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Technology in Islamic Education Curriculum: Challenges and Opportunities

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ABSTRACT

The integration of technology into Islamic education is crucial for meeting the evolving needs of students in the digital age, aiming to enhance both academic and moral development while preserving Islamic values. However, several challenges hinder this integration, including inadequate infrastructure, limited teacher training, and resistance to new teaching methods. This study explores these challenges and identifies opportunities for integrating technology into the curriculum of Islamic Elementary Schools (Madrasah Ibtidaiyah) and Kindergartens (TK) in Indonesia. A systematic review following the PRISMA framework was conducted, analyzing nine articles out of 25,570. The study identified key barriers, such as limited access to digital devices and the internet, inadequate digital competency among teachers, and resistance to changes in traditional pedagogical methods. Despite these challenges, the study highlights opportunities to enhance student engagement and foster critical thinking through the use of interactive technologies, such as multimedia and AI. These technologies can bridge the gap between traditional Islamic values and modern educational practices. This study demonstrates the importance of continuous professional development for teachers, investment in digital infrastructure, and curriculum reform that integrates Islamic teachings with modern technology. A balanced approach is crucial to ensure the integrity of Islamic education while simultaneously harnessing the benefits of technological advancements. Future research should focus on developing strategies to address these challenges and maximize the potential of technology in Islamic teaching, ultimately improving student outcomes and engagement.

***Keywords**: Technology Integration, Islamic Education, Madrasah Ibtidaiyah, Teacher Training, Pedagogical Innovation*

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INTRODUCTION

The rapid advancement of educational technology has dramatically transformed modern education worldwide, providing innovative tools that enhance learning outcomes, foster creativity, and cultivate critical skills. In Indonesia, this shift is particularly significant in Islamic teaching, specifically within institutions like Madrasah Ibtidaiyah (MI) and Kindergartens (TK) (Salim et al., 2024). The integration of technology into early education presents considerable opportunities to improve the educational experience, while also posing unique challenges that require strategic solutions (Sofwan Manaf, 2023). The widespread adoption of digital tools, however, raises critical questions regarding their alignment with the goals of Islamic education(Dwinata et al., 2024).

Islamic education places a strong emphasis on fostering moral and ethical principles in addition to academic growth. The Islamic curriculum places a strong focus on character development from an early age in early education settings such as MI and TK. In contrast, traditional approaches frequently concentrate on memorization and rote learning. However, a significant shift is underway, with educational leaders increasingly advocating for the use of contemporary technology to enhance interactive, student-centered learning. This shift aims to foster creativity, critical thinking, and deeper engagement with complex subjects such as Fiqh (Islamic jurisprudence), Akidah (creed), and Akhlak (ethics) (Huda et al., 2024). However, it remains unclear to what extent educational technologies can effectively contribute to improving learning outcomes in these traditionally challenging subjects.

Research on the integration of technology in education has shown promising results in various contexts (Dwinata et al., 2024). There is a lack of substantial evidence supporting the assertion that educational technologies universally lead to improved outcomes in Islamic education at the early education level. Furthermore, the challenge of balancing modern technological advancements with the preservation of Islamic values remains underexplored (Laila & Anwar, 2024). The existing literature has not sufficiently addressed how technology can be strategically integrated into the Islamic curriculum without compromising its moral and ethical foundations.

In addition to these pedagogical concerns, several challenges limit the effective incorporation of technology into MI and TK in Indonesia. Infrastructure remains a significant barrier, as many schools struggle to acquire essential technological resources, including computers, tablets, and reliable internet access. Budget constraints further exacerbate these issues, limiting schools' ability to obtain the necessary devices and digital learning materials (Salim et al., 2024). Additionally, a significant digital skills gap exists between younger and older educators, with many veteran teachers lacking the necessary training to effectively

integrate technology into their teaching practices (Syukur et al., 2023). These challenges highlight the need for comprehensive professional development programs to enhance educators' digital competencies.

Cultural factors also contribute to the resistance against technological integration in Islamic education. Traditional educational practices in Islamic schools, including lecture-based methods and rote memorization, continue to dominate. This resistance is compounded by the perception that technology serves only as a tool for speeding up learning rather than enhancing understanding and pedagogy. As such, many educators and stakeholders view technology with skepticism, questioning its potential to improve the educational process and promote critical thinking (Susilo & Kartowagiran, 2023).

This study aims to identify and address the main challenges in integrating technology into the Islamic education curriculum, particularly in Madrasah Ibtidaiyah (MI) and Kindergartens (TK) in Indonesia. It focuses on several key areas. First, it aims to identify infrastructure challenges that hinder the implementation of technology-based learning in MI and TK, particularly in remote areas where many schools lack adequate hardware and software, and have unstable internet connections (Siregar et al., 2025). Second, the study aims to assess the technical skills of teachers, many of whom have not been trained in using technology effectively for teaching, whether in delivering lessons, interacting with students, or assessing their work (Haddade et al., 2024). It also addresses the cultural resistance that often favors traditional teaching methods (Binsaleh & Binsaleh, 2023). Third, the research will analyze the opportunities for utilizing technology to enhance the quality and effectiveness of Islamic education, particularly through more interactive learning methods such as video, animations, and web-based educational applications, which can increase student participation and facilitate peer collaboration (Azman et al., 2025).

