

ARTIFICIAL INTELLIGENCE IN ISLAMIC EDUCATION: Opportunities and Challenges in the Digital Era

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Received: 12-03-2025; Revised: 23-04-2025; Accepted: 26-05-2025; Published regularly: June 2025

Abstract: This article examines the application of artificial intelligence (AI) in Islamic education as a response to the challenges and opportunities presented by the digital era. Using a qualitative library research method, the study explores literature related to the integration of technology within Islamic educational systems. AI is considered capable of improving educational quality through personalized learning approaches, technology-based curriculum development, and enhanced administrative efficiency. In this context, AI can enrich the learning experience by supporting interactive, flexible, and student-centered education. However, the implementation of AI also faces various challenges, including infrastructure limitations, insufficient teacher training, and ethical issues such as the protection of students' personal data. The study finds that the integration of AI into Islamic education in Indonesia has already begun in several institutions, although its adoption remains uneven. Therefore, supportive policies, targeted training programs, and cross-sector collaboration among government bodies, educational institutions, and technology developers are essential. In conclusion, AI holds significant potential to improve the effectiveness of Islamic education, but its implementation must be approached with caution to ensure alignment with Islamic moral and ethical values. This article provides strategic recommendations to encourage the ethical, adaptive, and sustainable use of AI in the Islamic education ecosystem.

Keywords: artificial intelligence; Islamic education; Islamic values; technology integration; digital era

Abstrak: Artikel ini mengkaji penerapan kecerdasan buatan (artificial intelligence/AI) dalam pendidikan Islam sebagai respons terhadap tantangan dan peluang di era digital. Penelitian ini menggunakan metode studi pustaka kualitatif dengan menelaah literatur yang membahas integrasi teknologi dalam sistem pendidikan Islam. AI dinilai mampu meningkatkan kualitas pembelajaran melalui pendekatan yang dipersonalisasi, pengembangan kurikulum berbasis teknologi, serta efisiensi dalam manajemen pendidikan. Dalam konteks ini, AI dapat memperkaya proses pembelajaran yang interaktif, fleksibel, dan sesuai dengan karakteristik peserta didik. Namun, implementasi AI juga menghadapi berbagai tantangan, seperti keterbatasan infrastruktur, minimnya pelatihan bagi pendidik, serta isu etika dan perlindungan data pribadi peserta didik. Studi ini menemukan bahwa integrasi AI dalam pendidikan Islam di Indonesia telah dimulai di sejumlah lembaga pendidikan, namun penerapannya masih belum merata. Oleh karena itu, dibutuhkan kebijakan yang mendukung, program pelatihan, serta kolaborasi lintas sektor antara pemerintah, institusi pendidikan, dan pengembang teknologi. Kesimpulannya, AI memiliki potensi besar dalam meningkatkan efektivitas pendidikan Islam, namun implementasinya harus dilakukan secara bijak agar tetap sejalan dengan nilai-nilai moral dan etika Islam. Artikel ini menawarkan rekomendasi strategis guna mendorong pemanfaatan AI secara etis, adaptif, dan berkelanjutan dalam ekosistem pendidikan Islam.

Kata kunci: kecerdasan buatan; pendidikan Islam; nilai-nilai Islam; integrasi teknologi; era digital

Introduction

Islamic Education is one of the main pillars in building a civilization of the people based on religious values. Along with the development of the era and the rapid advancement of technology, Islamic education is faced with major challenges to adapt to these changes, one of which is through the use of artificial intelligence (AI) in the education system. In the increasingly advanced digital era, AI offers opportunities to increase the effectiveness and efficiency of the learning process, both at the elementary, secondary, and tertiary levels. Therefore, it is important to understand how AI can be applied in the context of Islamic education, as well as to identify the opportunities and challenges that may arise.

Artificial intelligence (AI) in education can refer to the use of technology that mimics human thinking abilities, such as in data processing, student behavior analysis, or learning personalization. In Islamic education, AI has great potential to support teaching, both in terms of morals, religious understanding, and social and intellectual skills. For example, AI systems can be used to analyze students' learning styles, provide learning recommendations that are tailored to individual needs, and provide a more interactive and effective online learning platform. This technology can also support the development of a curriculum based on Islamic values by using a digital platform that combines religious knowledge and worldly skills.

