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Integration of Artificial Intelligence in Islamic Education: Trends, Methods, and Challenges in the Digital Era

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Abstract

This study employs a qualitative descriptive approach with a literature review method to analyze the application of Artificial Intelligence (AI) in Islamic education. Data were collected from 26 scholarly articles obtained through a systematic search in the SINTA database (1–6) and international journals (Q1–Q4), using keywords related to AI in Islamic education. Articles were selected based on their relevance to the research topic. Data analysis was conducted using descriptive analysis to identify AI usage trends and content analysis to evaluate key topics and challenges. The findings reveal a significant increase in AI usage since 2018, with descriptive analysis being the most commonly applied method. Key topics include AI integration in Qur'an and Hadith learning, the development of AI-based educational media, and the digitalization of Islamic manuscripts. Major challenges involve technological infrastructure limitations, ethical considerations, cultural sensitivities, and technological disparities between urban and rural areas.

Keywords: Artificial Intelligence, Islamic religious education, digitalization, technology-based learning

Introduction

Technological advancements have had a significant impact across various sectors, including education. One of the most influential innovations is Artificial Intelligence (AI) (Sholeh, 2023). This technology has begun to be applied in education, including Islamic religious education, to improve learning effectiveness, provide personalized learning experiences, and assist educators in managing and delivering teaching materials (Syahrizal, Yasmi, & Mary, 2024). In this context, AI offers a great opportunity to revolutionize traditional learning methods and address educational challenges in the digital era.

Islamic religious education in Indonesia is essential in fostering moral, spiritual, and cultural values. However, conventional teaching methods often prove ineffective in addressing the challenges of the modern era (Patahuddin et al., 2024). The current generation, growing up

amidst technological advancements, requires a more innovative and interactive educational approach (Mauluddin, 2024). AI technology presents a solution to these challenges by providing personalized learning, digitalizing religious resources, and managing student data more efficiently (Sarinda, Martina, & Noviani, 2023).

Several innovations have been implemented in Islamic religious education, such as AI-based chatbots that assist students in understanding the Qur'an through automated text analysis. This technology also facilitates interactive learning through media like educational videos and AI-based simulations (Syahrizal et al., 2024).

In this study, various perspectives on the application of Artificial Intelligence (AI) in Islamic religious education have been explored, covering a range of topics and approaches. One primary focus is the digitalization of Islamic education, where AI plays a crucial role in modernizing Islamic education systems. Andriani et al. (2023) highlight how AI-based digitalization can expand access to religious learning, particularly through technological transformation. Similarly, Fadhli (2023) discusses the application of AI in digitalizing pesantren education, demonstrating that this technology can improve the efficiency and quality of learning in traditional religious institutions. (Noer, 2023)

The role of technology in Islamic religious education in the digital era is the central concern of this study. Aziz and Nirwana (2023) note that AI-based technology integration offers significant opportunities to enhance teaching efficiency while introducing new challenges, such as ethical considerations. Other perspectives on digital transformation are presented by Kisno et al. (2023), who explore the utilization of AI to support digital transformation in religious education, including technology-based learning.

The development of AI-based learning media is also an important topic. Maulana and Rahman (2023) emphasize the effectiveness of AI-based interactive media in increasing student engagement, while Andryan et al. (2023) stress the integration of AI in digital learning media as a modernization strategy for Islamic education. In a similar study, Hasan and Arif (2023) discuss the development of AI-based Qur'an applications designed to help students understand sacred texts more deeply.

This study also explores the challenges of AI implementation in Islamic education. Syamsuddin (2024) highlights various obstacles in integrating AI into Islamic education curricula, such as infrastructure limitations and cultural resistance. Furthermore, Suleimanov et al. (2024) examine the adaptation of AI-based learning in Islamic education and its contribution to fostering critical thinking among students. (Fakhrurrazi et al., 2023)

AI is also used for religious text analysis, as explained by Zafar and Iqbal (2023) in their study on AI-based Qur'anic text analysis. This technology helps digitalize and simplify the understanding of religious texts. Another study by Zainuddin and Laila (2023) evaluates AI-based Qur'an learning systems, demonstrating their effectiveness in improving student learning outcomes.