In addition, the study will propose systematic strategies to overcome existing barriers, including continuous teacher training to enhance digital skills and the provision of adequate infrastructure in schools, particularly in underserved areas (Tsilenko et al., 2023). Furthermore, the research will evaluate the effectiveness of technology integration in Islamic education, examining not only its impact on academic outcomes but also on student motivation and the development of character and ethics, which are essential components of Islamic education (Lu et al., 2025). Ultimately, the study will emphasize the significance of collaboration among stakeholders, including the government, schools, parents, and the community, in fostering an environment that promotes the effective use of technology in education (Abubakari et al., 2024).

METHOD

This study adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, a robust framework designed to enhance the transparency, rigor, and replicability of the review. The systematic review protocol is often divided into three key phases: planning, conducting, and reporting. Each phase is crucial to ensure that the review adheres to high standards of quality and completeness, resulting in an evidence-based synthesis of the available literature on the specified topic. The principles outlined in these guidelines have been integrated into various research studies, demonstrating their widespread application across different fields of research.

Planning of the Review

In the planning phase, researchers outline clear research objectives, formulate specific inclusion and exclusion criteria, and determine an appropriate methodology for data collection. This foundational step is critical, as it helps to narrow the focus of the review and defines the scope of literature to be reviewed. For instance, studies such as those by Jessen et al. (2022) exemplify how adherence to PRISMA guidelines shapes the research design, ensuring that all relevant articles meet pre-established quality standards for inclusion. The establishment of these criteria enhances the likelihood that the review will yield relevant and reliable findings that contribute meaningfully to the field of study (Pressman et al., 2024). During this phase, three key procedures are undertaken: database searching and keyword selection, establishing inclusion and exclusion criteria, and the selection process.

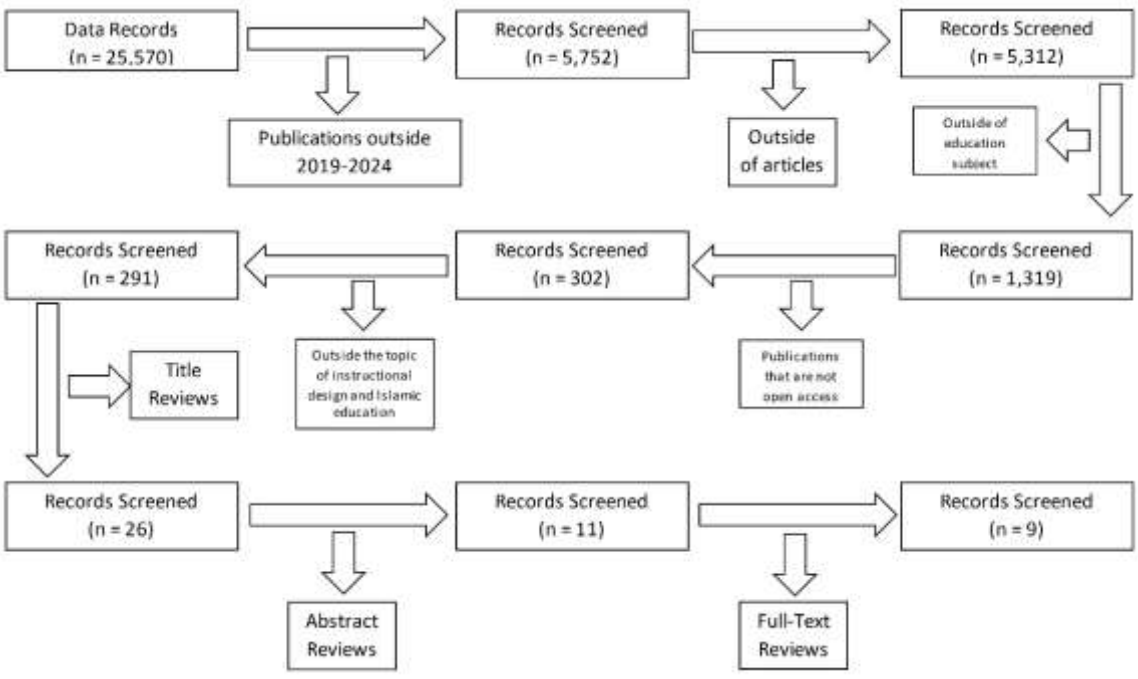

Figure 1. Flowchart of the study

The initial dataset retrieved from the Taylor & Francis database comprised 25,570 articles related to Islamic education. Taylor & Francis was selected as the primary database due to its reputation as a leading academic publisher known for high-quality books and scholarly journals. This publishing house encompasses a broad range of disciplines, as evidenced by the diverse publications featured in the search results (Cavagnis et al., 2023). Subsequently, specific criteria were established to determine the selection of articles for review. The detailed criteria for article selection are presented in Table 1.