However, despite the many opportunities, the application of AI in Islamic education also faces a number of challenges. One of them is the limitation in adequate infrastructure and human resources. In the Indonesian context, for example, a number of Islamic boarding schools and schools still have difficulty in accessing adequate technology, as well as the limited number of educators trained in the use of advanced technology. In addition, the application of AI must also be accompanied by attention to ethical issues, such as the protection of personal data and student privacy, which are becoming increasingly important in the ever-evolving digital world.

A case study in Indonesia that can be used as a reference is the application of AI in several Islamic universities that have begun to integrate this technology into the learning process. For example, the State Islamic University (UIN) in Jakarta has begun implementing an AI-based learning platform to facilitate distance learning (PJJ). However, the success of this implementation still depends on the readiness of the infrastructure and the academic readiness of lecturers and students in utilizing this technology optimally.

This study aims to examine in more depth how artificial intelligence can provide opportunities for Islamic education, as well as the challenges that must be faced to optimize its use in Indonesia.

Method

The type of research used to collect data is library research. Library research is a type of research that is carried out by reading books or magazines and other data sources to collect data from various literature, both libraries and other places.¹ According to Mestika Zed, literature study is a series of activities related to methods of collecting library data, reading and recording and processing research materials.² From the explanation above, it can be understood that library research is not only reading and recording the data that has been collected. But more than that, researchers must be able to process the data that has been collected with the stages of library research.

The author chose library research, because data collection in this study is qualitative and also in this study does not intend to test the hypothesis, in the sense of only describing and critically analyzing a problem that the author studies, namely Artificial Intelligence in Islamic Education: Opportunities and Challenges in the Digitalization Era. Thus the

¹ Geneva R. Johnson, *Educational Research Methods, Physical Therapy*, vol. 52 (Bandung: CV Pustaka Setia, 1972), <https://doi.org/10.1093/ptj/52.5.603>. Hamid Darmadi, "Educational Research Methods," *Bandung: Alfabeta*, (2011).

² Mestika Zed, *Metode Penelitian Kepustakaan* (Yayasan Pustaka Obor Indonesia, 2008).

discussion in this study is based on a literature review of books related to Artificial Intelligence in Islamic Education and several writings that are relevant to the object of study in this study.

The data collection method used in this study is the documentation method, namely searching for data related to Artificial Intelligence in Islamic Education and Opportunities and Challenges in the Digitalization Era using primary data sources and secondary data.³ Because it is a literature study, the data collection is a review and studies of literature in the form of verbal data in the form of words, not numbers. So that the discussion is editing, reducing, presenting, and then analyzing.⁴ The emphasis in this study is to find various principles, theories, opinions and ideas about Artificial Intelligence in Islamic Education which are then understood as materials for analyzing and solving the problems studied. The analysis method used to reveal ideas and thoughts is the analytical descriptive method. Literature research is used to solve conceptual-theoretical research problems. So the main instrument in this study is the researcher himself,⁵ the researcher must be able to reveal and explain Artificial Intelligence in Islamic Education and Opportunities and Challenges in the Digitalization Era well.

Results and Discussion

The Concept of Artificial Intelligence in Islamic Education

Artificial Intelligence is a branch of computer science that focuses on developing systems capable of performing tasks that normally require human intelligence, such as pattern recognition, decision-making, problem solving, and natural language processing. In the context of Islamic education, AI can be used to enhance students' learning

experiences, optimize teaching performance, and provide more efficient personalized learning solutions. Various applications of AI in education include intelligent tutoring systems, data analysis for curriculum adjustment, and the use of chatbots for independent learning.

In the context of Islamic education, AI is not only a learning tool, but also a means that can accelerate the spread of religious knowledge more efficiently, data-based, and personally.

AI can be used to adapt open materials according to the needs and abilities of students. For example, AI-based applications can provide explanations of the Quran, Hadith, or fiqh according to the level of understanding of each individual. This allows for more effective learning and focuses on the strengths and weaknesses of each student.