Yusro et al. (2023) discuss how AI supports digital literacy in Islamic education environments, highlighting its relevance in the era of technological transformation.

This study provides a comprehensive perspective on AI application in various aspects of Islamic religious education, including the development of learning media, digitalization, and challenges in implementing technology in religious contexts. Thus, this study is expected to contribute to developing inclusive, adaptive, and relevant AI-based education strategies that meet modern needs. (Pamuji, 2023)

The Importance of AI Research in Islamic Religious Education

Research on the application of AI in Islamic religious education is increasingly relevant in the digital era. This technology not only provides efficiency in learning processes but also enables broader accessibility to educational resources (Faisal, 2024).

However, implementing AI faces various obstacles. One of the main challenges is infrastructure limitations in many regions of Indonesia, exacerbating the digital divide between urban and rural areas (Sarinda et al., 2023).

Research Trends in Indonesia

In Indonesia, research on AI in Islamic religious education covers various topics, ranging from developing AI-based learning applications to digitalizing religious manuscripts. For example, research using the AI-based ADDIE model demonstrates that this approach can enhance students' understanding of Islamic concepts (Syahrizal et al., 2024).

AI technology also supports Qur'an learning through personalization and interactive teaching. For instance, students can learn according to their level of understanding, while teachers receive data that helps design more effective teaching methods (Sarinda et al., 2023).

Although AI offers great potential in Islamic religious education, its implementation is not without challenges. Limited access to technology remains a significant hurdle, especially in remote areas (Faisal, 2024).

Nevertheless, the opportunities offered by AI are promising. This technology enables innovation in teaching methods, increases learning efficiency, and systematically manages student data (Syahrizal et al., 2024). With the right strategy, AI can be a catalyst for creating more relevant Islamic religious education in the modern era (Sarinda et al., 2023).

Research on AI in Islamic Religious Education

Various studies have explored the role of AI in Islamic religious education. Fauziyati (2023) highlights the impact of AI in PAI learning, showing an increase in students' understanding through personalized learning despite infrastructure constraints. Sarinda et al. (2023) found that AI-based interactive media, such as educational games, improve student motivation but need to align with religious values.

Nugraha et al. (2024) underline the effectiveness of AI-based media in Qur'an learning through gamification, while Mambu et al. (2023) emphasize the benefits of AI-based tutoring systems for independent student learning. Kurniawan (2023) examines the role of AI-based chatbots in Islamic preaching, which facilitate real-time access to religious literature.

Hasanah and Rasyid (2024) discuss AI-based gamification, which enhances student motivation in religious learning. Meanwhile, Hidayat et al. (2023) highlight the importance of ethical oversight in AI implementation to ensure its compliance with Islamic teachings. Faisal (2024) concludes that AI-based personalized learning creates a more effective learning experience. Finally, Amalia and Darwis (2023) stress the importance of educator training for successfully implementing AI in Islamic education curricula.

Research Questions

1. Based on the latest literature, what are the trends in AI implementation in Islamic religious education in Indonesia?
2. What are the main topics of focus in AI research in Islamic religious education?
3. What data analysis methods dominate research related to AI in Islamic religious education?
4. What are the main opportunities and challenges in implementing AI in Indonesian Islamic religious education?

Research Method

This research employs a qualitative descriptive approach to analyze AI implementation in Islamic religious education. The focus is identifying trends, methods, topics, and key challenges from articles sourced from SINTA (1–6) and Elicit.com (Q1–Q4) journals. This approach allows descriptive data analysis from secondary sources, such as scholarly articles and research reports.

Data Analysis Techniques

The data analysis follows five main steps:

1. **Article Classification**: Categorizing articles by publication year, research type, topics, data analysis methods, and challenges.
2. **Trend Identification**: Analyzing annual publication trends to understand AI research developments in Islamic religious education.
3. **Content Analysis**: Review articles to identify key research focuses, such as AI integration in Qur'an learning, AI-based learning media development, and digitalization of religious manuscripts.
4. **Method Evaluation**: Understanding data analysis approaches used in each article.
5. **Challenge Exploration**: Examining primary barriers, such as infrastructure limitations, ethical issues, and technological gaps.

