending on how it's used (Tahir, 2024). At Darul Hikmah Kyai Abdan Boarding School, AI has started to be implemented to support both academic and administrative activities, particularly in the teaching of the Qur'an and Hadith. The school has adopted automated text-processing technology and AI-based chatbots to support Islamic learning. These chatbots are designed to answer students' questions related to Tafsir, Fiqh, and Aqidah in real-time, drawing from verified and trustworthy sources.

AI is also integrated into administrative systems, managing student data, academic scores, and attendance records with efficiency and accuracy. Teachers benefit from this by being able to access students' information quickly, allowing them to focus more on teaching. In addition, students can access AI-based learning applications that offer content summaries, practice questions, and interactive videos on Islamic studies.

The emergence of AI has brought transformative changes across various fields, including Islamic education. According to Qamariyyah (2023), AI refers to the development of computer systems that mimic human intelligence and behavior. Interviews with teachers

at the boarding school reveal that AI has helped reduce their administrative workload, allowing them to devote more energy to instruction. Automated systems for grading and attendance tracking eliminate the need for time-consuming manual input. However, observations indicate that AI implementation at the school is still in its early stages. Some classrooms continue to rely entirely on traditional teaching methods, and many teachers are still unfamiliar with how to integrate AI into their teaching practices. Thus, continuous training and mentoring are necessary for optimal adoption.

The wave of digital transformation has reshaped many aspects of life, including education. Students are now required to adapt to different learning styles, using technology to understand and practice religious values in more interactive and innovative ways (Ayatillah et al., 2024). AI also supports memorization evaluation by analyzing Qur'anic text and providing automated feedback on interpretation. This allows for more objective and accurate evaluations compared to conventional methods.

AI's impressive capabilities significantly enhance learning efficiency and productivity. It should serve as motivation for individuals to improve their work ethic and embrace innovation (Tahir, 2024). From an administrative perspective, AI also aids in optimizing human resource management. With data-driven analysis, the boarding school can better allocate resources—be it in curriculum planning, staff deployment, or learning facilities.

Two main approaches can be applied in integrating AI into the learning process. The first involves transitioning tasks traditionally handled by teachers to intelligent systems that function as personalized tutors. This allows for tailored content delivery, enabling each student to learn according to their pace and capabilities. Smart tutoring systems are now widely used in various classrooms, enhancing the effectiveness and efficiency of learning (Fauziyati, 2023).

Nevertheless, challenges remain. One key issue is limited access to compatible digital devices. Not all students possess the technology required to benefit from AI-based platforms. Therefore, the school must find equitable solutions to ensure inclusive access for all students. Additionally, resistance from some educators who are accustomed to traditional methods remains a barrier. Targeted training programs are necessary to help them understand and maximize the potential of AI in education.

Traditional learning systems often fall short in today's tech-driven world, especially when innovation and creativity are vital. Many teachers still rely on monotonous, lecture-based instruction, making them the sole source of knowledge. This approach is a significant hurdle in Islamic education, which should embrace innovation for more engaging and effective learning (Bakati & Cahyadi, 2024). Despite the challenges, the AI implementation at Darul Hikmah Kyai Abdan Boarding School has already shown positive outcomes. Students are more motivated to learn through interactive methods and have greater opportunities to study independently and revisit materials based on their individual needs.

In addition to academic improvements, AI also contributes to enhanced security on campus. AI-powered monitoring systems help supervise boarding school activities, promoting order and safety among students. AI's presence in education fosters personalized learning experiences and improves teacher-student interactions. Through advanced data analytics, lesson schedules can be optimized to avoid conflicts and ensure effective time management.

Overall, while AI implementation at Darul Hikmah Kyai Abdan Boarding School is still developing, it has demonstrated promising results. To achieve optimal outcomes, strategic steps must be taken, such as strengthening the technological infrastructure, providing comprehensive teacher training, and ensuring equitable access for all students.

AI, as a product of advanced scientific innovation, reflects the clear distinction between those who possess knowledge and those who do not. Knowledge equips individuals with the wisdom to face challenges and use technology responsibly (Tahir, 2024). At Darul Hikmah Kyai Abdan Boarding School, AI has positively impacted both students and educators. It has simplified access to Islamic materials, enhanced comprehension through adaptive learning systems, and improved administrative efficiency. Yet, challenges remain,

and addressing them will be key to expanding the benefits of AI throughout the entire educational environment.

Challenge in Implementation of AI in Islamic Boarding Schools

The integration of Artificial Intelligence (AI) into Islamic Religious Education (PAI) at Darul Hikmah Kyai Abdan Boarding School has the potential to transform traditional learning methods. However, several significant challenges hinder its optimal implementation. These challenges span technological infrastructure, teacher readiness, financial limitations, and the lack of contextually relevant AI content.

Limited Technological Infrastructure

One of the primary obstacles in implementing AI-based learning at Darul Hikmah Kyai Abdan is the inadequacy of technological infrastructure. Many classrooms are not equipped with the necessary tools and devices to support AI-driven education. Additionally, a number of students face difficulties in accessing personal digital devices, such as laptops or smartphones, which are essential for utilizing AI learning applications effectively. According to Ayatillah et al. (2024), low digital literacy among teachers and insufficient infrastructure are among the most common barriers to AI adoption in Islamic education. Without adequate facilities, the integration of AI into learning processes remains limited and uneven.

Readiness of Teaching Staff

The readiness of educators to adopt AI is another critical issue. Many teachers are accustomed to conventional teaching methods and often find it difficult to adapt to new technologies. A lack of understanding about how AI works and its potential benefits in Islamic education contributes to resistance among some educators. As a result, they are hesitant to transition to AI-based learning systems. To address this, comprehensive and ongoing training programs are essential. Teachers must be equipped with the necessary skills and mindset to utilize AI tools effectively, ensuring that the integration of technology enhances rather than disrupts the educational experience.

