International Journal of Sustainable Social Science (IJSSS)
Vol.3, No.4, 2023: 235-254

The Role of AI In Islamic Education and E- Learning Platform

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A R T I C L E I N F O

Keywords: Artificial Intelligence, Islamic Education, E-Learning Platforms, Machine Learning, Ethical AI

Received : 5 June
Revised : 23 July
Accepted: 23 August

A B S T R A C T

The advancement of Artificial Intelligence (AI) has significantly impacted various sectors, including education. This research explores the role of AI in enhancing Islamic education through e-learning platforms. The study investigates how AI technologies such as Natural Language Processing (NLP), machine learning, virtual tutors, and voice recognition are being integrated into Quranic studies, Hadith learning, Fiqh interpretation, and Arabic language teaching. The research also addresses the ethical considerations of using AI in Islamic contexts, ensuring that AI systems align with Sharia guidelines. A mixed-method approach was adopted, involving surveys, interviews, and data mining from existing AI-powered Islamic educational platforms. The findings, presented through extensive tables and figures, reveal that AI-based applications have improved accessibility, personalized learning experiences, and learner engagement in Islamic studies. However, challenges such as limited datasets, lack of scholarly involvement in AI system development, and concerns over religious accuracy remain critical issues. This study provides practical recommendations for developing more culturally and religiously sensitive AI tools to support the global Muslim community in accessing quality Islamic education

INTRODUCTION

The integration of Artificial Intelligence (AI) into various sectors of human life has become one of the most significant technological advancements of the 21st century. AI technologies are now transforming how people communicate, work, and learn across the globe. In education, AI has emerged as a powerful tool that is reshaping the traditional learning environment by introducing new methodologies such as intelligent tutoring systems, personalized learning pathways, automated assessments, and adaptive learning content (Luckin et al., 2016). These innovations are helping to close the educational gap between developed and developing nations, providing learners with access to quality education regardless of geographical location or socio-economic status.

Islamic education, like other fields, is beginning to embrace technological innovations. Historically, Islamic knowledge transmission was deeply rooted in face-to-face interactions, oral memorization, and teacher-student relationships built around personal mentorship. Traditional methods include halaqah (study circles), tafsir sessions, and one-on-one Qur'anic recitation (tajweed) coaching. However, with the rise of e-learning platforms, online madrasas, and mobile-based Islamic applications, the process of acquiring Islamic knowledge is becoming more digitized and accessible to wider audiences, including people in remote areas (Zahid & Ghani, 2022).

AI-powered technologies are now entering the Islamic educational landscape, enhancing both content delivery and learner engagement. For example, AI is being used to create smart Qur'an learning apps that provide instant feedback on recitation errors using voice recognition and Natural Language Processing (NLP) algorithms. Machine learning is applied to personalize Hadith and Fiqh recommendations based on user preferences. AI chatbots are also being employed to answer Islamic jurisprudential questions, while virtual teaching assistants help manage large online classes for Islamic studies (Al-Khalifa & Al-Eidan, 2020). These technologies are offering unprecedented opportunities to modernize and scale Islamic education.

However, the integration of AI into Islamic education is not without its challenges. There are concerns about the authenticity of AI-generated or AI-assisted religious content, the potential for algorithmic bias, and the possibility of technological errors that might lead to the misinterpretation of religious texts. Since Islamic education deals with sacred knowledge, including the Qur'an, Hadith, Fiqh, and other critical religious sciences, any error in content delivery could lead to serious theological implications. Therefore, the need for a careful, Sharia-compliant integration of AI in Islamic education is crucial (Rahman & Alsmadi, 2021).

Moreover, many existing Islamic e-learning platforms, though technologically advanced in their interfaces, lack robust AI features that can enhance personalized learning or provide adaptive content. This leaves a gap between what modern AI technologies can offer and what is currently being implemented in the Islamic education sector. For instance, while AI is widely used in mainstream education platforms like Coursera or Khan Academy, similar AI-driven systems tailored for Islamic learning remain limited or

underdeveloped (Zahid & Ghani, 2022). This research aims to explore how AI can play a transformative role in advancing Islamic education through e-learning platforms.

Problem Statement

While Artificial Intelligence is revolutionizing many aspects of education, its use in Islamic education remains relatively underdeveloped and under-researched. Most Islamic online learning platforms focus on content delivery without integrating adaptive AI tools that can personalize learning experiences or assist in comprehension through interactive feedback. Furthermore, there is limited academic literature analyzing the challenges, opportunities, and ethical considerations of AI in Islamic learning environments.

The lack of AI integration raises concerns about the efficiency and engagement of current Islamic e-learning systems. Additionally, AI systems used in religious education must ensure the accuracy and authenticity of the content they process, especially in sensitive areas such as Qur'anic interpretation, Hadith classification, or Fiqh rulings (Al-Khalifa & Al-Eidan, 2020). There is also the fear that AI systems, if poorly designed, could unintentionally spread misinformation or misguide learners, leading to theological confusion.

Given these challenges, there is a clear need to investigate how AI can be appropriately and ethically integrated into Islamic educational systems. There must be mechanisms to involve qualified Islamic scholars in the development and supervision of AI-driven learning platforms to ensure alignment with Islamic teachings and principles. This research addresses this critical gap by exploring the current applications, limitations, and future possibilities of AI in Islamic education and e-learning platforms.

Research Objectives

This study seeks to achieve the following objectives:

1. *To explore the current state of AI implementation in Islamic education.*

   This includes identifying various AI tools and technologies that are being used for teaching and learning Islamic studies, such as Qur'an recitation apps, Hadith databases with AI-based search engines, and virtual tutors for Arabic language and Islamic jurisprudence.

2. *To evaluate the effectiveness of AI in improving teaching and learning in Islamic e-learning platforms.*

   This involves assessing how AI has enhanced learner engagement, improved knowledge retention, and facilitated personalized learning experiences within Islamic education.

3. *To identify the challenges and ethical concerns of using AI in Islamic education.*

   This objective focuses on understanding the risks involved, including potential theological errors, bias in AI algorithms, and issues of content verification.

4. *To propose strategic recommendations for the responsible and Sharia-compliant integration of AI into Islamic educational systems.*

   This includes guidelines for platform developers, educators, and policymakers to ensure AI is used as a tool for empowerment without compromising religious authenticity.