Table 1 Instruments for Analyzing AI Articles in Islamic Education

Instrument	Year/Category
Number of Publications	2018
	2019
	2020
	2021
	2022
	2023
	2024
Distribution of Research Type	Qualitative
	Quantitative
	Mixed Method
Main Research Topics	Integration of AI in Qur'an and Hadith Learning
	Development of AI-Based Learning Media
	Digitalization of Islamic Manuscripts
	AI for Personalized Learning
	AI for Evaluation and Feedback
Data Analysis Methods and Research Challenges	Descriptive Analysis
	Content Analysis
	Miles and Huberman
	Experiment
	Infrastructure Limitations
	Ethical and Cultural Sensitivity Issues
	Technological Gaps

Research Outputs

This study is expected to yield the following key outputs:

1. Trends in Publication Numbers: Highlighting the increase or decrease in interest toward specific topics.
2. Distribution of Research Types: Depicting the approaches used in the studies, such as qualitative, quantitative, or mixed methods.
3. Focus of Research Topics: Identifying dominant themes in AI research for Islamic education.
4. Data Analysis Methods: Illustrating the most commonly applied techniques in these studies.
5. Research Challenges: Identifying major barriers to implementing AI in the Islamic education sector.

Result

This study reveals several critical findings related to the application of Artificial Intelligence (AI) in Islamic education. Analysis of 26 articles indicates an increasing research trend, diverse analytical methods, relevant research topics, and significant challenges and opportunities in AI implementation within this field.

Figure 1. Analysis and Research Findings Based on the Publication Trends Graph

The graph depicting publication numbers indicates an increasing trend in research on the application of Artificial Intelligence (AI) in Islamic education during the 2018–2024 period. Below is a detailed analysis based on the graph data:

1. 2018
   In 2018, only one article was published. Research was still in its early exploratory phase, with a primary focus on the potential of AI in supporting Islamic education. Faisal (2024) noted that at this time, AI technology began to be regarded as a tool capable of supporting personalized learning and improving the efficiency of educational processes, despite its limited use.

2. 2019–2022
   Publications gradually increased during this period, reflecting growing academic interest in this topic. By 2022, the number of publications reached five articles. Research during this period focused on several key topics:

   - Digitalization of Religious Manuscripts: Mauluddin (2024) highlighted that AI technology aids the preservation of Islamic manuscripts through digitalization, enabling broader access to essential religious documents.
   - AI-Based Learning Media: Nugraha et al. (2024) noted that interactive AI-based media began to be used to enhance student engagement in Islamic learning.
   - Personalized Learning: Faisal (2024) demonstrated that AI-based personalized learning started to be adopted to create adaptive learning experiences.

3. 2023
   This year marked the peak of publication numbers, with six articles published. This surge reflects increased attention to AI's potential in Islamic education. The main research focuses included:

- Development of Interactive Media: Studies emphasized the importance of AI in creating more engaging and interactive learning experiences, such as through gamification applications (Nugraha et al., 2024).
- AI-Based Evaluation: Amalia & Darwis (2023) highlighted how this technology helps improve the efficiency and accuracy of student assessment processes.

4. 2024
   The number of publications slightly declined to five articles, possibly reflecting a stabilization in research after the previous year's peak. Research in this year shifted towards practical implementation, including:

   - AI for Evaluation and Feedback: Technology was increasingly used to provide personalized student and educator recommendations (Afif & Nawawi, 2024).
   - Implementation Challenges: Syamsuddin (2024) noted that infrastructure limitations and cultural resistance remain major barriers to AI adoption in some regions.

The graph illustrates a significant increase in publication numbers, indicating growing recognition of AI's potential in Islamic education. This trend underscores the importance of AI in supporting learning processes, from personalized learning and interactive media development to the preservation of religious manuscripts. Future research is expected to focus on solutions to implementation challenges, such as improving technological infrastructure and educator training, to ensure a more inclusive and sustainable application of AI.