The Role of Artificial Intelligence in Education

1. Personalization of Learning

One of the main benefits of AI in education is its ability to personalize the learning experience of students. AI-based systems can collect and analyze data on each student's abilities, learning speed, and preferences, allowing for the creation of a customized curriculum. For example, applications such as Khan Academy and Duolingo use algorithms to customize learning materials based on level of understanding.⁶

2. Intelligent Learning Systems

Intelligent learning is an approach where AI is used to provide feedback and assessment automatically. This system not only facilitates students to learn more independently, but also allows teachers to pay more attention to students who need it. For example, platforms such as Edmodo and Google Classroom utilize AI to analyze student engagement and provide relevant feedback in real time.⁷

³ Suharsimi Arikunto, "Research Procedures A Practical Approach Research: A Practical Approach," *Jurnal Universitas Udayana*. ISSN, 2013.

⁴ N Muhadjir, "Neong Muhadjir," *Qualitative Research Methods*, (2020), 60.

⁵ M Amin Abdullah and D Abdurahman, "Metodologi Penelitian Agama: Pendekatan Multidisipliner," *Yogyakarta: Lembaga Penelitian UIN Sunan Kalijaga*, (2006).

⁶ N Heffernan and C Heffernan, "The Learning Accelerator: Personalizing Education Using Artificial Intelligence," *Educational Technology* 45, no. 2 (2014).

⁷ D Koller, "Learning at Scale: The Role of AI in Online Education," *Education Technology* 72, no. 3 (2013.): 69-75.

3. Improving Accessibility of Education

AI also plays a role in expanding the accessibility of education. With technologies such as speech-to-text and text-to-speech, AI helps students with physical or cognitive disabilities to more easily access learning materials. For example, the University of Indonesia has implemented an AI-based application to support accessibility for students with disabilities.⁸

4. Improving the Efficiency of Educational Administration

AI also plays a role in simplifying and accelerating administrative processes in schools or universities. Learning management systems that use AI can automate the process of scheduling, grading, and processing academic data, allowing educators to focus more on teaching. This can improve the overall efficiency of the existing education system.

5. AI Application in Islamic Education Learning

In an effort to understand and apply *fiqh* - which is a basic understanding of Islamic law - in a modern context, where the need to utilize sophisticated technology such as ChatGPT is included in learning activities is a necessity. So that in modern learning *fiqh* and ChatGPT can be more dynamic. Students can interact directly with the system to get broader explanations and information on certain topics, conduct simulation discussions, or even carry out role-playing regarding certain legal situations. ChatGPT can also be a reliable source of additional information outside of textbooks and classical *fiqh* literature. This is certainly useful for answering contemporary questions that may not be explained in detail in classical literature. In addition, with a modern approach like this, it is possible that *fiqh* and ChatGPT can also be integrated with other sources, such as hadith, tafsir, and other *fiqh* literature. Thus allowing users to refer directly to

⁸ D Suryadi, "AI for Accessibility in Higher Education in Indonesia," *Indonesian Journal of Educational Technology* 10, no. 2 (2020.): 103

primary sources when discussing *fiqh* issues in a short time.⁹

The integration of Islamic Education Learning and ChatGPT offers a great opportunity to enrich learning and deepen students' understanding of Islamic education. However, this integration must be done carefully, ensuring that technology supports, not replaces, traditional and critical approaches to Islamic studies. Another thing that is no less important is how to ensure that the answers given by ChatGPT are always in accordance with the principles and correct understanding of Islam. Therefore, training the model with accurate and relevant data is very important. And the role of mentoring and supervision from scholars in this process needs to be carried out to ensure that AI does not deviate from the correct teachings

Opportunities for Artificial Intelligence in Islamic Education

1. Personalized Learning

One of the main advantages of AI in education is its ability to provide personalized learning. Using sophisticated algorithms, AI can assess each student's abilities, needs, and learning style, then suggest materials that are appropriate for them.¹⁰ In Islamic education, this can mean more effective religious learning, where Islamic teaching materials are tailored to the student's level of understanding and interests.