Table 1. Inclusion and exclusion criteria

Inclusion	Exclusion
Published from 2020 to 2025	Published from 2020 to 2025
Are the published articles?	Not a published article
Inside of education subject	Outside of the education subject
Open Access	Closed Access
Include instructional design and Islamic education topics	Outside of instructional design and Islamic education topics

The selected articles were required to meet specific inclusion criteria: (1) they must have been published between January 1, 2020, and Mei 1, 2025; (2) they must be peer-reviewed journal articles (excluding books, short documents, or other formats); (3) they must fall within the field of education; (4) they must be open-access publications; and (5) they must focus on instructional design and Islamic education.

The selected papers were anticipated to exhibit a high degree of quality and relevance to the integration of technology in Islamic education, specifically within the context of Madrasah Ibtidaiyah and Kindergarten curriculum, after a rigorous selection process based on predetermined criteria. Each selected study was required to make a significant contribution to understanding how technology can enhance instructional design and curriculum development in Islamic education. Researchers ensured that the included articles employed robust methodologies, presented in-depth analyses, and provided reliable conclusions regarding the challenges and opportunities of integrating technology.

Additionally, it was clearly documented how each article related to the research issue, specifically about Islamic education and the use of technology in early childhood education. This meticulous selection process ensured that only high-quality studies meeting the established standards were incorporated into the literature review. As a result, the findings of this review offer valuable contributions to advancing knowledge in the field of technology integration in Islamic education curriculum development.

Ultimately, after a thorough review of the titles, abstracts, and full texts, a total of nine articles were deemed suitable for analysis. These selected articles are internationally recognized and uphold high academic standards. The details of these nine articles are presented in Table 2.

Table 2. Articles to be reviewed

Studies	Authors	Title	Journal	Year
1	Zakiyyah, I., Suparto, & Maswani	Learning Management of Islamic Religious Education Based on Digital Technology	12th International Conference on Cyber and IT Service Management	2024
2	Binsaleh, S., Binsaleh, M.	4P-2E Model: Teaching and Learning Process Through ICT Integration for Private Islamic Schools in Thailand	Asian Journal of University Education	2020
3	Achruh, Rapi, M., Rusdi, M., Idris, R.	Challenges and Opportunities of Artificial Intelligence Adoption in Islamic Education in Indonesian Higher Education Institutions	International Journal of Learning, Teaching and Educational Research	2024
4	Siregar, H.S., Nurhamzah, Munir, M., Fikri, M.	Enhancing Islamic Education Through Technology Integration: A Study Of Teaching Practices In Indonesia	Jurnal Ilmiah Peuradeun	2025
5	Rekan, A.A., Kasim, T.S.A.T., Jamil, A.I.B., Jodi, K.H.M.	Creative and Active Learning of the History of Islamic Education Using the Nearpod Application	Jurnal Ilmiah Peuradeun	2025
6	Miskiah, M., Suryono, Y., Sudrajat, A.	Integration of Information and Communication Technology into Islamic Religious Education Teacher Training	Cakrawala Pendidikan	2020
7	Arim, S.N., Ajmain, M.T., Abdul Razak, K., Mohd Noor, S.S.	Navigating Educational Turbulence: A Systematic Literature Review on Challenges Faced by Islamic Education Amid the Pandemic	Studies in Systems, Decision and Control	2024
8	Azman, N.A., Hamzah, M.I., Baharudin, H.	Digital Teaching Strategies of Islamic Education Teachers: A Case Study in Primary Schools	International Journal of Learning, Teaching and Educational Research	2025

Studies	Authors	Title	Journal	Year
9	Abubakari, M.S., Shafik, W., Hidayatullah, A.F.	Evaluating the Potential of Artificial Intelligence in Islamic Religious Education: A SWOT Analysis Overview	AI-Enhanced Teaching Methods	2024

The reviewed articles are published in seven respected academic journals, as detailed in Table 2: (1) Jurnal Ilmiah Peuradeun (3 articles), (2) International Journal of Learning, Teaching and Educational Research (3 articles), (3) Cakrawala Pendidikan (1 article), (4) Asian Journal of University Education (1 article), (5) 12th International Conference on Cyber and IT Service Management (1 article), (6) AI-Enhanced Teaching Methods (1 article), and (7) Studies in Systems, Decision and Control (1 article). These articles span from 2020 to 2025 and are distributed as follows: (1) 2019 (1 article), (2) 2020 (1 article), (3) 2024 (5 articles), and (4) 2025 (2 articles). This distribution indicates a growing emphasis on integrating technology into Islamic education and improving teaching practices, with a notable increase in publications since 2024.