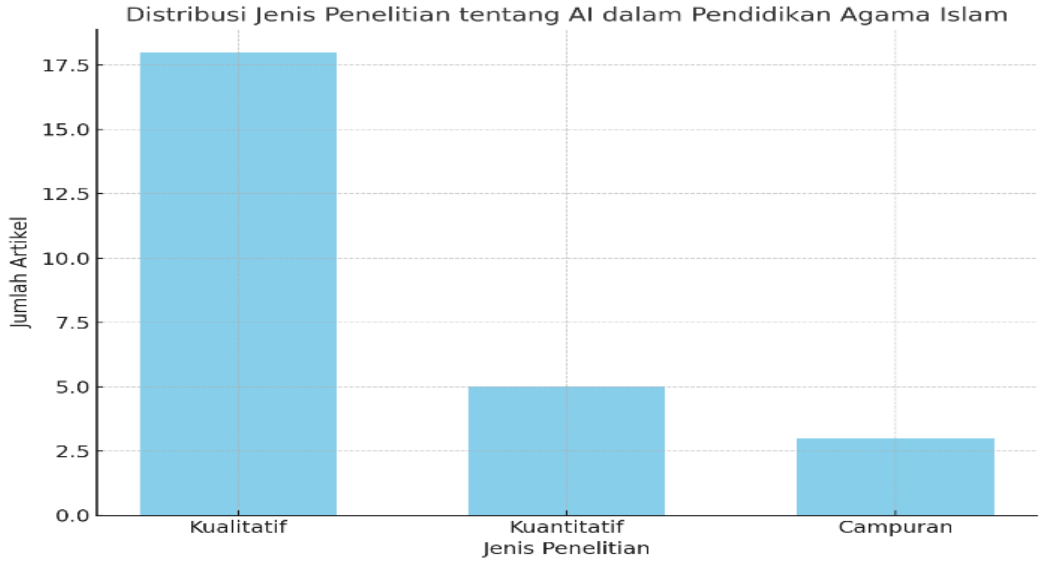

Figure 2. Analysis and Research Findings Based on the Challenges in AI Research Graph

The graph above illustrates the distribution of research types on Artificial Intelligence (AI) in Islamic education based on the methods employed. Qualitative research dominates, with 18 articles reflecting its frequent use in exploring the phenomenon of AI implementation in depth. The qualitative approach enables researchers to investigate the application of AI in Islamic education, such as the development of technology-based learning media and the integration of AI in Qur'an learning (Syahrizal, Yasmi, & Mary, 2024).

Quantitative research comprises only 5 articles. This approach tends to focus on empirical measurements, such as the effectiveness of AI-based learning media on student motivation and learning outcomes (Faisal, 2024). Although less commonly employed, quantitative research provides crucial numerical data to support decisions on AI implementation in Islamic education.

Mixed-methods research, combining qualitative and quantitative approaches, is found in 3 articles. This approach allows for both in-depth analysis and the generation of empirical data, such as evaluating user experiences with AI-based educational applications and assessing the technology's impact on learning outcomes (Amalia & Darwis, 2023).

The dominance of qualitative research indicates that studies on AI in Islamic education are still in an early exploratory phase. Conversely, the low number of quantitative and mixed-methods studies highlights the need for more measurable research to strengthen the validation of findings through empirical data. This study also emphasizes the potential of mixed-methods approaches in providing a more comprehensive perspective (Mauluddin, 2024).

Expanding the use of quantitative and mixed-methods approaches in AI research for Islamic education can provide a stronger foundation for the practical and sustainable development and implementation of technology.