For example, in studying the Quran, AI can help students by providing more in-depth explanations of Islamic interpretation, *fiqh*, or history based on their level of understanding. This technology also allows for the creation of automated exams or quizzes that can assess students' understanding in real-time.

⁹ Muhamad Tisna Nugraha, Moch Riza Fahmi, and Imam Agung Prakoso, "Integrasi Tradisi Dan Teknologi Dalam Pembelajaran Fiqh Dengan Pemanfaatan Chatgpt," *Innovative: Journal Of Social Science Research* 3, no. 6 (2023): 4486-95.

¹⁰ Wenting Ma et al., "Intelligent Tutoring Systems and Learning Outcomes: A Meta-Analysis.," *Journal of Educational Psychology* 106, no. 4 (2014): 901.

However, while AI technology promises deeper personalization, a major challenge in its implementation is the readiness of technological infrastructure in madrasahs and Islamic boarding schools. In many areas, especially in rural areas, access to hardware, stable internet, and training for teachers are still major obstacles. In addition, there are still concerns about how AI can handle the nuances and religious contexts that are so important in Islamic education, which require a deep understanding that machines sometimes cannot fully grasp.

2. Technology-Based Curriculum Development

AI can also play a role in developing a more effective and relevant curriculum. The Islamic education curriculum can be adjusted and updated automatically based on the latest developments in Islamic studies and technology. For example, AI can help analyze data from various sources to design learning modules that cover topics such as contemporary fiqh, Islamic economics, or science in Islam, which are relevant to the needs of the modern world.¹¹

A major challenge in developing an AI-based curriculum is the resistance from most Islamic educational institutions that tend to maintain traditional methods. Madrasahs and Islamic boarding schools are often tied to established curricula and may struggle to adapt to the rapid changes brought about by technology. There is also the issue of understanding and training religious teachers who may not yet be skilled in utilizing advanced technology.

3. Improving Teaching and Learning in Madrasah

In Indonesia, many madrasahs have begun to adopt technology to support the teaching and

¹¹ Ahmad Atho'ul Karim, "Integration of AI Tools in Islamic Education Curriculum Development Management: Challenges and Opportunities," Available at SSRN 5044475, 2024. See. J Gusfield and M Ibrahim, "Artificial Intelligence and Education: Building an Islamic Curriculum," *Journal of Islamic Education Studies* 8, no. 3 (2021): 101-115.

learning process. One example of the application of AI is the use of AI-based chatbots to help answer students' questions about the subject matter. In some madrasahs, AI can be used to provide interactive distance learning, allowing students in remote areas to access high-quality Islamic education materials.¹²

Despite the promising applications of this technology, many madrasahs and Islamic boarding schools still face issues of accessibility and digital divide. Limited internet infrastructure, limited devices, and lack of training for teachers on how to make the most of this technology are significant barriers. In addition, it is important to ensure that AI technology used in Islamic education maintains Islamic beliefs and values, and does not replace the role of teachers altogether.

4. More Effective Arabic Language Learning

Arabic as the language of instruction in many Islamic lessons is often an obstacle for students who are not fluent in Arabic. AI can be used to develop Arabic language learning applications that can help students understand the language more quickly and effectively. For example, an AI application that uses speech recognition can help students learn to read and pronounce Arabic letters correctly, while automatically correcting pronunciation errors.¹³

However, the challenge in learning Arabic through technology is the dependence on devices and stable internet. In many areas, not all students have adequate access to use these applications effectively. In addition, while technology can help students with pronunciation, no technology can replace the cultural and religious context that must be understood in learning Arabic in an Islamic context.

¹² Sedyanta Santosa and Muhammad Fahmi Jazuli, "The Digital Madrasah as an Idea of IT-Based Islamic Education," *Nazhruna: Jurnal Pendidikan Islam* 5, no. 2 (2022): 379-91. See. A Rahman, "Digital Learning in Islamic Education: The Case of Madrasah in Indonesia," *Jurnal Pendidikan Islam* 6, no. 1 (2020): 65-79

¹³ Adawiya Hayyawi Doohee, "The Contribution of Artificial Intelligence to Learning the Arabic Language," *European Journal of Language and Culture Studies* 3, no. 3 (2024): 17-23. See. M Bali, "Artificial Intelligence in Language Learning: A Case Study of Arabic," *Journal of Educational Technology* 10, no. 2 (2021): 45-58

Challenges of Implementing Artificial Intelligence in Islamic Education

1. Integrating Artificial Intelligence with Islamic Values

One of the main challenges faced in implementing artificial intelligence in Islamic education is how to integrate this technology with Islamic values. Islamic education does not only focus on mastering knowledge, but also on forming good character and morals. Therefore, the application of artificial intelligence in Islamic education must be in line with the main goal of Islamic education, namely to produce individuals who are not only intellectually intelligent, but also have noble character.