Conducting the Review

Upon selecting the relevant studies, we systematically coded and categorized the data based on themes or variables aligned with our research objectives. First, we conducted a comprehensive analysis of the extracted findings, followed by their interpretation and integration within relevant theoretical frameworks. This process enabled a deeper understanding of the relationships between the findings and established theoretical concepts in the literature, thereby strengthening the coherence of our interpretations. Next, the researchers identified recurring patterns and interconnections among the findings, including similarities, differences, influencing factors, and their practical implications for Islamic education. Recognizing these patterns allowed for a more nuanced understanding of the phenomena under study. The findings were then systematically organized into a structured narrative, ensuring that the information was presented clearly and logically. This step was essential in articulating well-founded conclusions. Lastly, it is conducted that a validation and verification process is undertaken to ensure the accuracy and reliability of the results. This involved revisiting the primary data from the selected studies, engaging in discussions with fellow researchers and subject matter experts, and reassessing the analytical methodologies used. These measures were vital for confirming the credibility and validity of the findings.

The direction of this study was determined through a manual analysis using content analysis methodology, focusing specifically on the discussion and conclusion sections of each reviewed article. Qualitative data analysis involves organizing and interpreting data that is not strictly numerical or systematically

structured, often employing grounded theory as an analytical approach. The insights gained from this process provide a foundation for identifying future research directions, such as areas requiring further investigation, refining research questions, or developing more comprehensive conceptual frameworks. Therefore, conducting manual analysis through content analysis and grounded theory offers significant contributions to advancing knowledge in the field of Islamic education.

Reporting the Review

The findings of this study are presented in accordance with the PRISMA framework to ensure transparency and rigor in systematic reporting. The review report is structured in a clear and organized manner, covering various sections including the abstract, methodology, results, discussion, and objectives. Each section is carefully crafted to deliver information that is pertinent and aligned with the study's aims. For instance, the report also provides a brief overview of the characteristics of the studies discussed, such as the study design, sample, analytical methods, and key concepts. This approach enables readers to gain a deeper understanding of the context and relevance of the studies under review.

RESULTS AND DISCUSSION

RESULTS

This research identifies significant challenges in integrating technology into the Islamic education curriculum, particularly in Madrasah Ibtidaiyah (MI) and Taman Kanak-Kanak (TK) in Indonesia. One of the main challenges is the lack of adequate infrastructure to support technology-based learning. Many schools, especially those in rural or remote areas, lack access to the modern hardware and software required for implementing technology in education (Siregar et al., 2025). In some cases, even though devices are available, poor internet connectivity remains a major barrier to their optimal use. This challenge has been widely discussed in previous studies, such as Zakiyyah (2024), who highlighted the importance of improving digital infrastructure to facilitate learning management in Islamic education.

Another issue is the technical skills of teachers, many of whom have not been trained in using technology effectively in teaching, whether it's for delivering lessons, interacting with students, or assessing their work. (Haddade et al., 2024) emphasize the need for teacher training in digital technologies to overcome such barriers. In fact, some teachers believe that technology disrupts the traditional methods they consider effective in teaching (Binsaleh & Binsaleh, 2020). Furthermore, cultural resistance from both teachers and parents regarding the use of technology in Islamic education is prevalent. Many people prefer to maintain traditional methods of teaching, which are often perceived as more aligned with the values of Islam. This resistance arises not only from a lack of knowledge about the benefits of technology but also from concerns that technology could alter the

perspective of Islamic education, which is often more focused on moral and spiritual development than technological advancements (Siregar et al., 2025).

Despite the challenges, the opportunities for leveraging technology in the development of the Islamic education curriculum are substantial. Technology can significantly improve the quality and effectiveness of education by creating more interactive and engaging learning experiences for students (Azman et al., 2025). One major opportunity is the ability to enhance student involvement through more interactive learning methods such as video, animations, and web-based educational applications (Rekan et al., 2025). These tools can foster active participation, allowing students to explore materials, engage with peers, and collaborate on technology-based projects. Additionally, technology expands access to a vast array of educational resources that were previously unavailable. For instance, instead of relying solely on textbooks, students can now access e-books, articles, online podcasts, and videos from various global platforms, which can broaden their knowledge and enhance their learning experience (Sri Nilawati et al., 2023). This shift enables students to develop 21st-century skills, such as critical thinking, creativity, and digital literacy, which are essential for their future careers.

To overcome the barriers to technology integration, systematic and structured strategies need to be implemented. One of the most important strategies is the continuous training and development of teachers' digital skills (Miskiah et al., 2019). For technology to be successfully incorporated into education, teachers are essential. Therefore, to equip teachers with the skills necessary to integrate technology into their teaching methods successfully, ongoing training is required. The technical aspects of using digital tools should be covered in this training, as should how technology can support Islamic educational objectives. Moreover, ensuring the availability of adequate infrastructure is another critical step. Infrastructure must include modern hardware, stable internet networks, and relevant software tools for the educational process. Governments, academic institutions, and society as a whole must collaborate to ensure that schools, especially those in underserved areas, have access to these resources (Siregar et al., 2025).

Additionally, the curriculum itself needs to be adapted to incorporate technology. This involves designing a curriculum that not only includes traditional knowledge but also leverages technology as a tool to enrich the learning process. Methods like Project-Based Learning (PBL) and Problem-Based Learning (PBL) can integrate technology by allowing students to engage with real-world problems and use digital tools to explore and solve these issues (Arim et al., 2024).