Financial Constraints

Financial limitations also pose a major challenge. The procurement of AI-compatible hardware, development of AI-based software, and the provision of professional development programs for teachers require significant investment. Islamic boarding schools, which often rely on donations or student contributions, may struggle to allocate sufficient funds for technological innovation. Without strong financial support, scaling AI implementation sustainably and effectively becomes a daunting task.

Furthermore, cultural barriers and public perception also play a role. Some community members, including school caretakers and parents, remain skeptical about the effectiveness of AI in religious education. Traditional Islamic learning has thrived for centuries without the use of modern technology, leading some to believe that conventional teaching methods are more effective in instilling Islamic values compared to AI-driven approaches.

Lack of AI Content Relevant to Islamic Education

Another significant challenge is the lack of AI content specifically tailored for Islamic studies. Most current AI systems are designed for general education subjects, such as science and mathematics, with limited availability of AI-based content focused on Islamic teachings. This mismatch creates a gap in curriculum integration and reduces the relevance of AI tools in Islamic learning environments.

To address this issue, collaboration is needed between Islamic scholars, educators, and technology developers to create AI systems that align with the needs and values of Islamic boarding schools. Developing AI content that reflects Islamic traditions and teachings is crucial for ensuring that AI enhances rather than dilutes the spiritual and moral objectives of religious education.

Solutions and Recommendations

To respond to the various challenges in integrating Artificial Intelligence (AI) into Islamic Religious Education at Islamic boarding schools such as Darul Hikmah Kyai Abdan,

a series of strategic solutions must be implemented. These efforts aim to optimize the use of AI in education and ensure it becomes a well-accepted and effective tool for enhancing students' learning experiences. With the right strategies in place, AI can be better utilized to improve the quality and accessibility of Islamic education.

Provision of Technological Infrastructure

One of the fundamental steps to overcoming infrastructural barriers is to establish collaborative partnerships with both governmental bodies and private sectors. Support in the form of computer devices, stable internet connectivity, and access to AI-based learning applications will significantly enhance the technological readiness of boarding schools. By ensuring equitable access to digital tools for all students and teaching staff, these institutions can create a more conducive environment for AI-supported education.

Teacher Training and Capacity Building

Enhancing the competencies of teaching staff is critical in the successful adoption of AI. Islamic boarding schools must organize regular and structured training programs that involve both technology experts and experienced educators. These programs should aim to deepen teachers' understanding of how AI functions and how it can be effectively integrated into Islamic religious instruction. With improved technological literacy and confidence, teachers will be more capable of utilizing AI to enrich the learning process.

Exploring Alternative Funding Sources

To address financial limitations, Islamic boarding schools are encouraged to explore alternative funding options. This can include applying for educational grants, participating in Corporate Social Responsibility (CSR) programs from technology companies, and initiating community-based crowdfunding campaigns. Through effective financial planning and resource management, the funds raised can be allocated towards the development of AI systems, teacher training, and the improvement of digital infrastructure.

Development of AI Content Aligned with Islamic Values

The successful implementation of AI in Islamic education also hinges on the development of AI content that aligns with Islamic principles and teachings. Most existing AI systems are designed for general education subjects, with limited focus on religious content. Therefore, it is essential to foster collaboration among Islamic scholars, educators, and technology developers to create AI-driven educational tools that are specifically tailored for Islamic studies. Such tools should maintain religious authenticity while leveraging modern technology to facilitate engaging and meaningful learning experiences.

Public Engagement and Socialization

Building public trust and acceptance of AI in religious education is equally important. Islamic boarding schools can host seminars, workshops, and community discussion forums involving students, parents, and caregivers. These platforms provide opportunities for open dialogue, allowing the community to better understand the role and benefits of AI in enhancing Islamic education. Transparent communication and continuous education efforts can gradually shift public perception towards a more positive and supportive stance.

Overall, the integration of AI in Indonesia's education sector holds great promise for increasing the efficiency and effectiveness of learning. However, its success depends on the ability to address challenges such as technological gaps, financial constraints, and ethical concerns. With the right approaches and strong collaboration among key stakeholders—including educators, religious leaders, government, and technology developers—AI can serve as a powerful tool in advancing Islamic education in Indonesia (Sihaloho & Napitupulu, 2024). By investing in infrastructure, empowering educators, and developing culturally relevant content, Islamic boarding schools can lead the way in harmonizing tradition with innovation—preserving religious values while embracing the future of digital learning.

CONCLUSION

This study highlights that the implementation of Artificial Intelligence (AI) in Islamic Religious Education at Darul Hikmah Kyai Abdan Islamic Boarding School holds great potential to enhance the quality of learning by enabling personalized instruction, interactive assessment, learning pattern analysis, and efficient administrative management. Early applications at the school include the use of AI-powered chatbots for answering religious questions, systems for Qur'an memorization evaluation, and digital management of student data. However, this integration faces significant challenges, including limited technological infrastructure, low teacher readiness, financial constraints, and a lack of AI content specifically aligned with Islamic teachings. To overcome these barriers, the study recommends several strategic solutions: building adequate technological infrastructure through collaboration with the government and private sector; conducting regular teacher training to strengthen digital competencies; exploring alternative funding sources such as educational grants and CSR programs; developing AI content grounded in Islamic values through partnerships between scholars, educators, and technologists; and conducting active public outreach to build trust and understanding of AI in religious education. With the implementation of these approaches, AI can be optimized to provide more adaptive, engaging, and effective Islamic education while preserving its traditional values.

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