For example, in the context of learning the Qur'an or hadith, artificial intelligence must be programmed to understand and adapt learning materials to the Islamic context, considering the existence of principles such as manners, morals, and ethics that must be considered in the educational process. In this case, technology must be designed with Islamic values in mind so as not to conflict with Islamic teachings that promote high morality and good behavior.

2. Dependence on Technology

Although artificial intelligence offers many conveniences, dependence on technology can be a problem in Islamic education. Dependence on technology can also reduce direct interaction between teachers and students, which is an important element in Islamic education. In Islamic education, the relationship between teachers and students is very important to form a sense of respect, affection, and responsibility. Excessive dependence on artificial intelligence can reduce the quality of this relationship, which in turn can hinder the process of forming good character in students. So in addition to teachers having to be adaptive to the development of the times, teachers must also have a conservative attitude in educating, teachers should not be too dependent on technology, not all problems can be solved by artificial intelligence.¹⁴

¹⁴ Arizqi Ihsan Pratama, "Inovatif Dan Konservatif Dalam

3. Limited Access and Infrastructure in Indonesia

In Indonesia, the implementation of artificial intelligence in Islamic education also faces challenges related to access and infrastructure. Although some schools or madrasahs have begun to adopt technology in learning, most Islamic educational institutions in the regions still lack adequate hardware and software. In addition, many students do not have adequate access to the internet and digital devices, which prevents them from utilizing advanced technologies such as artificial intelligence.

A case study that can illustrate this challenge is the implementation of technology at Madrasah Aliyah Negeri (MAN) 2 Surakarta City. Although this school has several digital facilities for distance learning, many students have difficulty accessing online learning materials due to limited internet access at home.¹⁵ This shows that uneven infrastructure can exacerbate inequality in the application of technology in Islamic education in Indonesia.

4. Lack of Teacher Training in the Use of Artificial Intelligence

In addition to infrastructure challenges, the human factor is also a major obstacle in the application of artificial intelligence in Islamic education. Many teachers in Indonesia, especially those teaching in madrasahs or Islamic-based schools, do not yet have adequate skills in using advanced technologies such as artificial intelligence. Without adequate training, teachers cannot optimally utilize this technology in the learning process. In various research results and writings, indicated that around 70 to 90% of teachers are considered to be technologically illiterate in utilizing

Menghadapi Era 4.0," in *The Annual Conference on Islamic Education and Social Science*, vol. 1, (2019), 23–33.

¹⁵ Miratu Khasanah, "Tantangan Penerapan Teknologi Digital Dalam Pendidikan Islam: Memanfaatkan Inovasi Untuk Meningkatkan Mutu Pembelajaran," *Leader: Jurnal Manajemen Pendidikan Islam* 2, no. 2 (2024): 282–89. Muhammad Imam Khosyirin and Moch Yazidul Khoiri, "Penerapan Teknologi Digital Dalam Meningkatkan Efektivitas Pembelajaran Pada Pendidikan Islam," *Sasana: Jurnal Pendidikan Agama Islam* 3, no. 1 (2024): 137–42.

advances in ICT in the learning process and other activities.¹⁶ Meanwhile, according to the Center for Information and Communication Technology (Pustekom) of the Ministry of Education and Culture (Kemendikbud), only 40 percent of non-information and communication technology (ICT) teachers are ready with technology.¹⁷

For example, in some areas, teachers in madrasahs still rely on traditional learning methods and do not fully understand how to integrate artificial intelligence into learning. This shows the importance of efforts to provide training and skills improvement for educators so that they can use this technology effectively and in accordance with the principles of Islamic education.

