



Opportunities and Challenges of Integrating Artificial Intelligence (AI) into Religious Education Systems: A Descriptive Study on Madrasa Education in Sri Lanka

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Abstract

Madrasa education in Sri Lanka has long served as a foundation for Islamic learning and community development, offering instruction in Islamic Studies and Arabic language, and related disciplines. However, many Madrasas continue to face challenges such as limited resources, traditional pedagogy, and the need to balance religious authenticity with modern relevance. At the same time, Artificial Intelligence (AI) is transforming education globally through adaptive learning, natural language processing, and intelligent tutoring systems. This study explores the opportunities and challenges of integrating AI into Madrasa education in Sri Lanka. Using a qualitative approach, data were collected from five Madrasas in the Eastern Province through focus group discussions with teachers and students, non-participant observations, and secondary sources such as scholarly literature and policy documents. Findings reveal that AI can support personalized and adaptive learning, multilingual assistance, and digital Qur'an and Hadith study tools, while also improving performance tracking and resource management. Nevertheless, integration faces barriers including technological and financial limitations, teacher preparedness, ethical concerns, and inadequate policy guidance. The study concludes that localized AI solutions, teacher training, and community engagement are essential for sustainable implementation. A balanced, culturally sensitive approach can enable Madrasas to benefit from AI innovations while preserving Islamic educational values.

Keywords: Artificial intelligence (AI), madrasa education, sri lanka, arabic language

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Introduction

Madrasa education has long been a basis of Islamic learning and community development in Sri Lanka. Rooted in centuries of tradition, Madrasas provide instruction in Qur'an, Hadith, Fiqh,

Arabic language, and related disciplines, while also serving as centers for moral and spiritual formation. In recent decades, many Madrasas have begun to incorporate elements of secular education, responding to the evolving needs of Muslim communities in a rapidly changing world and concerning contemporary educational, economic, and social trends of Sri Lanka. Nevertheless, they continue to face challenges such as limited resources, traditional teaching methods, and the demand to balance religious authenticity with modern relevance. At the same time, the global educational landscape is being transformed by Artificial Intelligence (AI). AI-driven technologies such as intelligent tutoring systems, adaptive learning platforms, natural language processing tools, and data analytics are reshaping how knowledge is delivered, assessed, and experienced. These tools hold promise not only for mainstream education but also for religious institutions, where they can support personalized learning, enhance access to knowledge, and facilitate multilingual education. (Hayati & Ushalli, 2024) confirm that recent research demonstrates growing interest in integrating artificial intelligence (AI) into Islamic education, particularly in Madrasah settings (Nwadiokwu, 2025). Studies reveal significant potential for AI and machine learning to enhance personalized learning experiences in Islamic educational institutions, though implementation requires careful planning and resource allocation (Hayati & Ushalli, 2024); (Herman Darmawan & M. Ramli, 2025).

For Madrasas in Sri Lanka, the integration of AI presents both opportunities and challenges. On one hand, AI could enrich traditional pedagogy, provide new ways of engaging students with Islamic sciences, and bridge the gap between religious and modern education. On the other hand, it raises concerns regarding cultural compatibility, ethical implications, financial possibility, and infrastructural willingness. This study, therefore, explores the integration of AI in Madrasa education in Sri Lanka, focusing on the potential benefits as well as the obstacles that may arise. By critically examining these dimensions, the research aims to contribute to the wider discourse on how religious education can adapt to technological advancements without losing its authenticity and core values.

Methodology

This study employed a qualitative research approach to explore the integration of Artificial Intelligence (AI) in Madrasa education in Sri Lanka, drawing on both primary and secondary data.

1. Research Setting and Participants

The research was conducted in the Eastern Province of Sri Lanka, focusing on five Madrasas in Batticaloa and Ampara districts. A purposive sampling technique was used to select five administrators, eight teachers, and twelve senior students who could provide informed perspectives on teaching, administration, and learning practices. This approach ensured representation from multiple levels of the Madrasa system.

2. Data Collection

Primary data were gathered through focus group discussions (FGDs) and non-participant observations. FGDs, conducted separately with teachers and students (6–8 participants per group), explored their views on AI's relevance, benefits, and challenges in religious education. Observations were used to examine classroom practices, teaching methods, and the existing use of technology. Secondary data—such as scholarly articles, reports, and policy documents—supported contextual understanding and triangulation.

3. Data Analysis and Trustworthiness

Data were analyzed thematically using an inductive approach based on Braun and Clarke's (2006) framework, allowing themes to emerge from participant experiences. Trustworthiness was

ensured through data triangulation, combining different data sources and participant groups to enhance the credibility and dependability of findings.