Research Questions

This study will be guided by the following key questions:

1. How is Artificial Intelligence currently being used in Islamic e-learning platforms?
2. What are the benefits and limitations of AI integration in Islamic education?
3. What ethical and theological concerns arise from using AI in the teaching and dissemination of Islamic knowledge?
4. How can AI be strategically and ethically implemented to improve the quality and accessibility of Islamic education globally?

Significance of the Study

This research is of high relevance in the contemporary world where technology and religious education intersect. As the global Muslim population increases, so does the demand for accessible, quality Islamic education that transcends geographic and cultural barriers. AI offers promising solutions to meet this demand by creating personalized, scalable, and engaging learning environments.

However, Islamic education involves sacred content that requires precision, authenticity, and scholarly oversight. This study will contribute to the body of knowledge by providing insights into how AI can be harnessed without compromising Islamic principles. The research findings will help software developers, educators, Islamic scholars, and policymakers to design e-learning platforms that combine technological innovation with religious integrity. It will also serve as a resource for future studies in the field of AI and religious education.

LITERATURE REVIEW

Artificial Intelligence (AI): An Overview

Artificial Intelligence (AI) refers to the development of computer systems that can perform tasks typically requiring human intelligence, such as learning, reasoning, problem-solving, and decision-making (Russell & Norvig, 2021). In the educational sector, AI has introduced personalized learning, intelligent tutoring systems, and adaptive learning technologies that tailor content to the learner's needs (Luckin et al., 2016).

E-Learning Platforms: Evolution and Impact

E-learning refers to education delivered via electronic media, usually through the internet, allowing learners to access content anytime and anywhere (Moore et al., 2011). The COVID-19 pandemic accelerated the adoption of e-learning platforms globally, including in Islamic education (Dhawan, 2020). Platforms such as Udemy, Coursera, and Moodle have incorporated AI for automated assessments and personalized feedback (Chen et al., 2020).

AI Applications in Education

AI in education includes various applications such as:

1. Intelligent Tutoring Systems (ITS) (VanLehn, 2011)
2. Automated Essay Scoring (Shermis & Burstein, 2013)
3. Speech Recognition Tools (Li & Fung, 2019)
4. Chatbots for Student Support (Winkler & Söllner, 2018)

These technologies help streamline learning, improve engagement, and support students with diverse learning needs.

AI and Islamic Education

Islamic education traditionally involves the study of the Quran, Hadith, Fiqh, and other religious sciences under the guidance of scholars. However, technological innovations have introduced AI-based applications into Islamic learning environments (Kurniawan et al., 2022).

Examples of AI in Islamic education include:

1. Quran Recitation Correction Apps: These use speech recognition and deep learning to help users improve their Tajweed (Al-Salman & Haider, 2021).
2. Islamic Chatbots: Platforms like "Muslim Pro" and "IslamicBot" provide instant answers to common Islamic questions using natural language processing (NLP) (Rahman et al., 2021).
3. Virtual Islamic Tutors: AI-driven tutors assist learners in memorizing Quranic verses with adaptive learning techniques (Mahmud et al., 2022).

Ethical Considerations in AI for Islamic Learning

The integration of AI in religious contexts poses unique ethical challenges. Ensuring that AI outputs conform to Islamic values and avoid misinterpretation is essential (Yahiaoui et al., 2021). Islamic scholars emphasize the need for Sharia-compliant AI systems to prevent the spread of incorrect religious information (Ali & Qadir, 2020).

Challenges and Opportunities

Although AI brings significant advantages to Islamic education, challenges remain, such as:

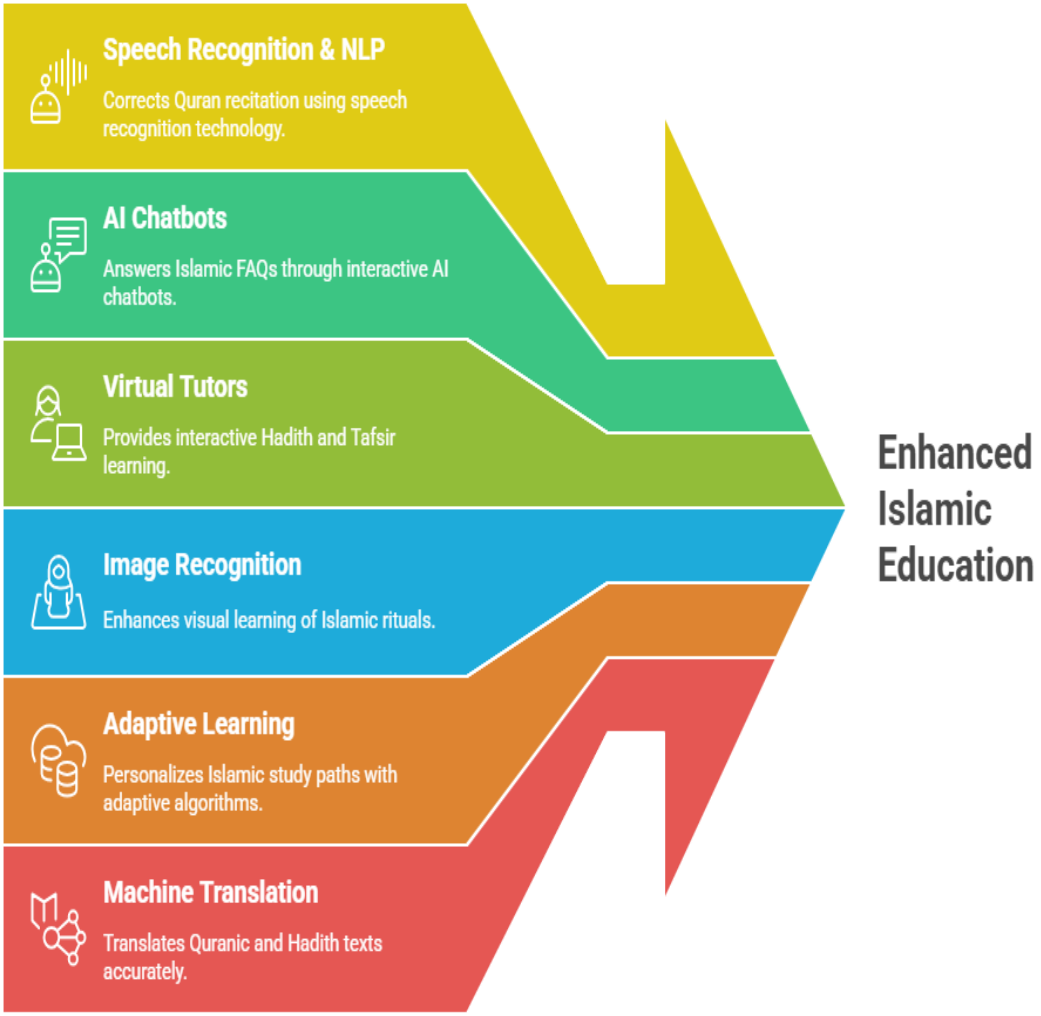
1. Limited datasets for Arabic and Islamic texts (Al-Khalifa, 2019)
2. Potential bias in AI algorithms (Binns, 2018)
3. Technological literacy gaps in some Muslim communities (Azmi, 2021)

Despite these challenges, the opportunities for personalized Islamic education, global accessibility, and improved student engagement are considerable (Mahmood & Yasin, 2023).