5. Ethical and Data Security Issues

Ethical and data security issues are also major challenges in the implementation of artificial intelligence in Islamic education. In the AI-based learning process, students' personal data, including academic data, behavior, and even psychological data, are collected and analyzed by the system. This raises concerns about the privacy and protection of students' personal data.

It is important to ensure that the use of artificial intelligence in Islamic education is carried out by paying attention to ethical aspects and the protection of personal data. In this context, Islamic law that regulates the protection of individual rights, such as the right to privacy, can be used as a basis for designing policies for the use of artificial intelligence that are safe and in accordance with Islamic teachings.

Implementation of AI in Islamic Education in Indonesia

In Indonesia, Islamic education has a very important role in shaping the character and morals of society. Islamic education does not only talk

about religious teachings, but also covers various aspects of life that can be guided through a good and correct Islamic approach. With the development of technology, AI is now starting to be applied in Islamic education in Indonesia to support and improve the existing system.

1. AI Application in Islamic Religious Subject Learning

One of the applications of AI in Islamic education is through an adaptive learning system that can adjust teaching materials according to students' abilities. One area that has attracted special attention is the use of AI for learning the Quran and Arabic. AI-based Tahfidz (the Quran memorization) applications are increasingly popular. These applications use Speech Recognition technology to listen to students' readings, detect tajweed errors (*makharijul huruf, ghunnah, mad*, etc.) in real-time, and provide instant feedback and accuracy scores. Likewise, AI translator tools and Arabic conversation chatbots help students practice independently. NLP (Natural Language Processing) is also used to analyze classical Islamic texts (*turats*) or assist in research at PTKI, although its application still requires strict expert supervision due to the complexity and sensitivity of interpretation.¹⁸

2. Improving Teaching in Madrasahs and Islamic Boarding Schools

Several Islamic boarding schools and madrasahs in Indonesia have begun to adopt AI technology to improve the quality of teaching. The application of artificial intelligence-based technology such as Turnitin, Scribo AI, and ChatGPT in the assessment of Islamic Religious Education (PAI) learning has a significant impact on improving the quality of evaluation. Turnitin is effective in detecting plagiarism and maintaining academic integrity, Scribo AI is able to provide automatic feedback that helps improve grammar and writing structure, while ChatGPT is

¹⁶ D Darmawan, *Information and Communication Technology Education* (Bandung: Remaja Rosdakarya, 2013.).

¹⁷ <https://gtk.dikdasmen.go.id/read-news/40-persen-guru-yang-siap-dengan-teknologi>

¹⁸ Mohammad Adnan, "Islamic Education and Character Building in the 4.0 Industrial Revolution," *Nazhruna: Jurnal Pendidikan Islam* 5, no. 1 (2022): 11–21.

an interactive assistant that supports a deeper understanding of the material.¹⁹

3. AI-Based Education Management System

In addition to the direct teaching process, AI can also be applied in the Islamic education management system. For example, student data management, attendance, exams, and assessments integrated into one AI-based system can make it easier for schools or Islamic boarding schools to make more precise and faster decisions. This system can also be used to analyze students' academic tendencies, helping teachers or ustaz in designing better and more relevant curriculum.

AI-based Islamic education management in the digital era is an inevitability that offers tremendous potential to increase efficiency, personalization, and effectiveness, but must be carried out with wisdom, caution, and a firm commitment to the basic values of Islam.²⁰

Case Study: Implementation of AI in Islamic Boarding School (*Pesantren*)

One of the Islamic boarding schools that has implemented AI is the Darul Ma'arif Islamic Boarding School. The implementation of AI and VR at the Darul Ma'arif Islamic Boarding School, Rejang Lebong, can be an example of how Islamic boarding schools can adapt to technological developments without neglecting the traditional values they uphold. This project can also inspire other Islamic boarding schools in Indonesia to explore the use of technology in their education.²¹

On the other hand, in terms of administration, this Islamic boarding school uses an AI-based system

to manage student data, attendance, and exams efficiently. This system helps the management of the Islamic boarding school to make decisions more quickly and accurately, and reduces human error in recording data.