To ensure that the use of technology in Islamic education is truly effective, continuous evaluation is crucial. This evaluation should take place at the individual (student and teacher), classroom, and school-wide levels. One of the

evaluation approaches that can be used is leveraging data from Learning Management Systems (LMS), which help manage the teaching and learning processes (Zakiyyah, 2024). The data collected can be used to assess not only student performance but also how effectively teachers utilize technology in delivering content and engaging students. The evaluation should go beyond just academic outcomes; it should also assess whether technology has positively impacted student motivation and whether it has helped develop students' character and ethics, which are key aspects of Islamic education (Miskiah et al., 2019). Based on this evaluation, feedback should be gathered to guide continuous improvement.

The successful integration of technology into Islamic education cannot be achieved by any single entity alone. Therefore, collaboration among various stakeholders is essential. Schools, governments, parents, and communities must work together to create an environment that promotes the effective use of technology in education. Schools should provide teachers with the necessary technical support and professional development. At the same time, the government must ensure that policies facilitate the adoption of technology in education and offer incentives to schools that successfully implement it. Parents also play an important role in supporting the use of technology at home, ensuring that students have access to devices and the internet, and guiding them in using technology productively (Abubakari et al., 2024).

DISCUSSION

Challenges of Technology Integration in Islamic Education Curriculum

Integrating technology into the Islamic education curriculum brings both significant opportunities and considerable challenges. These challenges are often multidimensional, encompassing infrastructural, pedagogical, and cultural concerns that must be carefully addressed to ensure the successful incorporation of technology without compromising the values and principles of Islamic education. The integration of modern technology must be done in a way that enhances the quality of education while preserving the essence of traditional Islamic pedagogical methods (Siregar et al., 2025).

The first major challenge faced by many Islamic educational institutions, particularly those in rural areas, is limited access to technology. This issue is particularly pronounced in regions with inadequate infrastructure, where students struggle with limited access to devices and the internet, thereby hindering their ability to engage in digital learning opportunities fully. The digital divide is not only a barrier to access but also exacerbates existing inequalities in educational outcomes, as students from more affluent backgrounds have better access to technology and digital learning resources (Rohman et al., 2024). For example,

many schools in Pakistan and Indonesia face significant difficulties due to the absence of reliable internet and insufficient educational technology tools (Hidayati & Slamet, 2025). Without substantial investment in infrastructure, bridging this gap remains a formidable task for educational authorities.

In addition to the lack of infrastructure, there is a significant pedagogical challenge in the form of insufficient teacher training and digital competence. Many educators in Islamic institutions have not received adequate training in using digital tools effectively within their teaching practices. The lack of digital literacy among teachers hinders the seamless integration of technology into classrooms, leaving many students without the full benefits that technology has to offer. This problem is particularly prevalent in traditional Islamic schools where teaching methods are deeply rooted in conventional religious practices, and there is resistance to the adoption of new methodologies. Enhancing teacher training programs and providing continuous professional development are crucial steps in overcoming this obstacle(Azman et al., 2025). Teachers must be empowered with the skills and knowledge to utilize technology in ways that enhance the learning experience while respecting the spiritual and moral development that is central to Islamic education.

Another challenge is balancing the traditional pedagogical approaches of Islamic education with the demands and opportunities presented by modern technology. The integration of artificial intelligence (AI) and other technological tools in Islamic education raises important questions about how these technologies can be used while preserving the ethical and spiritual dimensions of learning. The role of the teacher, which has always been central to Islamic education, must not be diminished in the face of technological advancement. Instead, technology should serve as a tool that complements the teacher's guidance in fostering students' holistic development. This requires a careful and balanced approach that respects the traditions of Islamic education while embracing technological innovations that can improve learning outcomes (Rapi et al., 2024).

Cultural resistance to technological integration is another significant barrier. In many Islamic communities, there is a hesitancy to adopt technology due to concerns over its ethical implications. Issues such as data privacy, algorithmic bias, and the transparency of technological processes are of particular concern when introducing AI and other advanced technologies into the educational sphere. These concerns are often rooted in the desire to ensure that technological tools do not conflict with Islamic ethical values, which prioritize justice, honesty, and transparency. As a result, there is a need for digital tools and platforms that are developed with a strong understanding of Islamic principles, ensuring that they support rather than undermine the values taught in Islamic education (Abubakari et al., 2024).

Ethical considerations must be at the forefront of any efforts to integrate technology into the Islamic education curriculum. Any technological resources used in Islamic schools must not only be effective in enhancing educational outcomes but also be culturally sensitive and aligned with Islamic teachings. For example, AI tools used for educational purposes must be designed in a way that respects Islamic ethical standards, ensuring that they do not encourage harmful behaviors or promote ideas contrary to Islamic values. Developing such resources requires collaboration between educators, technology developers, and religious scholars to ensure that technology can be used in a manner that upholds the integrity of Islamic education (Rohman et al., 2024).

To overcome these challenges, several strategies can be implemented. First, enhancing technological infrastructure is essential. Governments and educational institutions must invest in the necessary infrastructure, including providing internet access, purchasing digital devices, and creating the conditions that support digital learning. This will help ensure that all students, regardless of their geographic or economic background, have equal access to the benefits of digital education (Winoto, 2022). By bridging the digital divide, institutions can create an inclusive learning environment where technology becomes an empowering tool for all students.