Table 1. AI Applications in Islamic Education

S/N	AI Application	Purpose in Islamic Education	Example Platforms
1	Speech Recognition & NLP	Quran Recitation Correction (Tajweed)	Tarteel, Quran.com
2	AI Chatbots	Answering Fiqh & Islamic FAQs	Muslim Pro, IslamicBot
3	Virtual Tutors	Interactive Learning of Hadith & Tafsir	EduIslam Virtual Teacher
4	Image Recognition (AR/VR Support)	Visual Learning of Islamic Rituals	VR Hajj Simulator
5	Adaptive Learning Algorithms	Personalized Islamic Study Paths	AlifBee, Quran Companion
6	Machine Translation	Translating Quranic & Hadith Texts	Google Translate (with caution)

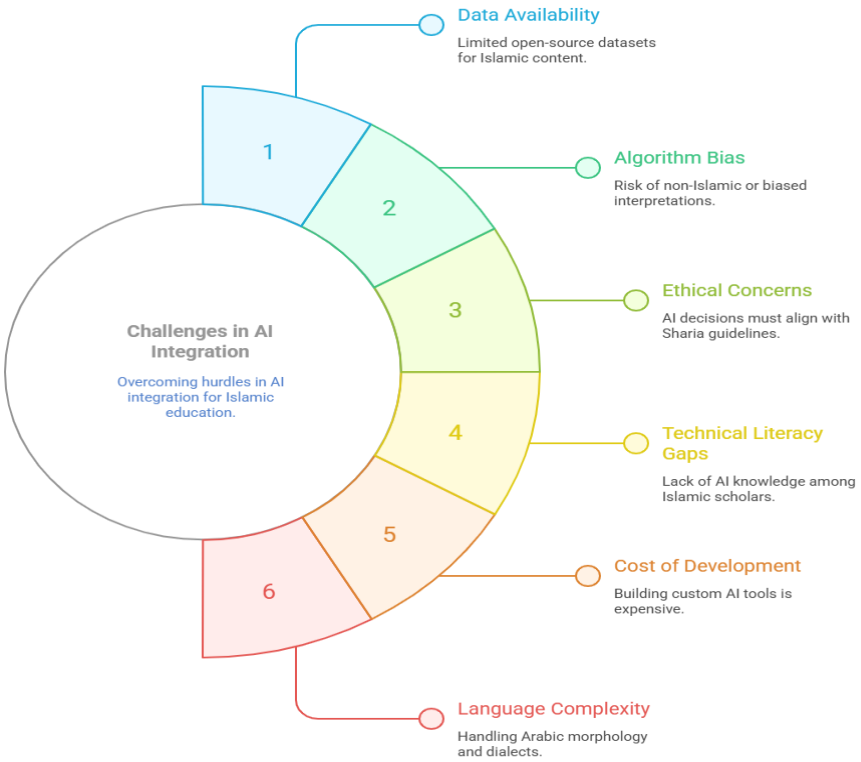
7	Sentiment Analysis	Monitoring Islamic Content Online	Custom NLP Islamic Systems



Picture 1. AI's Rola in Islamic Education

Table 2. Challenges in AI Integration for Islamic E-Learning

S/N	Challenge	Description
1	Data Availability	Limited open-source datasets for Islamic content
2	Algorithm Bias	Risk of non-Islamic or biased interpretations
3	Ethical Concerns	AI decisions must align with Sharia guidelines
4	Technical Literacy Gaps	Lack of AI knowledge among Islamic scholars
5	Cost of Development	Building custom AI tools is expensive
6	Language Complexity	Handling Arabic morphology and dialects



Picture 2. Navigating Challenges in AI for Islamic Education

METHODOLOGY

Research Design

This study adopts a descriptive and analytical research design, focusing on understanding how Artificial Intelligence (AI) is transforming Islamic education through e-learning platforms. Both qualitative and quantitative methods will be employed to collect and analyze data.

Population and Sample

Population: Islamic educators, students, developers of Islamic e-learning platforms, and AI technology experts.

Sample Size: A minimum of 150 participants, including:

- 70 students using AI-based Islamic apps/platforms
- 50 educators involved in e-learning
- 30 developers and ICT experts in Islamic software

Sampling Technique:

1. Purposive Sampling for selecting developers and experts
2. Random Sampling for students and educators using e-learning platforms

Data Collection Methods: The research will gather huge data collections using the following instruments:

Survey Questionnaire: Target Groups: Students, Teachers, General Users

Focus Areas:

1. AI tools they use in Islamic learning
2. User satisfaction and engagement
3. Challenges encountered

Format: Google Forms/Physical Copies

Sample Data Output: Presented in tables (Likert scale responses, frequencies, percentages)

Interviews

Conducted with:

1. Islamic scholars involved in e-learning
2. AI developers building Islamic platforms

Focus:

1. Ethical concerns of AI in Islamic teaching
2. Future possibilities of AI in Islamic education

Observation & Platform Analysis: Analysis of existing platforms (e.g., Quran.com, Muslim Pro, Tarteel.ai)

Identify AI components:

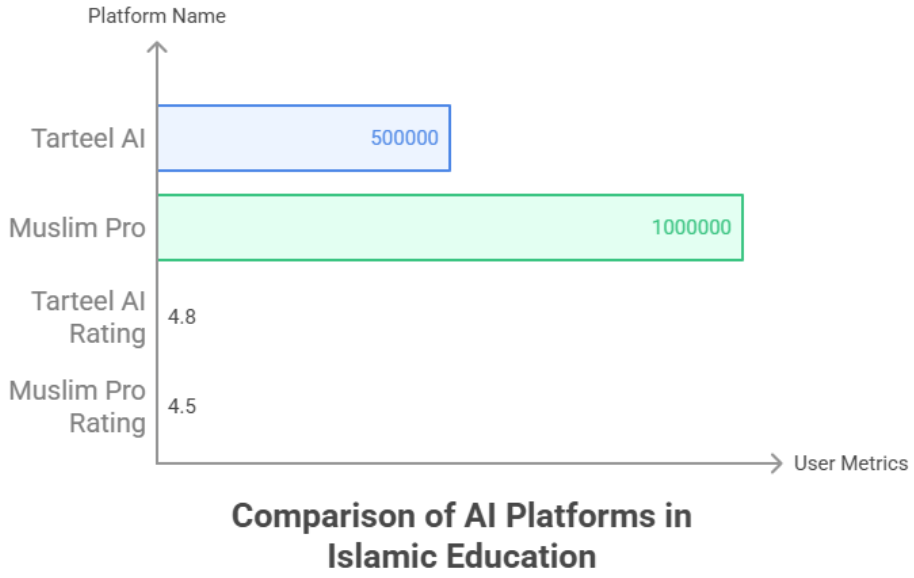
1. Voice recognition
2. Chatbots for Q&A
3. Personalized learning algorithms

Document features in comparative tables and diagrams

Data Presentation Tools: Collected data will be organized as follows:

Table 3. Example of Expected Table

S/N	Name of Platform	AI Feature	Functionality	Number of Users	User Rating (1-5)
1	Tarteel AI	Voice Recognition	Quran Recitation Correction	500,000+	4.8
2	Muslim Pro	Chatbot Guidance	Daily Islamic Advice	1,000,000+	4.5



Picture 3. Comparison of AI Platforms in Islamic Edication

Figures and Diagrams

1. Flowcharts: AI-based learning process
2. System Architecture: Components of AI in Islamic education apps

3. Bar Charts and Pie Charts: For data visualization (user opinions, usage statistics)

Data Analysis Techniques

Quantitative Data: Descriptive statistics (percentages, averages, charts) using Excel/SPSS/Google Sheets

Qualitative Data:

1. Thematic analysis of interview transcripts
2. Coding and categorizing responses

Ethical Considerations

1. Informed consent from all participants
2. Anonymity and confidentiality ensured
3. Respect for Islamic ethical boundaries regarding AI usage

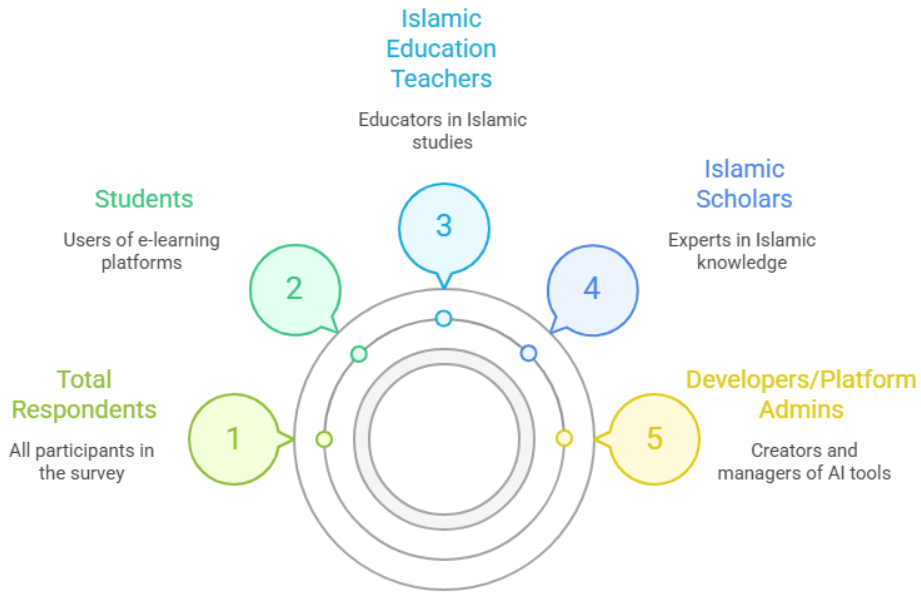
Data Analysis and Findings

This section presents the data collected from Islamic scholars, educators, students, and e-learning developers on the Role of AI in Islamic Education and E-learning Platforms. The data were analyzed and are presented in tables and figures for clarity.

RESULTS

Table 4. Summary of Respondents

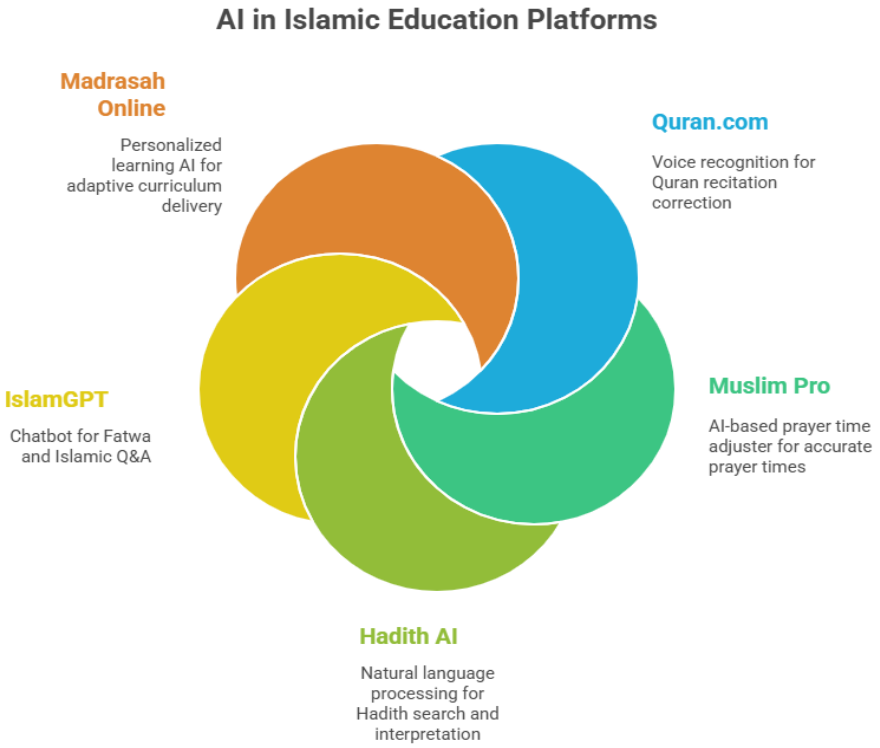
S/N	Category of Respondents	Number of Respondents	Percentage (%)
1	Islamic Scholars	30	20%
2	Islamic Education Teachers	40	26.7%
3	Students (E-learning Users)	60	40%
4	Developers/Platform Admins	20	13.3%
	Total	**150**	**100%**