Results and Discussion

1. Madrasa Education in Sri Lanka: An Overview

1.1 Historical Development of Madrasas in Sri Lanka

Madrasas in Sri Lanka have a long-standing history, dating back to the 19th century when Muslim communities established them to provide religious education for children and young adults. Initially, they focused primarily on Qur'anic memorization, basic Islamic teachings, and Arabic language and literature. Over time, these institutions expanded, adapting to the needs of local communities while preserving Islamic identity. Many Madrasas were established as community initiatives, supported by parents and local leaders, emphasizing moral and spiritual development alongside academic learning. (Rislan et al., 2025) states that, Madrasah education in Sri Lanka has evolved significantly since its establishment in the late 19th century. The system developed through three distinct phases: pre-colonial Monolithic Madrasah (pre-1505 CE), Indigenous religious Madrasah during colonization (1505 CE to late 19th century), and the current Indian Model Madrasah. (M. H. Alrashidi & Ismail, 2025). These institutions emerged to teach the Holy Quran and religious sciences, serving as important components of the country's educational (Eva Nurazizah et al., 2025)

1.2 Current Structure and Curriculum

Today, Madrasas in Sri Lanka combine religious and secular education. The religious component includes Qur'an, Hadith, Fiqh (Islamic jurisprudence), Aqidah (principle of faith), and Arabic language, Islamic history, and ethics. Secular subjects often include mathematics, science, English, and native languages (Sinhala and Tamil), reflecting an effort to equip students with skills relevant to modern society. The structure varies widely: some Madrasas operate part-time alongside regular schools, while others function as full-time institutions or boarding schools. But, these institutions are criticized for primarily focusing on Arabic language instruction for religious purposes, offering eight-year sharia certificate courses alongside Quranic and religious sciences (Nagoor Gafoordeen, 2013). However, contemporary madrasahs face significant challenges including inadequate curriculum development, lack of qualified teachers due to unattractive salaries, insufficient modern equipment, and poor learning environments (Nagoor Gafoordeen, 2013).

1.3 Role in Community Development and Islamic Scholarship

Madrasas play a central role in community cohesion and development. They try to develop moral values, social responsibility, and religious literacy among students, while also serving as centers for adult religious education and community gatherings. Many Madrasas contribute to Islamic scholarship by producing teachers, imams, and religious leaders who serve local and national communities. Beyond religious instruction, Madrasas often organize social welfare initiatives, such as supporting underprivileged families and conducting charitable activities, reinforcing their integral role in community life. Thus, by integrating curricula that emphasize shared values, engaging with the wider community, and facilitating inter-religious understanding, Sri Lankan Madrasas have a promising role to play in strengthening social harmony and coexistence and reducing communal tensions.

1.4 Limitations and Challenges Before AI Integration

Despite their contributions, Madrasas face several challenges:

- I. Pedagogical limitations: Traditional methods often rely heavily on rote learning, with limited use of technology or interactive teaching approaches. Resource constraints: Many Madrasas lack modern facilities, digital tools, and well-trained teachers.
- II. Curriculum standardization: The curriculum varies across institutions, leading to differences in educational quality.
- III. Limited exposure to modern education: Students may struggle to balance religious and secular learning, and some may have limited proficiency in languages or digital literacy.
- IV. Administrative challenges: Record-keeping, performance tracking, and student assessment are often manual, time-consuming, and prone to inefficiency.

These limitations highlight the potential value of integrating AI tools to enhance teaching, administration, and learning outcomes, while respecting the religious and cultural context of Madrasas.

2. Artificial Intelligence in Education: A Global Perspective

Artificial Intelligence (AI) in education refers to the use of machine learning, natural language processing, and other AI technologies to enhance teaching, learning, and administrative processes. Key concepts include adaptive learning, where systems adjust to individual students' intelligence, level, and learning style; intelligent tutoring systems that provide personalized instruction and feedback; automated assessment and grading to improve efficiency and consistency; and learning analytics, which collect and analyze student data to guide decision-making and improve outcomes. Overall, AI aims to enhance learning experiences, increase accessibility, support teachers, and streamline administrative tasks. Globally, AI tools are applied across various educational contexts. Adaptive learning platforms, such as DreamBox, Smart Sparrow, and Knewton, personalize lessons to students' needs. Chatbots and virtual assistants assist students by answering queries and managing administrative tasks. Natural language processing (NLP) tools facilitate language learning, essay evaluation, translation, and automated feedback. Predictive analytics and data dashboards track student progress, identify learning gaps, and recommend targeted interventions.