Comprehensive teacher training is another vital strategy for addressing the pedagogical challenges of integrating technology. Teachers require ongoing professional development programs that equip them with the skills to integrate technology into their classrooms effectively. These programs should focus not only on teaching educators how to use digital tools but also on how to align these tools with Islamic pedagogical methods. By doing so, teachers will be able to leverage technology to enhance the educational experience while maintaining the integrity of the Islamic educational system (Sabieh, 2024).

Incorporating balanced pedagogical approaches is also crucial for integrating technology without compromising traditional educational values. Islamic education must retain its focus on nurturing students' spiritual, moral, and intellectual growth. Technology should be viewed as a tool that aids in this process rather than replacing the traditional methods of instruction. For instance, while digital platforms can provide interactive learning experiences, they must be designed in a way that complements the values of Islamic education (Siregar et al., 2025).

Ultimately, establishing effective policy frameworks and support systems is crucial to facilitating the successful integration of technology into the Islamic education curriculum. Policies should be developed that prioritize the creation of high-quality educational content, the continuous training of teachers, and the establishment of ethical guidelines for the use of technology in Islamic education.

Furthermore, government support for these initiatives is crucial, as it will provide the necessary resources and encouragement for educational institutions to adopt technology in a way that is both effective and ethically sound (Haddade et al., 2024). In conclusion, the integration of technology into the Islamic education curriculum presents a range of challenges that require careful consideration and a culturally sensitive approach. By addressing infrastructural issues, improving teacher training, balancing traditional and modern pedagogical methods, and ensuring that technology aligns with Islamic ethical standards, these challenges can be overcome. The strategic integration of technology has the potential to enhance the quality of education in Islamic institutions. Still, it must be implemented in a manner that respects the principles and values of Islamic teachings (Abubakari et al., 2024).

Opportunities for Curriculum Development in MI and Kindergarten

The integration of technology into Islamic education at madrasahs offers significant opportunities to enhance the learning experience, engagement, and academic outcomes for students. As the digital age progresses, the application of technology in education has become essential. In the context of Islamic education, the use of technology can enhance learning outcomes, promote engagement, and bridge the gap between traditional values and modern pedagogical approaches (Siregar et al., 2025).

One of the greatest benefits of integrating technology into the madrasah curriculum is the enhancement of learning outcomes(Malik, 2023). Research indicates that technology-based education can enhance academic performance, improve retention, and foster critical thinking skills (Wekerle et al., 2022). When students are exposed to digital learning tools, they have the opportunity to engage in more interactive lessons, allowing them to apply their knowledge in real-world contexts. In Islamic education, the integration of technology also offers the possibility of merging Islamic values with modern scientific knowledge, making learning more relevant and meaningful for students (Wulan et al., 2021). This fusion of the sacred and the contemporary can foster a deeper connection with the material, encouraging students to apply their religious values in their daily lives.

In addition to improving academic outcomes, technology plays a crucial role in increasing student engagement. The use of digital tools such as interactive apps, online platforms, and multimedia resources can make learning more dynamic and enjoyable (Chen et al., 2010). These tools can cater to different learning styles, allowing students to interact with content in various formats, including text, audio, video, and interactive simulations. This diversity in teaching methods can significantly boost motivation, especially for students who may struggle with traditional teaching methods. As a result, students are more likely to

stay engaged and committed to their studies, leading to improved academic performance(Lu et al., 2025).

However, despite these clear benefits, the integration of technology in Islamic education also presents several challenges. One of the main barriers is the need for a balanced pedagogical approach. While technology offers innovative learning tools, traditional methods of Islamic education mustn't be compromised. Madrasahs must find ways to integrate digital tools in a way that supports, rather than replaces, the values and principles of Islamic education. Teachers need to be trained to effectively incorporate these methods, ensuring that core Islamic values, such as discipline, morality, and spirituality, remain at the forefront of the learning process (Siregar et al., 2025).

The integration of technology in madrasahs also requires significant investments in infrastructure and teacher training. A robust technological infrastructure, including reliable internet access and modern digital devices, is crucial for the success of any technology-based educational program. Without these resources, the benefits of digital learning tools cannot be fully realized. Additionally, teachers must be proficient in using digital tools to maximize their potential. Continuous professional development programs are essential for equipping educators with the skills and knowledge necessary to navigate the complexities of modern educational technology (Zakiyyah, 2024). This ensures that teachers can leverage available resources and integrate them effectively into their teaching practices.

One promising technological tool for enhancing Islamic education is Artificial Intelligence (AI). AI has the potential to provide personalized learning experiences for students, adapting content to suit individual needs and preferences. It can also automate administrative tasks, giving teachers more time to focus on impactful teaching activities. However, the integration of AI in Islamic education must be done carefully. AI systems must be designed and implemented in a manner that aligns with Islamic principles, thereby avoiding potential conflicts between the technology and the values taught in madrasahs (Abubakari et al., 2024).