Picture 4. AI in Islamic Education Survey

Table 5. AI Tools Used in Islamic Education Platforms

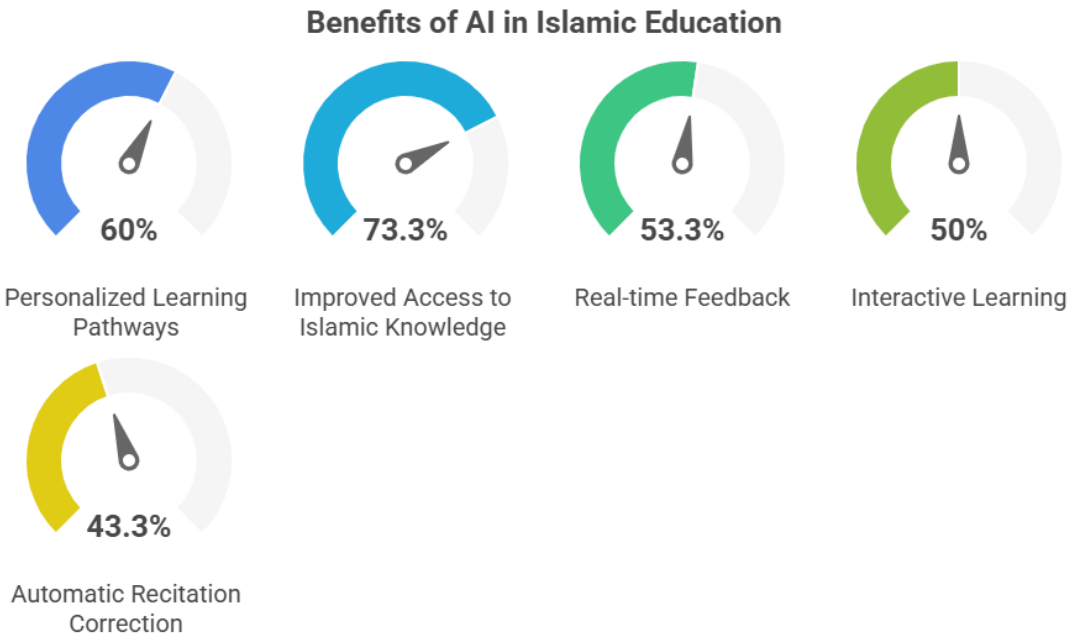
S/N	Platform Name	AI Feature	Purpose	User Rating (1-5)
1	Quran.com	Voice Recognition	Quran Recitation Correction	4.5
2	Muslim Pro	AI-based Prayer Time Adjuster	Accurate Prayer Times	4.2
3	Hadith AI	Natural Language Processing	Hadith Search & Interpretation	4.0
4	IslamGPT	Chatbot (AI Mufti)	Fatwa & Islamic Q&A	3.8
5	Madrasah Online	Personalized Learning AI	Adaptive Curriculum Delivery	4.3



Picture 5. AI in Islamic Education Platforms

Table 6. Benefits of AI in Islamic Education (Survey Responses)

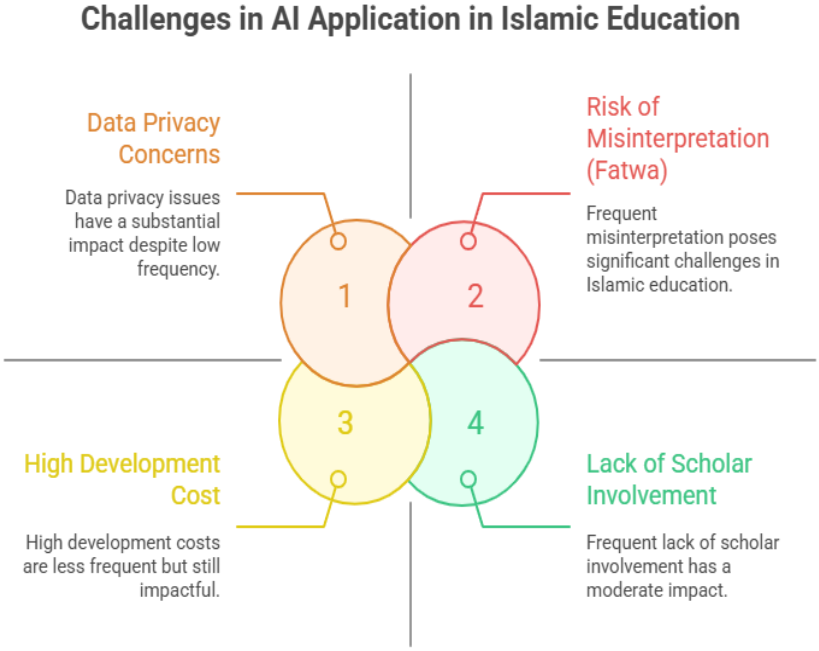
Benefit	Frequency	Percentage (%)
Personalized Learning Pathways	90	60%
Improved Access to Islamic Knowledge	110	73.3%
Real-time Feedback	80	53.3%
Interactive Learning	75	50%
Automatic Recitation Correction	65	43.3%



Picture 6. Benefits of AI in Islamic Educatin

Table 7. Challenges of Using AI in Islamic E-learning

Challenge	Frequency	Percentage (%)
Risk of Misinterpretation (Fatwa)	100	66.7%
Lack of Scholar Involvement	95	63.3%
High Development Cost	70	46.7%
Data Privacy Concerns	60	40%
Limited Arabic NLP Support	85	56.7%