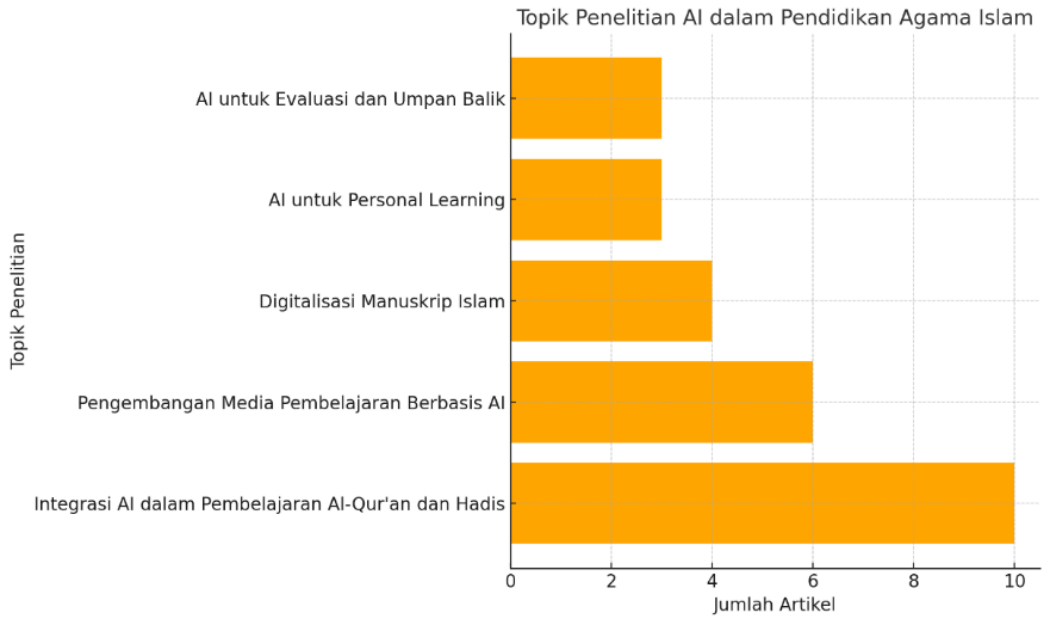

Figure 3. Analysis and Research Findings Based on the Research Topics Graph

Key Findings Based on the Research Topics Graph

1. Integration of AI in Qur'an and Hadith Learning (10 Articles)

   This topic is a primary focus in research on AI in Islamic education, reflecting the fundamental need for technology to enhance understanding of the Qur'an and Hadith. Studies show that AI can contextually explain Quranic verses, enabling students to grasp their meanings more deeply (Fauziyati, 2023). Furthermore, the application of AI in

Tajweed and Tafsir learning improves learning accuracy through automated voice and text analysis (Afif & Nawawi, 2024). This technology offers instant feedback, making it easier for students to evaluate and correct their mistakes.

2. Development of AI-Based Learning Media (6 Articles)

   AI-based learning media, such as interactive videos and gamification applications, is a major research focus. These media are designed to boost students' motivation by offering engaging and adaptive learning experiences (Sarinda et al., 2023). Nugraha et al. (2024) found that AI-based media effectively supports knowledge transfer and provides students with opportunities to learn more creatively and interactively, particularly in Islamic education.

3. Digitalization of Islamic Manuscripts (4 Articles)

   Digitalizing religious manuscripts using AI technology significantly contributes to the preservation of religious documents. Mauluddin (2024) noted that AI can transform physical manuscripts into easily accessible digital formats, protecting them from damage and expanding access for further research. Additionally, AI is used to translate and classify religious texts, ensuring their content remains relevant to modern needs (Afril et al., 2023).

4. AI for Personalized Learning (3 Articles)

   Research highlights how AI can create personalized and adaptive learning experiences, allowing students to learn according to their needs and levels of understanding. Faisal (2024) found that AI technology provides learning content recommendations based on students' learning patterns, resulting in a more efficient learning experience. Moreover, AI helps students become more independent in understanding Islamic education materials, particularly in the context of Qur'an and Hadith learning (Amalia & Darwis, 2023).

5. AI for Evaluation and Feedback (3 Articles)

   Research on this topic focuses on how AI is used to provide accurate and efficient automated evaluations. Afif & Nawawi (2024) noted that AI can analyze student learning outcomes in real-time, offer relevant feedback, and assist educators in identifying areas that need improvement. Other studies show that this technology speeds up the evaluation process, reduces educators' workload, and enhances the overall quality of learning.