Darussalam Blokagung Banyuwangi Islamic Boarding School has also integrated AI into its learning system. Darussalam Blokagung Banyuwangi Islamic Boarding School has proven itself as an Islamic educational institution that is adaptive to the development of digital technology. Through the integration of technology in the learning process, this Islamic boarding school has succeeded in creating a more inclusive and responsive educational environment to the challenges of the digital era. The application of digital technology, such as multimedia devices and online learning platforms, has increased the accessibility and quality of education in Islamic boarding schools. In addition, the use of social media as a means of disseminating information and preaching expands the reach of Islamic boarding schools, making them more relevant in modern society. This innovative step also includes the use of artificial intelligence (AI) technology to support a more comprehensive digital transformation. With this approach, Islamic boarding schools not only strengthen the basis of religious education, but also equip students with digital skills that are relevant for the future.²²

However, the use of this technology also faces challenges, especially in terms of teacher training and data management. Teachers in Islamic boarding schools must be trained to understand and use this technology properly in order to maximize the potential of AI without reducing the essence of learning based on Islamic values.

Conclusion

This article highlights the application of Artificial Intelligence (AI) in Islamic education in Indonesia, focusing on the opportunities and

¹⁹ Aenullael Mukarromah, Mujiburrahman Nur, and Ali Salim Banqitoh, "Strategy of Islamic Boarding School-Based in Facing the Era of Revolution 4.0 towards the Era of Society 5.0," *At-Ta'lim: Jurnal Pendidikan* 10, no. 2 (2024): 234-44.

²⁰ Firmansyah Kobandaha, "Islamic Education Based on Artificial Intelligence in the Digital Era A," *Literature Review Journal of Artificial Intelligence and Digital Business (RIGGS)* 4, no. 1 (2024).

²¹ Ari Yanto, "Implementation of AI and VR at Darul Ma'arif Islamic Boarding School, Rejang Lebong," *Journal of Education* (2024).

²² Khasanah, "Tantangan Penerapan Teknologi Digital Dalam Pendidikan Islam: Memanfaatkan Inovasi Untuk Meningkatkan Mutu Pembelajaran."

challenges faced. Through a qualitative literature study, it is found that AI has great potential in improving the quality of Islamic education, especially in personalizing learning, developing technology-based curriculum, and increasing the efficiency of education management. However, challenges such as dependence on technology, limited infrastructure, teacher training needs, and ethical issues such as protecting students' personal data need to be addressed to ensure effective implementation of AI that is in accordance with Islamic moral principles. The main findings of this study are that AI can adjust learning materials to the needs and abilities of individual students, increasing the effectiveness of the teaching and learning process. AI enables the development of adaptive and responsive curricula to developments in science and technology, as well as relevance to the Islamic context. The implementation of AI can expand access to Islamic education to remote areas and increase efficiency in educational administration management. This article provides new insights into the integration of technology in Islamic education, offering innovative approaches that can be adopted by Islamic educational institutions to improve the quality of learning and management. In practice, these findings can form the basis for the development of educational policies that support the ethical and effective use of technology in the context of Islamic education.

Effective AI use in Islamic education requires integration into learning, educator training, supportive policies, and ethical guidelines. Developers should design AI aligned with Islamic values. These efforts will enhance quality and sustainability in the digital era.