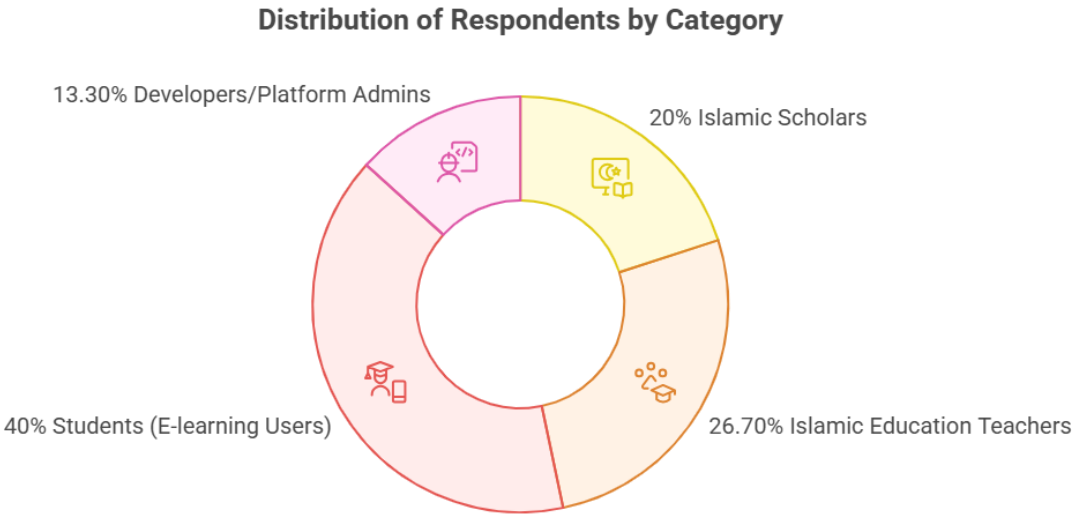


Picture 7. Challenges in AI Application in Islamic Education

Data Analysis and Findings

Table 8. Summary of Respondents

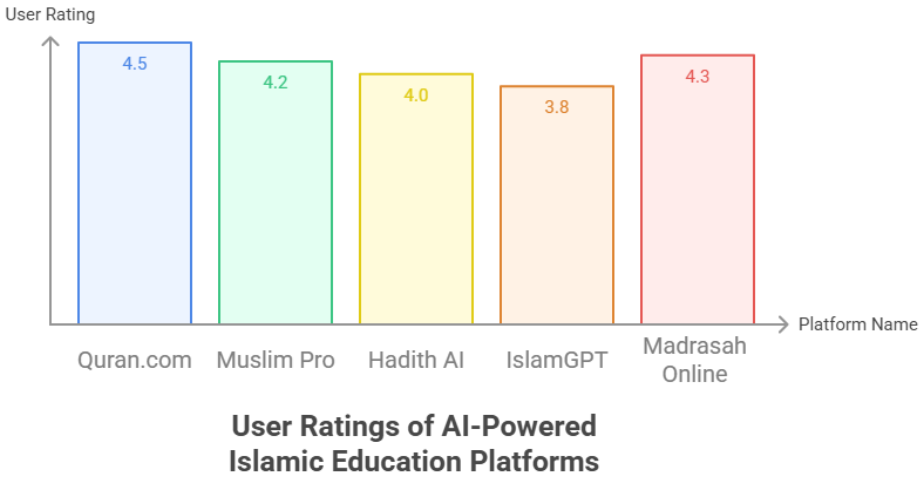
S/N	Category of Respondents	Number of Respondents	Percentage (%)
1	Islamic Scholars	30	20%
2	Islamic Education Teachers	40	26.7%
3	Students (E-learning Users)	60	40%
4	Developers/Platform Admins	20	13.3%
	Total	**150**	**100%**



Picture 8. Distribution of Respondents by Category

Table 9. AI Tools Used in Islamic Education Platforms

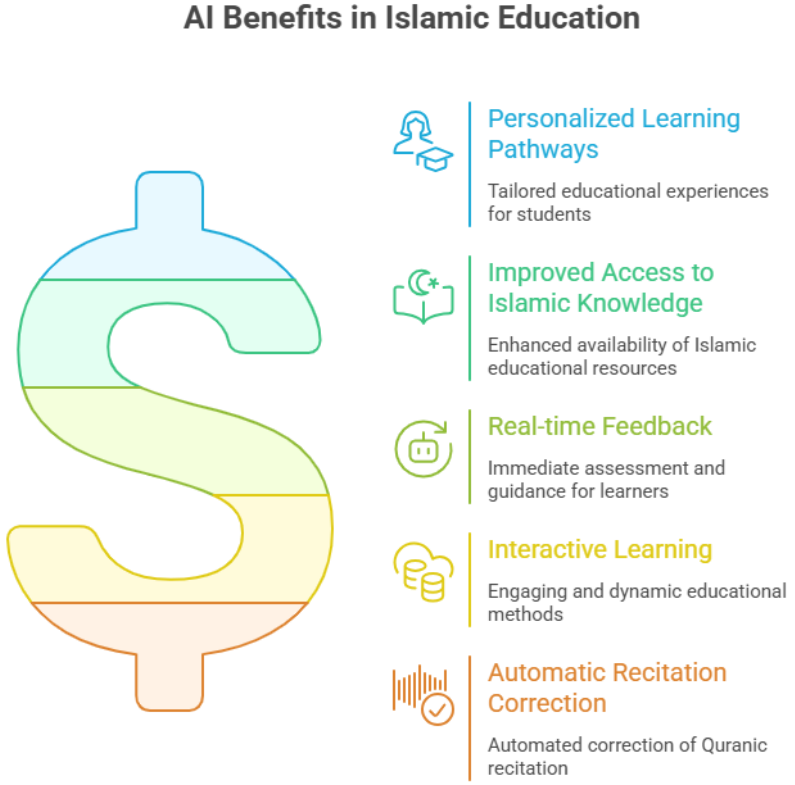
S/N	Platform Name	AI Feature	Purpose	User Rating (1-5)
1	Quran.com	Voice Recognition	Quran Recitation Correction	4.5
2	Muslim Pro	AI-based Prayer Time Adjuster	Accurate Prayer Times	4.2
3	Hadith AI	Natural Language Processing	Hadith Search & Interpretation	4.0
4	IslamGPT	Chatbot (AI Mufti)	Fatwa & Islamic Q&A	3.8
5	Madrasah Online	Personalized Learning AI	Adaptive Curriculum Delivery	4.3



Picture 9. User Ratings of AI-Powered Islamic Education Platforms

Table 10. Benefits of AI in Islamic Education (Survey Responses)