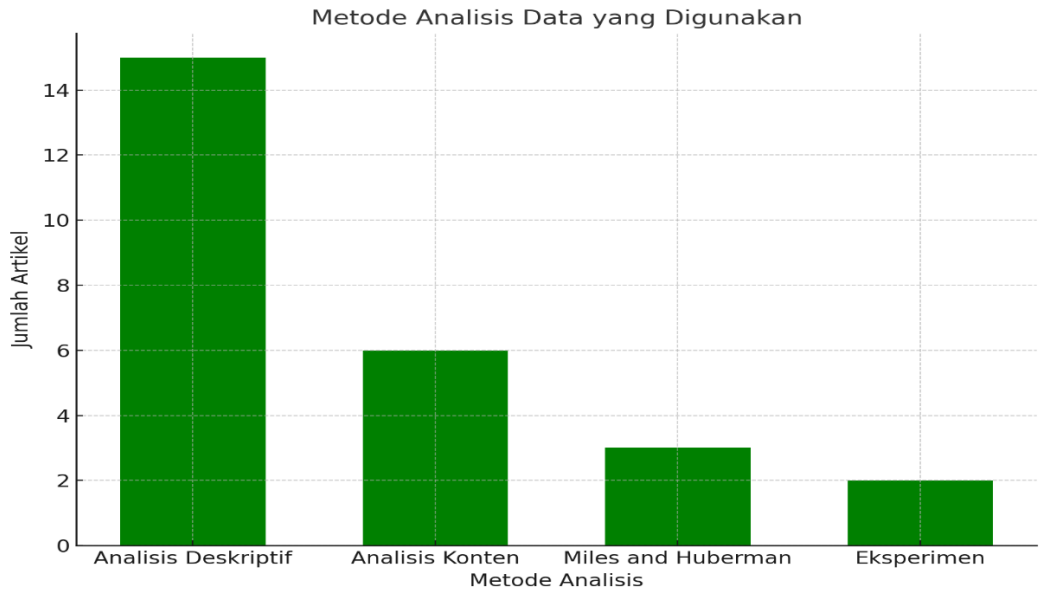

Figure 4 Analysis and Research Findings Based on the Data Analysis Methods Graph

The graph above shows the distribution of data analysis methods used in research on the application of Artificial Intelligence (AI) in Islamic education. Four primary methods were identified: descriptive analysis, content analysis, Miles and Huberman, and experimental methods. Each method plays a unique role in providing a deeper understanding of AI implementation in this field.

1. Descriptive Analysis (15 Articles)

   Descriptive analysis is the most dominant method, with 15 articles utilizing this approach. It is widely used to depict the phenomenon of AI implementation comprehensively. Researchers employ this method to evaluate various AI applications, such as interactive learning media and personalized education systems. For instance, Fauziyati (2023) used descriptive analysis to explain how AI enhances students' understanding of Qur'an and Hadith materials. Nugraha et al. (2024) also applied this method to assess the effectiveness of AI-based learning media in increasing student engagement.

2. Content Analysis (6 Articles)

   Content analysis is the second most frequently used method in six articles. This approach evaluates the quality of AI-based content, such as learning applications and the digitalization of Islamic manuscripts. Researchers emphasize the importance of ensuring that the generated content aligns with Islamic values. Mauluddin (2024) noted that content analysis helps identify the relevance and accuracy of digitalized religious manuscript outcomes.

3. Miles and Huberman (3 Articles)

   The Miles and Huberman method was utilized in three articles to conduct in-depth qualitative data analysis. This method often involves interviews with educators and students to explore their experiences using AI technology. Faisal (2024) employed this

approach to describe how students responded to AI applications in independent learning and how this technology influenced their understanding of religious materials.

4. Experimental Methods (2 Articles)

   Although only used in two articles, experimental methods play a significant role in testing the effectiveness of AI applications. These studies involve direct trials of AI-based tools, such as chatbots and simulation applications, to evaluate their impact on student learning outcomes. Afif and Nawawi (2024) applied experimental methods to assess how AI enhances students' motivation and learning outcomes, particularly in Qur'an and Hadith studies.