Mobile learning (m-Learning) is another technology that can enhance the accessibility of Islamic education. Mobile apps can provide students with the flexibility to learn at any time and from anywhere, making education more accessible for those who may not have the resources to attend traditional classes. This is particularly beneficial for madrasah students living in rural or remote areas where access to educational resources is limited. With mobile learning, students can access Quranic teachings, Islamic history, and other religious subjects through their smartphones, ensuring that learning continues outside the classroom (Ahmad et al., 2025).

In addition to mobile learning, interactive and multimedia tools such as Virtual Reality (VR) and Augmented Reality (AR) hold the potential to revolutionize Islamic education. These tools can provide immersive learning experiences, especially in subjects such as Quranic studies and Islamic history. By using VR and AR, students can explore historical events, visit religious sites, and interact with the Quran in an engaging and educational way. Such interactive learning can help students retain information more effectively, as they are not just passively consuming content, but actively engaging with the material (Alahmadi et al., 2024).

Madrasah reform programs, such as those implemented in Indonesia, have shown positive results in integrating technology into Islamic education. These programs serve as valuable models for other madrasahs seeking to modernize their curricula and improve educational outcomes. By incorporating digital tools into their teaching methods, madrasahs can offer a more engaging and dynamic learning experience that appeals to today's tech-savvy generation of students. These reforms can help ensure that Islamic education remains relevant in the digital age while preserving its core values (Haddade et al., 2024).

The integration of STEAM (Science, Technology, Engineering, Arts, and Mathematics) subjects with Islamic education also presents a unique opportunity. By combining these subjects with Islamic teachings, madrasahs can provide students with the skills and knowledge needed to thrive in the 21st century. STEAM integration fosters creativity, collaboration, and problem-solving skills — essential qualities in today's rapidly changing world. It also encourages students to view Islamic education through a modern lens, allowing them to apply their religious values to contemporary challenges (Zaqiah et al., 2024).

To ensure the successful integration of technology in Islamic education, several strategies can be employed. First, madrasahs should develop comprehensive digital curricula that combine both traditional Islamic teachings and modern digital learning tools. These curricula should be designed to align with Islamic educational goals while fully leveraging the benefits offered by digital learning tools. Second, continuous professional development for teachers is essential. Teachers need ongoing support and training to stay updated with the latest technological advancements and pedagogical strategies. Third, investing in technological infrastructure is critical. Madrasahs should allocate resources to enhance internet access, acquire modern devices, and develop digital platforms that facilitate interactive learning. Finally, madrasahs should adopt student-centered learning approaches that encourage active participation and self-regulated learning. This can help students take ownership of their education and become more motivated to succeed (Henrie et al., 2015).

Strategies to Optimize Technology in Islamic Education at MI and Kindergarten

To overcome barriers and maximize the use of technology in Islamic education, a multifaceted approach is necessary. One of the most important strategies is the professional development and training of teachers. Comprehensive training programs should be established to enhance teachers' digital competencies and pedagogical strategies. This training should focus on the use of various digital tools and platforms, such as game-based learning, web-based tools, metaverse-based applications, and social media integration. This will enable educators to harness technology effectively, engaging students and improving learning outcomes (Malik, 2023). Furthermore, continuous professional development is necessary to keep teachers up-to-date with the latest technological advancements and instructional methods. Regular workshops and peer learning opportunities will allow teachers to refine their skills and remain adaptable to technological changes in education (Adebule, 2009).

In parallel, improving the infrastructure and resources within educational institutions is essential for successful technology integration. Islamic schools must invest in robust technological infrastructure, including digital teaching modules, Learning Management Systems (LMS), and reliable internet access. These resources are vital for enabling seamless online learning and facilitating effective use of technology in daily classroom activities (Zakiyyah, 2024). However, even with these resources, there must be an emphasis on resource optimization. Efficient management of existing resources can help overcome limitations related to budget constraints and ensure that schools maximize the use of available resources. Schools should prioritize the judicious use of their technological assets, focusing on areas where the impact of technology will be most beneficial (Lu et al., 2025).

Pedagogical innovation plays a crucial role in maximizing the effectiveness of technology in Islamic education. Educators should adopt diverse digital strategies, such as game-based learning and web-based tools, to make lessons more interactive and engaging for students (Wekerle et al., 2022). The integration of social media and other online platforms also enhances communication and collaborative learning (Chen et al., 2010). At the same time, it is important to strike a balance between traditional pedagogical methods and digital tools. By blending conventional teaching practices with modern technology, educators can maintain pedagogical effectiveness while embracing the benefits that technology offers. This balanced approach ensures that the essence of Islamic education is preserved while fully leveraging the possibilities that technology provides (Kamalludeen, 2022).