Case studies from around the world demonstrate the potential of AI in education. In the United States, AI-powered tutoring platforms like Carnegie Learning have significantly improved math proficiency among middle and high school students. In Europe, intelligent feedback systems in universities provide automated grading and personalized learning recommendations. In Asian countries such as Indonesia and Malaysia, AI has been incorporated into Islamic schools to support Qur'anic learning, language acquisition, and administrative efficiency. This illustrates AI's ability to enhance personalization, efficiency, and scalability in diverse educational settings. The lessons from these global experiences are highly relevant for Madrasas. AI can support personalized learning for students progressing at different speeds in both religious and secular subjects, while language tools can assist in Arabic, English, and Tamil learning. AI can reduce administrative workload for teachers, allowing them to focus on instruction and mentoring, and learning analytics can provide insights into student performance and curriculum effectiveness. Furthermore, AI offers scalable solutions that can help standardize educational quality across multiple Madrasas, even in resource-limited settings. When integrated thoughtfully, AI has the potential to enhance educational outcomes while respecting the religious and cultural identity of Madrasas.

Recent research demonstrates AI's transformative potential in education through personalized learning approaches. AI technologies, including machine learning processes, intelligent tutoring systems, and adaptive learning platforms, enable tailored educational experiences by analyzing student data to predict performance and adjust instructional strategies in real-time (Yarlagadda, 2025). These systems assess individual strengths, weaknesses, and learning styles to recommend

customized materials and improve student engagement, retention, and academic achievement (Emmanuel Dumbuya, 2024). AI applications extend to specialized educational contexts, with Islamic education institutions exploring integration of AI and machine learning for personalized learning in Madrasah settings (Chakkaravarthy et al., 2025). Key benefits include enhanced efficiency, improved accessibility, and more equitable education through predictive analytics and automated grading systems (Emmanuel Dumbuya, 2024). However, implementation challenges include technical infrastructure requirements, teacher preparedness, data privacy concerns, and the digital divide (Wulandani et al., 2024); (Syafnan et al., 2025)

3. Opportunities of AI Integration in Madrasa Education

The integration of Artificial Intelligence (AI) into Madrasa education offers a wide range of opportunities across pedagogical, administrative, and social dimensions. From a pedagogical perspective, AI can support personalized learning and adaptive curricula, enabling students to progress at their own capacity and focus on areas where they need additional support. For example, AI-driven systems can adjust lessons in Qur'anic memorization, Arabic grammar, or Islamic studies according to individual learning speeds. Language translation tools can further enhance learning by providing real-time assistance in Arabic, Sinhala, Tamil, and English, allowing students to access a broader range of educational materials and facilitating multilingual understanding. Additionally, digital Qur'an and Hadith learning aids such as interactive recitation apps and AI-assisted annotation tools can make religious texts more accessible, engaging, and easier to study comprehensively. A research done by Moh. Mauluddin, (2024) finds that AI integration provides easy access to religious information sources including sacred texts, tafsir, and hadith, supporting more inclusive and in-depth learning while enabling personalized approaches suited to individual learner needs (Sukmawati, 2024).

AI also brings significant administrative advantages. Systems for student performance tracking and evaluation can monitor learning progress, identify gaps, and provide data-driven feedback to teachers, improving both academic outcomes and classroom management. Similarly, AI-based tools for resource management can optimize scheduling, manage teaching materials, and streamline administrative tasks, reducing workload and increasing operational efficiency in Madrasas. Beyond pedagogy and administration, AI creates social opportunities that can bridge the gap between traditional and modern education. By integrating AI, Madrasas can introduce students to modern learning technologies while preserving religious and cultural values, fostering a balance between heritage and innovation. Moreover, AI can enhance global connectivity, enabling students to participate in online learning communities, access international educational resources, and connect with scholars and peers worldwide. These opportunities demonstrate that AI has the potential not only to improve educational quality but also to strengthen the overall relevance and impact of Madrasa education in a rapidly evolving digital world. (Amilusholihah & Ramadhan, 2025) found that "AI has moderate but significant impact on Islamic education. The most influential factors are socio-cultural factors followed by learning effectiveness focusing on adaptive learning and the connectedness of the learning environment." (Zaharah et al., 2024).

4. Challenges of AI Integration in Madrasa Education

Despite its potential, integrating Artificial Intelligence (AI) into Madrasa education faces several significant challenges across technological, financial, cultural, and regulatory dimensions. From a technological perspective, many Madrasas lack the necessary infrastructure, including adequate devices, reliable internet access, and electricity, which hinders the implementation of AI tools. In addition, most existing AI solutions are not suitable for the linguistic needs of Madrasa students, who often study in Arabic, Tamil, or Sinhala, creating a demand for localized AI tools that can effectively support multilingual learning and religious content. Financial limitations also pose a major obstacle.