The distribution of these methods indicates that research related to AI in Islamic education is still dominated by descriptive approaches, reflecting a focus on the early exploration of phenomena. Content analysis and the Miles and Huberman method provide deep insights into the quality of materials and user experiences, while experimental methods pave the way for stronger empirical validation. The combination of these methods offers a comprehensive framework for understanding the potential and challenges of AI implementation in Islamic education.

Future research is needed to expand the use of experimental and mixed-method approaches to produce more measurable and practical findings.

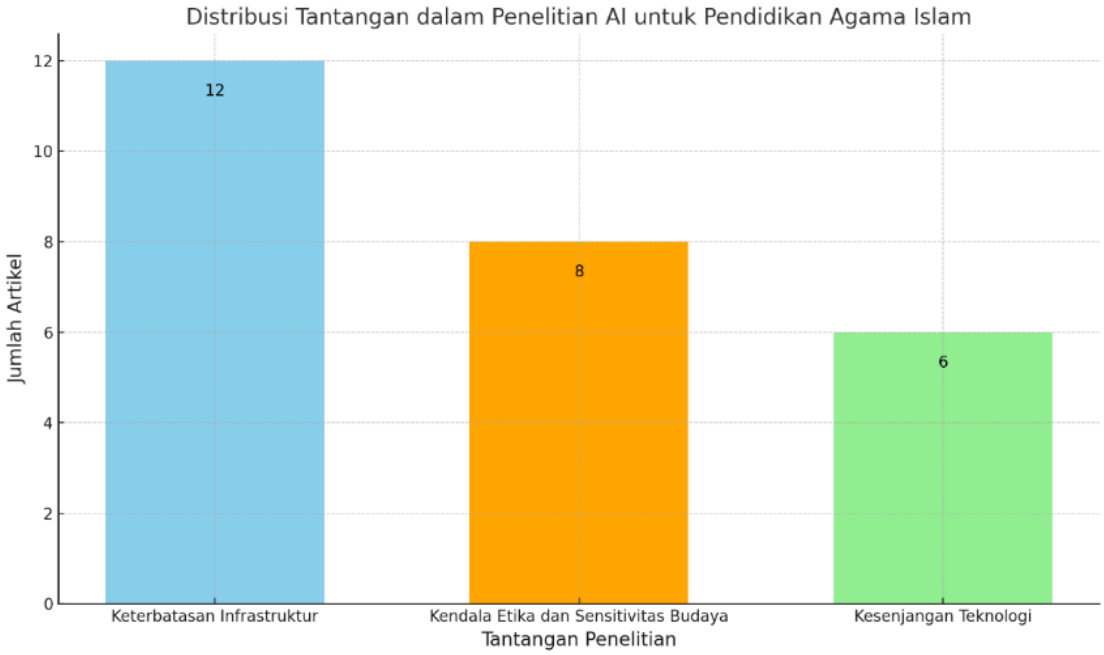

Figure 5 Analysis and Research Findings Based on the Challenges in AI Research Graph

The graph identifies three major challenges in the research and implementation of Artificial Intelligence (AI) for Islamic education: infrastructure limitations, ethical and cultural sensitivity issues, and technological gaps. Each challenge has unique characteristics and is supported by findings from various articles.

1. Infrastructure Limitations (12 Articles)

   Infrastructure limitations are the primary challenge in AI implementation, as reported by Fauziyati (2023). Many educational institutions, particularly in remote areas, lack adequate internet access and hardware to support AI-based technologies. Nugraha et al. (2024) emphasized that inadequate infrastructure hampers the use of AI-based interactive learning media, such as applications or educational videos, Kurniawan (2023) noted that while AI holds great potential in Islamic preaching, the lack of supporting tools remains a significant barrier in rural areas. Hidayat et al. (2023) further highlighted that technological infrastructure deficiencies often result in an imbalance in access between urban and rural educational institutions.

2. Ethical and Cultural Sensitivity Issues (8 Articles)

   Ethical and cultural sensitivity issues are significant challenges in AI research and application, as explained by Mauluddin (2024). The development of AI content must align with Islamic values, especially in the digitalization of religious manuscripts and AI-based applications. Sarinda et al. (2023) added that AI-based learning media should be carefully designed to avoid misunderstandings or misinterpretations. Hasanah and Rasyid (2024) stated that AI-based gamification in Islamic education faces ethical challenges, particularly in ensuring that gamification elements remain relevant to Islamic contexts. Amalia and Darwis (2023) highlighted that cultural sensitivity poses a barrier to AI implementation, especially when applied in educational settings with deeply traditional cultural norms.