Addressing both external and internal barriers is crucial for the seamless integration of technology in Islamic education. External barriers include challenges such as limited access to digital devices, inadequate training, insufficient time for lesson preparation, and inadequate institutional support (Haddade et al., 2024). To overcome these challenges, schools must ensure that both teachers and students

have sufficient access to the necessary technological resources. Institutional leadership must also provide essential support, such as offering dedicated time for teachers to engage in technology-related training. On the other hand, internal barriers stem from teachers' personal beliefs and attitudes towards technology. Some educators may resist adopting new teaching methods due to concerns about the reliability of technology or their own limited skills (Azman et al., 2025). To address this, changing teachers' attitudes and fostering a mindset of continuous learning are crucial. Providing teachers with opportunities to explore new methods in a supportive environment can help mitigate these challenges (Siregar et al., 2025).

One strategy to promote innovation in teaching is the application of design thinking. By integrating design thinking into the curriculum, teachers can approach technology integration problems creatively and innovatively. This approach encourages teachers to focus on the needs of their students and to design solutions that make technology a seamless part of the learning experience (Henrie et al., 2015). It also emphasizes problem-solving and collaboration, which are key skills in both modern education and the workplace (Wulan et al., 2021).

Community and parental involvement are another important strategy for maximizing the use of technology in Islamic education. When parents and community members are actively involved in the decision-making process and in supporting technology initiatives, the entire educational ecosystem becomes more cohesive. Parents can provide valuable insights into the types of technology that would be most beneficial for their children's learning, and their engagement can help ensure that students use technology effectively both in and outside the classroom. Involving the community also fosters a sense of shared responsibility, making the integration of technology a collective effort that benefits all parties involved (Siregar et al., 2025).

At the policy level, institutional and governmental support is crucial for facilitating the integration of technology in Islamic education. Educational policies that prioritize technology integration and allocate funds for the necessary infrastructure and professional development can provide the foundation needed for change. Additionally, establishing a policy framework that promotes the adoption of new technologies, including incentives for teachers and schools, will foster more widespread use. This can be further bolstered by offering financial incentives or recognition to educators who effectively integrate technology into their teaching practices (Adebule, 2009).

Another important consideration is providing incentives and motivation for teachers to adopt and utilize technology. Many educators may be hesitant to adopt new technologies due to a lack of motivation or uncertainty about their effectiveness. To overcome this, schools should offer tangible incentives, such as

professional recognition or career advancement opportunities, for teachers who demonstrate proficiency in using technology to enhance teaching and learning. Such incentives create a positive reinforcement loop, motivating teachers to continually improve their digital skills and engage more deeply with technology in the classroom (Henrie et al., 2015).

Lastly, fostering student-centered learning is key to enhancing the effectiveness of technology integration in Islamic education. Emphasizing constructivist approaches, where students actively participate in their own learning process, aligns well with the potential of technology to create more interactive and personalized learning experiences. Technology can enable students to engage with content at their own pace, access diverse learning materials, and collaborate with peers in innovative ways (Malik, 2023). By prioritizing student-centered approaches, schools can make the learning process more dynamic, fostering greater student autonomy and preparing them for the challenges of the 21st century. In conclusion, by addressing the various barriers and implementing a comprehensive set of strategies, Islamic education can successfully integrate technology into its curriculum. This will not only enhance the learning experience for students but also equip educators with the necessary skills and resources to provide a high-quality education that is both modern and in line with the values of Islamic teaching. By continuously evolving and embracing technological advancements, Islamic education can become more accessible, effective, and engaging for all students (Zakiyyah, 2024).

CONCLUSION

This study has identified the key challenges and opportunities in integrating technology into the Islamic education curriculum, particularly at Madrasah Ibtidaiyah (MI) and Taman Kanak-Kanak (TK) in Indonesia. To fully utilize technology in Islamic education, several obstacles must be overcome, including a lack of infrastructure, inadequate teacher training, and cultural reluctance. To overcome these challenges, a comprehensive strategy is necessary, one that involves ongoing teacher professional development in addition to improving infrastructure and resources. The integration of modern tools and the preservation of traditional pedagogical approaches, which serve as the cornerstone of Islamic education, must be balanced critically.

Despite these challenges, the opportunities for innovation through technology are substantial. Digital tools, including multimedia platforms, interactive apps, and AI-powered learning resources, can significantly enhance student engagement, foster critical thinking, and improve academic outcomes. These tools can also provide a more personalized, dynamic learning experience, facilitating greater access to resources and enhancing overall educational quality.

Moreover, the integration of technology into Islamic education equips students with the digital skills necessary for success in the 21st century, aligning traditional Islamic values with contemporary educational practices.

To effectively integrate technology into Islamic education, stakeholders — including educators, curriculum developers, policymakers, and the community — must collaborate and implement a set of prioritized, actionable strategies. These should include investing in educational infrastructure, providing comprehensive teacher training, and developing curricula that combine traditional Islamic teachings with modern technological approaches. Government policies and institutional support play a vital role in ensuring the sustainability and effectiveness of these initiatives. Future studies should focus on cross-context comparisons to identify best practices that can be applied in various contexts, as well as conduct longitudinal studies to monitor the long-term effects of technology integration on student outcomes. Researchers can contribute to the development of evidence-based practices that support the growth of both students and teachers in a rapidly evolving digital world by systematically evaluating the impact of technology in Islamic education.

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