Many Madrasas operate with limited budgets, relying on community donations, which makes investing in digital transformation, AI software, and training programs challenging. Beyond technology and funding, cultural and religious concerns can affect acceptance. Some community members and teachers may resist AI, fearing that modern technologies could undermine traditional teaching methods or weak religious values. There are also ethical considerations, as AI systems must be carefully designed to align with Islamic principles and avoid content or practices that contradict religious teachings. As Sukron Djazilan et al. (2024) observe, “despite its benefits, AI implementation in Islamic schools faces several challenges, including technological infrastructure limitations, teacher readiness, and ethical concerns related to AI alignment with Islamic principles” (Djazilan et al., 2024).

Finally, policy and regulatory challenges further complicate integration. Sri Lanka currently lacks clear national guidelines or frameworks for incorporating AI into religious education, leaving Madrasas without structured support or standards. Additionally, data privacy and security concerns are critical, as student information and learning data must be protected to prevent misuse. Together, these challenges highlight the need for careful planning, community engagement, and policy development to ensure that AI integration in Madrasas is both effective and culturally appropriate. This part focuses on case studies for comparing experiences. Examining AI integration in Madrasas and Islamic schools in other Muslim-majority countries provides valuable insights that can inform practices in Sri Lanka. In Malaysia, several Islamic schools have adopted AI-driven learning platforms to support Qur’anic memorization, Arabic language instruction, and adaptive learning in secular subjects, demonstrating improvements in both engagement and academic outcomes. Similarly, in Indonesia, Madrasas have incorporated digital Qur’an apps, AI-assisted recitation tools, and language translation software to personalize instruction and facilitate multilingual learning. In parts of the Middle East, particularly in countries like Saudi Arabia and the United Arab Emirates, AI-powered intelligent tutoring systems are used in both traditional and modern Islamic education settings, helping students access personalized content, track their learning progress, and connect with teachers remotely.

These examples reveal several lessons that can be adapted for Sri Lankan Madrasas. First, localized AI tools that accommodate the specific linguistic and cultural context of students are essential for effective implementation. Second, combining AI with traditional pedagogy enhances engagement without undermining religious values. Third, teacher training and community involvement are critical to ensuring acceptance and successful adoption. Finally, scalable AI solutions can help standardize educational quality across multiple institutions, even in resource-constrained environments. By learning from these global experiences, Sri Lankan Madrasas can develop a strategic approach to AI integration that balances innovation with tradition and maximizes educational outcomes. Global experiences provide important lessons for Sri Lankan Madrasas in integrating Artificial Intelligence. At Al-Risalah Islamic Boarding School, for instance, researchers note that “additional training and reinforcement of local values in teaching materials” are essential when adopting AI, highlighting the need for localized tools that respect linguistic and cultural contexts. (Zaharah et al., 2024). Similarly, studies on Muslim learning environments show that AI can complement, rather than replace, traditional pedagogy, as “AI tools enable us to concentrate on spiritual growth and mentoring” once routine tasks are automated (Munawwaroh & Adeleke Adeoye, 2024). At the same time, scholars emphasize that scalable AI platforms can “offer rapid feedback and adaptive study paths, promising more responsive learning environments,” which is crucial for maintaining quality across multiple institutions despite resource constraints (Papakostas, 2025). Together, these insights suggest that localized AI solutions, combined with teacher training, community involvement, and scalable models, can help Sri Lankan Madrasas balance innovation with tradition while enhancing educational outcomes.

Conclusion

This study examined the integration of Artificial Intelligence (AI) into Madrasa education in Sri Lanka, focusing on Madrasas in the Eastern Province. Findings show that AI can enhance personalized learning, support multilingual education, and improve administrative efficiency through digital Qur'an and Hadith tools, adaptive platforms, and performance tracking systems. These innovations can enrich traditional pedagogy while maintaining the religious and cultural values of Madrasas. Despite these opportunities, the study identified challenges including technological and financial limitations, teacher readiness, ethical and cultural concerns, and the lack of clear policy guidelines. Effective AI adoption therefore requires a balanced and context-sensitive approach that aligns innovation with Islamic educational principles. The study implies that developing localized AI tools, providing teacher training, and promoting community participation are key to sustainable implementation. However, as a qualitative study limited to a few institutions in Eastern Sri Lanka, the findings may not fully represent all Madrasas nationwide. Future research should examine broader contexts and assess measurable educational outcomes. In conclusion, AI offers significant potential to modernize Madrasa education while preserving its spiritual foundation if integrated thoughtfully, ethically, and in alignment with local cultural and religious contexts.

Conflicts of Interest

The author declares no conflict of interest.

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