3. Technological Gaps (6 Articles)

   Technological gaps are another critical challenge. Faisal (2024) observed that urban educational institutions have better access to AI technology than rural areas, leading to disparities in learning quality. Afif and Nawawi (2024) found that AI-based applications, such as chatbots for Qur'an learning, often cannot be optimally accessed in areas with poor internet connectivity. Syahrizal, Yasmi, and Mary (2024) added that technological gaps also impact educator training, where teachers in remote areas have fewer opportunities to learn how to use AI in education. Mambu et al. (2023) noted that these gaps create significant barriers to adopting AI technology in underdeveloped regions.

These three challenges highlight that AI implementation in Islamic education still faces complex barriers. Infrastructure limitations are the largest obstacle to accessing technology, while ethical and cultural sensitivity issues require a cautious approach to ensure technology aligns with Islamic values. Technological gaps, on the other hand, create disparities that worsen access to AI in certain regions. Further research is needed to address these barriers by focusing on strengthening infrastructure, developing ethical AI-based content, and improving equitable access to technology.

Conclusion

Based on the analysis of research articles, several key points can be concluded regarding the implementation of Artificial Intelligence (AI) in Islamic education:

1. Research Trends

   Research on AI in Islamic education has grown significantly since 2018, peaking in 2023. This indicates that AI is becoming increasingly relevant as a technology supporting Islamic learning, particularly in the era of digitalized education.

2. Research Topics

   The primary focus of research is the integration of AI in Qur'an and Hadith learning, reflecting the essential need for technology to enhance understanding of religious texts. Other topics, such as AI-based learning media development, digitalization of Islamic manuscripts, personalized learning, and AI-based evaluation, contribute significantly to innovations in Islamic education.

3. Research Methods

   Most studies use descriptive analysis methods to explore AI implementation. Content analysis evaluates learning materials, while the Miles and Huberman method provides deep insights through qualitative data. Although limited, experimental methods provide empirical evidence of AI's effectiveness.

4. Research Challenges

   Three main challenges are:

   - Infrastructure Limitations: The largest obstacle in AI implementation, particularly in remote areas with limited technology access.
   - Ethical and Cultural Sensitivity Issues: Ensuring that AI applications align with Islamic values and cultural norms.
   - Technological Gaps: Differences in access to AI technology between urban and rural areas create inequalities in implementation.

5. Contributions and Opportunities

   AI offers significant opportunities to enhance the quality of Islamic education through innovations in learning media, preservation of religious manuscripts, personalized learning processes, and efficient evaluation.

Recommendations

1. Technological Infrastructure Development

   Greater investment in building technological infrastructure, particularly in remote areas, is necessary to ensure equal access to AI technology in Islamic education.

2. Training for Educators and Students

   Comprehensive training should be provided to educators and students to improve their understanding of AI technology usage. This includes technical and pedagogical training to ensure technology is effectively utilized in learning.

3. Improvement in Research Methods

   More experimental and mixed-method research is needed to provide strong empirical evidence of AI's effectiveness in Islamic education. Quantitative studies should also be increased to complement the predominantly phenomenological exploration.

4. Development of Ethical and Sensitive Technology

   AI technology must be developed in alignment with Islamic values and cultural norms. Ensuring that generated content, such as digitalized manuscripts or learning applications, adheres to Islamic teachings is essential.

5. Multidisciplinary Collaboration

   Encouraging collaboration among academics, technology developers, and Islamic education practitioners can create inclusive, relevant, and practical AI-based solutions.

6. Further Research

   Continued research is needed to address the identified challenges, such as reducing technological gaps and overcoming cultural resistance to technological innovation in Islamic education.

By implementing these recommendations, AI can act as a catalyst for transforming Islamic education into a more inclusive, adaptive, and sustainable system capable of addressing the challenges of education in the digital era.

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