References

- Abdullah, M Amin, and D Abdurahman. "Metodologi Penelitian Agama: Pendekatan Multidisipliner." Yogyakarta: Lembaga Penelitian UIN Sunan Kalijaga, 2006.
- Adnan, Mohammad. "Islamic Education and Character Building in the 4.0 Industrial Revolution." *Nazhruna: Jurnal Pendidikan Islam* 5, no. 1 (2022): 11–21.
- Arikunto, Suharsimi. "Research Procedures A Practical Approach Research: A Practical Approach." *Jurnal Universitas Udayana*. ISSN, 2013.
- Bali, M. "Artificial Intelligence in Language Learning: A Case Study of Arabic." *Journal of Educational Technology* 10, no. 2 (2021).
- Darmadi, Hamid. "Educational Research Methods." Bandung: Alfabeta, 2011.
- Darmawan, D. *Information and Communication Technology Education*. Bandung: Remaja Rosdakarya, 2013.
- Doohee, Adawiya Hayyawati. "The Contribution of Artificial Intelligence to Learning the Arabic Language." *European Journal of Language and Culture Studies* 3, no. 3 (2024): 17–23.
- Gusfield, J, and M Ibrahim. "Artificial Intelligence and Education: Building an Islamic Curriculum." *Journal of Islamic Education Studies* 8, no. 3 (2021).
- Heffernan, N, and C Heffernan. "The Learning Accelerator: Personalizing Education Using Artificial Intelligence." *Educational Technology* 45, no. 2 (2014).
- Johnson, Geneva R. *Educational Research Methods. Physical Therapy*. Vol. 52. Bandung: CV Pustaka Setia, 1972. <https://doi.org/10.1093/ptj/52.5.603>.
- Karim, Ahmad Atho'ul. "Integration of AI Tools in Islamic Education Curriculum Development Management: Challenges and Opportunities." Available at SSRN 5044475, 2024.
- Khasanah, Miratu. "Tantangan Penerapan Teknologi Digital Dalam Pendidikan Islam: Memanfaatkan Inovasi Untuk Meningkatkan Mutu Pembelajaran." *Leader: Jurnal Manajemen Pendidikan Islam* 2, no. 2 (2024): 282–89.
- Khosyihin, Muhammad Imam, and Moch Yaziidul Khoiri. "Penerapan Teknologi Digital Dalam Meningkatkan Efektivitas Pembelajaran Pada Pendidikan Islam." *Sasana: Jurnal Pendidikan Agama Islam* 3, no. 1 (2024): 137–42.
- Kobandaha, Firmansyah. "Islamic Education Based on Artificial Intelligence in the Digital Era A." *Literature Review Journal of Artificial Intelligence and Digital Business (RIGGS)* 4, no. 1 (2024).

- Koller, D. "Learning at Scale: The Role of AI in Online Education." *Education Technology* 72, no. 3 (2013).
- Ma, Wenting, Olusola O Adesope, John C Nesbit, and Qing Liu. "Intelligent Tutoring Systems and Learning Outcomes: A Meta-Analysis." *Journal of Educational Psychology* 106, no. 4 (2014): 901.
- Muhadjir, N. "Neong Muhadjir." *Qualitative Research Methods*, 2020, 60.
- Mukarromah, Aenuellael, Mujiburrahman Nur, and Ali Salim Banqitoh. "Strategy of Islamic Boarding School-Based in Facing the Era of Revolution 4.0 towards the Era of Society 5.0." *At-Ta'lim: Jurnal Pendidikan* 10, no. 2 (2024): 234-44.
- Nugraha, Muhamad Tisna, Moch Riza Fahmi, and Imam Agung Prakoso. "Integrasi Tradisi Dan Teknologi Dalam Pembelajaran Fiqh Dengan Pemanfaatan Chatgpt." *Innovative: Journal Of Social Science Research* 3, no. 6 (2023): 4486-95.
- Pratama, Arizqi Ihsan. "Inovatif Dan Konservatif Dalam Menghadapi Era 4.0." In *The Annual Conference on Islamic Education and Social Science*, 1:23-33, 2019.
- Rahman, A. "Digital Learning in Islamic Education: The Case of Madrasah in Indonesia." *Jurnal Pendidikan Islam* 6, no. 1 (2020).
- Santosa, Sedy, and Muhammad Fahmi Jazuli. "The Digital Madrasah as an Idea of IT-Based Islamic Education." *Nazhruna: Jurnal Pendidikan Islam* 5, no. 2 (2022): 379-91.
- Suryadi, D. "AI for Accessibility in Higher Education in Indonesia." *Indonesian Journal of Educational Technology* 10, no. 2 (2020).
- Yanto, Ari. "Implementation of AI and VR at Darul Ma'arif Islamic Boarding School, Rejang Lebong." *Journal of Education* 2024 (2024).
- Zed, Mestika. *Metode Penelitian Kepustakaan*. Yayasan Pustaka Obor Indonesia, 2008.