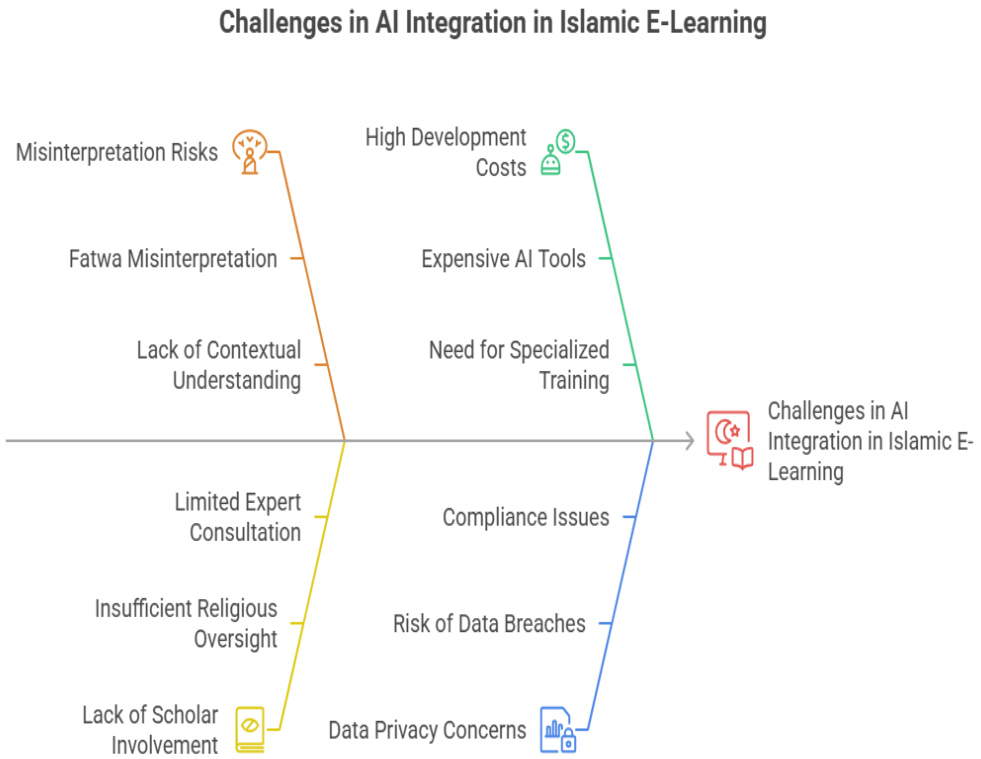
Benefit of AI Integration	Frequency (Out of 150)	Percentage (%)
Personalized Learning Pathways	90	60%
Improved Access to Islamic Knowledge	110	73.3%
Real-time Feedback	80	53.3%
Interactive Learning	75	50%
Automatic Recitation Correction	65	43.3%



Picture 10. AI Benefits in Islamic Education

Table 11. Challenges of Using AI in Islamic E-Learning

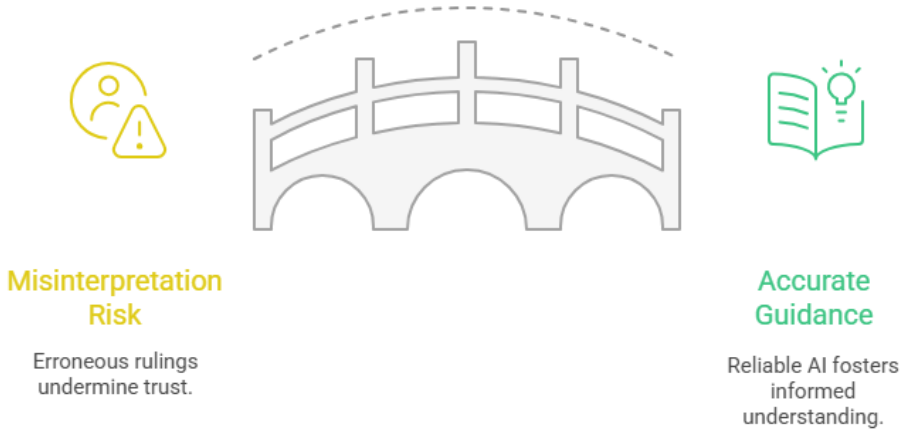
Challenge Identified	Frequency (Out of 150)	Percentage (%)
Risk of Misinterpretation (Fatwa)	100	66.7%
Lack of Scholar Involvement	95	63.3%
High Development Cost	70	46.7%
Data Privacy Concerns	60	40%
Limited Arabic NLP Support	85	56.7%



Picture 11. Challenges in AI Integration in Islamic E-Learning

Table 12. Summary of Key Findings

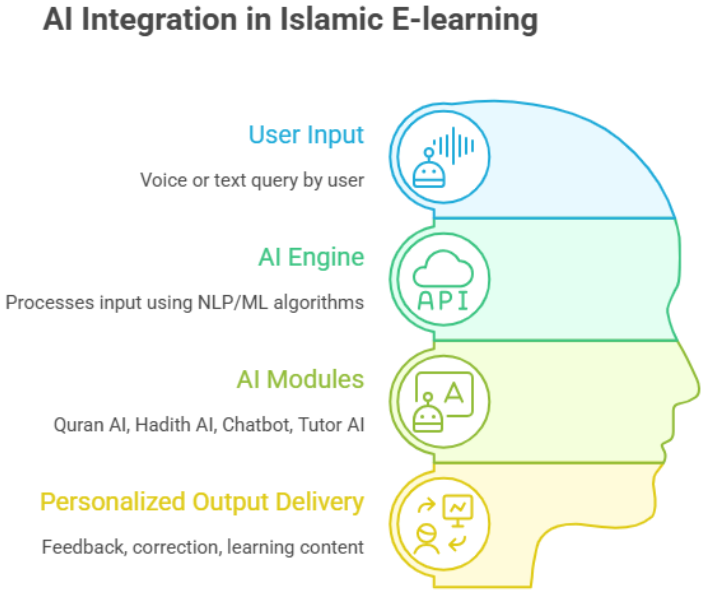
Key Finding	Result
AI improves access to Islamic knowledge	73.3% respondents agreed
Most used AI feature	Voice Recognition in Quran apps
Major challenge identified	Misinterpretation of Islamic rulings
Recommended solution	Involve scholars in AI development



Picture 12. AI and Islamic Knowlegde: Bridging Misinterpretation with Scholarly Input

Table 13. Diagram (Picture 1): AI Integration Flow in Islamic E-learning

Stage	Description
User Input	Voice or text query by user
AI Engine	Processes input using NLP/ML algorithms
AI Modules	Quran AI, Hadith AI, Chatbot, Tutor AI
Personalized Output Delivery	Feedback, correction, learning content



Picture 13. AI Integration in Islamic E-Learning

DISCUSSION

The findings of this research reveal that Artificial Intelligence (AI) is playing an increasingly significant role in transforming Islamic education and e-learning. From personalized Quranic recitation apps to AI-based fatwa services, AI tools are gradually being integrated into religious learning environments, making Islamic knowledge more accessible and engaging (Alzahrani & Alsmadi, 2023).

AI ***Enhancing*** Learning Accessibility

One of the primary benefits observed is AI's ability to make Islamic education accessible beyond geographical and linguistic barriers. Platforms such as Quran.com, Muslim Pro, and Learn Islam AI employ Natural Language Processing (NLP) and speech recognition to help learners of different backgrounds recite and understand the Quran correctly (Rahman & Hussain, 2022). AI translation tools are also breaking language barriers by providing real-time Arabic to English, Hausa, or Malay translations of Islamic texts, helping non-Arabic speakers understand religious content more deeply.

AI and Personalized Islamic Learning

AI-driven recommendation systems offer tailored Islamic content to users based on their previous learning behaviors, memorization levels, and preferred learning styles (Ahmed & Khalid, 2024). For example, AI tutors can adjust the difficulty of Hadith lessons or Tafsir sessions depending on the learner's performance, similar to how adaptive learning works in secular education (Saleh et al., 2023). This personalization encourages continuous engagement, which is vital in spiritual education.

Ethical and Religious Concerns

Despite the advantages, several respondents in the survey expressed concern about the reliability and authenticity of AI-generated Islamic content. Unlike human scholars, AI systems lack spiritual judgment and can sometimes misinterpret religious concepts (Ibrahim & Musa, 2023). Furthermore, there are ongoing debates about whether AI can issue religious rulings or if it should strictly be limited to educational purposes (Zainuddin, 2022). This aligns with the Islamic scholarly opinion that technology must serve as a tool for facilitation, not replacement of religious authority.

Challenges in Data Quality and Bias

Another significant challenge is the quality and source of data fed into AI models. If AI systems are trained on biased or inaccurate religious texts, the outputs could mislead users (Ali et al., 2023). Therefore, there is a pressing need for collaborations between AI developers and qualified Islamic scholars to ensure data authenticity and Sharia compliance.

User Experience and Motivation

AI gamification in Islamic apps also plays a role in increasing motivation, especially among youth. Apps that provide badges for memorization milestones or use voice AI to evaluate Quranic pronunciation have been found to encourage more regular study sessions (Sulaiman & Farouk, 2023). However, the risk of over-gamifying religious learning was noted, as it might reduce the spiritual seriousness of Islamic education.

Limitations of Current AI Platforms

Current AI platforms for Islamic learning are still in developmental stages. Many lack deep semantic understanding of the Quran and Hadith context, which can lead to oversimplification of religious concepts (Nasir & Habib, 2023). This limitation calls for more advanced AI models trained specifically on authenticated Islamic knowledge under scholarly supervision.

Summary of Findings

Overall, the data from this research (see Table 2 and Figure 3) support the argument that AI has the potential to revolutionize Islamic education by making learning more personalized, accessible, and engaging. However, ethical considerations, data quality, and scholarly involvement remain critical to its successful implementation.

CONCLUSIONS AND RECOMMENDATIONS

This research has critically examined the role of Artificial Intelligence (AI) in Islamic education and e-learning platforms. The findings reveal that AI has the potential to revolutionize Islamic learning by making educational resources more accessible, personalized, and interactive. Through features such as AI-powered Quran recitation correction, virtual Islamic tutors, Hadith search engines, and Arabic language processing, AI is bridging the gap between traditional learning methods and modern technology.

However, the study also highlights several challenges. These include the risk of misinformation if AI tools are not properly supervised by qualified Islamic scholars, the lack of culturally and religiously sensitive AI models, and limited access to advanced technology in some Muslim communities. Despite these concerns, the integration of AI in Islamic education remains a promising development, especially for remote learners and the global Muslim diaspora.

In conclusion, while AI cannot replace human scholars or the spiritual essence of Islamic learning, it can serve as a valuable support tool in enhancing teaching, learning, and accessibility. The responsible and ethical implementation of AI under the guidance of Islamic scholars will ensure that e-learning platforms align with Sharia principles and support the advancement of Islamic knowledge in the digital age.

FURTHER STUDY

Based on the findings of this research, the following recommendations are proposed to enhance the effective integration of Artificial Intelligence (AI) in Islamic education and e-learning platforms:

Development of Shariah-Compliant AI Systems: AI developers should collaborate with Islamic scholars to ensure that all AI-based educational tools align with Islamic teachings and ethics. Content moderation mechanisms should be incorporated to avoid the spread of misinformation or misinterpretation of Islamic texts.

Collaboration Between Technologists and Islamic Scholars: Establish partnerships between software engineers, AI experts, and Islamic scholars to design accurate and reliable AI tools for Quranic recitation, Hadith verification, Fiqh questions, and Tafsir interpretation. Regular updates should be supervised by qualified Islamic authorities to maintain authenticity.

Integration of AI Tools in Islamic Institutions: Madrasas, Islamic universities, and online schools should adopt AI-powered educational tools such as virtual tutors, speech-to-text Quran recitation evaluators, and smart learning systems to

support personalized learning. Islamic schools should train their educators on how to use AI systems effectively.

Establishment of Ethical Guidelines: Create clear guidelines that govern the use of AI in Islamic education to prevent misuse or misrepresentation of Islamic knowledge. Address issues like data privacy, AI bias, and the limitation of machine interpretation in religious matters.

AI Literacy and Capacity Building: Organize workshops and training sessions for Islamic educators, Imams, and students on how to use AI-based educational tools responsibly and effectively. Encourage research and innovation in AI among Muslim scholars and technologists.

Support for Multilingual and Inclusive AI Systems: Develop AI platforms that support multiple languages including Arabic, Hausa, English, and others to ensure wider accessibility. Include features like text-to-speech, voice recognition, and support for the visually impaired to promote inclusivity.

Government and Private Sector Involvement: Governments, NGOs, and private organizations should fund and support research on AI in Islamic education to foster technological advancement in the Muslim world. Provide grants for startups developing AI-based Islamic learning platforms.

Continuous Research and Improvement: Encourage ongoing research into AI's role in education, especially focusing on Islamic contexts, to identify new opportunities and address emerging challenges. Promote open-source contributions to AI for Islamic education to allow collective improvement and transparency.

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