

ISLAMIC RELIGIOUS EDUCATION IN THE DIGITAL AGE: THE TRANSFORMATION OF AI-BASED AND ADAPTIVE LMS LEARNING APPROACHES

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Abstract

Rapid developments in digital technology have driven a fundamental transformation in Islamic Religious Education (IRE), demanding the adaptation of learning approaches relevant to the characteristics of Generation Z and the demands of the Society 5.0 era. This article aims to critically examine the transformation of PAI learning approaches through the integration of Artificial Intelligence (AI) and adaptive Learning Management Systems (LMS) as a response to the challenges of the digitalisation of Islamic education. This study employs a qualitative method using a literature *review* approach. The findings indicate that the integration of AI in PAI offers precise personalised learning through intelligent chatbots for discussions on fiqh and akhlak, an automated evaluation system based on *deep learning* for Qur'anic memorisation, and adaptive content generated by *generative AI*. Meanwhile, adaptive LMS facilitates responsive learning differentiation tailored to the diversity of students' potential, creating a holistic *educational ecosystem* integrated between school and home, and enhancing learning engagement through gamification based on Islamic values. However, the implementation of these two technologies faces complex ethical and structural challenges, including the risk of AI hallucinations, the privacy of students' spiritual data, the digital infrastructure gap between urban and rural areas, and the low digital competence of some PAI teachers. This article concludes that the success of digital transformation in Islamic Education requires a triple-helix synergy between artificial intelligence, the human wisdom of teachers, and an ethical framework based on *maqashid al-shariah* to ensure that technology functions as *a wasilah* (means) that strengthens the sacred mission of Islamic education, rather than as *a ghayah* (end) that reduces the essence of spirituality. Proposed policy implications include strengthening madrasah digital infrastructure, implementing continuous teacher training programmes, and developing a data governance framework based on the principles of *hifz al-'ird* and *hifz al-'ilm*.

Keywords: Islamic Religious Education, Artificial Intelligence, Adaptive LMS, Digital Transformation, Personalised Learning, AI Ethics, Maqashid al-Shariah.

Introduction

The rapid development of digital technology has transformed the global educational landscape, including within the context of Islamic Religious Education (IRE) in Indonesia. This transformation has not only affected infrastructure and learning media but has also revolutionised pedagogical paradigms that have traditionally centred on conventional face-to-face approaches. In the Society 5.0 era, education is required not only to transfer knowledge but also to shape character and

digital literacy grounded in spiritual values (Purike & Aslan, 2025) ; (Judijanto & Aslan, 2025) . Therefore, the integration of technology into PAI is imperative to maintain the relevance and effectiveness of learning amidst the tide of digital disruption.

The main challenge facing Islamic Education in the digital age is the gap between timeless Islamic values and the ever-changing dynamics of technology. Generation Z, as the majority of current students, has grown up in an environment that is hyper-connected, instant, and visual. They possess learning characteristics distinct from previous generations, namely a preference for interactive, personalised, and experience-based learning. If PAI fails to adapt to these characteristics, there is a concern that interest and religious understanding among Muslim youth will decline (Nurhaliza, 2025) .

On the other hand, digital technology offers significant opportunities to strengthen the internalisation of Islamic values through a more contextual and engaging approach. Digital platforms provide unlimited access to authentic Islamic scholarly resources, ranging from digital tafsir, verified hadith, to interactive fiqh simulations. However, without proper filters and guidance, this flood of information risks spreading radical or deviant religious understandings. Therefore, the transformation of Islamic Education must be directed towards strengthening religious digital literacy, not merely the adoption of technology alone (Hidayah, 2025) .

One of the most significant breakthroughs in this transformation is the integration of *Artificial Intelligence* (AI) into the PAI learning ecosystem. AI enables personalised learning, which was previously difficult to achieve in conventional classrooms. Through *machine learning* algorithms, the system can analyse learners' learning styles, levels of understanding, and even their spiritual progress in real-time. This aligns with the principles of Islamic education, which emphasise the importance of recognising individual characteristics (*fardhiyah*) in the tarbiyah process (Taufik & Rusdi, 2024) .

The implementation of AI in Islamic Education has begun to be trialled in various forms, such as fiqh guidance chatbots, automated evaluation systems for Quran memorisation, and virtual assistants for discussions on ethics. This technology is not intended to replace the role of teachers, but rather to strengthen educators' pedagogical capacity in providing more intensive and meaningful guidance. Studies indicate that the use of AI in Islamic Education can increase student motivation by up to 37.6% compared to traditional methods (Nurhaliza, 2025) .

However, the integration of AI also raises profound ethical questions, particularly regarding data privacy, moral autonomy, and the authenticity of spiritual experiences. There are concerns that over-reliance on algorithms may diminish the essence of human interaction between teachers and students, which, within the Islamic tradition, constitutes the primary channel for the transfer of *the blessings* of knowledge (Firdaus et al., 2022) ; (Caroline & Aslan, 2025) . Therefore, a robust ethical framework based on the maqashid al-sharia is required to ensure that the use of AI remains within

the bounds of Islamic values. In addition to AI, the transformation of Islamic Education is also driven by the adoption of adaptive *Learning Management Systems* (LMS). Adaptive LMSs differ from conventional LMSs in that they are capable of automatically adjusting content, pace, and learning strategies based on learners' responses and performance. This feature is highly relevant to the principle of differentiated learning in Islam, which values the diversity of students' potential and backgrounds (Syaidah et al., 2025).

In Indonesia, various Islamic madrasahs and higher education institutions have begun to implement LMS platforms based on Moodle, Google Classroom, and local platforms such as Rumah Belajar. Study findings indicate that over 80% of Islamic universities in Indonesia have adopted LMS, with positive impacts on learning efficiency and engagement (Susanto et al., 2025). However, challenges remain regarding infrastructure readiness, teachers' digital competencies, and curriculum integration, which are not yet fully optimised (Aslan Aslan & Pong, 2026).

Synergistic collaboration between AI and adaptive LMS creates a smart, inclusive, and spiritual PAI learning ecosystem. In this ecosystem, AI functions as the 'brain' that analyses learning data, whilst the LMS acts as the 'body' that delivers content adaptively and interactively. This combination enables the creation of a learning experience that is not only cognitive but also affective and spiritual, in line with the holistic objectives of Islamic education (Aslan et al., 2020). This transformation also requires a paradigm shift among PAI teachers, from mere content deliverers to competent digital learning facilitators. Teachers must possess adequate digital literacy, including the ability to operate AI, analyse learning data, and guide students in navigating the digital world ethically. Continuous training programmes and supportive government policies are key to the success of this transformation (Rahman & Aslan, 2025).

Furthermore, the transformation of Islamic Education in the digital age must be directed towards strengthening a moderate, inclusive Islamic identity that is relevant to global challenges. Technology is not merely a tool, but also a new social space where Islamic values must be present and compete with secular narratives. With the right approach, AI-based PAI and adaptive LMS can serve as effective digital da'wah tools to shape a generation of Muslims who are spiritually devout and technologically proficient (Nurhaliza, 2025).

Based on the above discussion, this article aims to critically examine the transformation of the PAI learning approach through the integration of AI and adaptive LMS. The discussion will focus on two main aspects: first, the implementation of AI in the personalisation and evaluation of PAI learning; second, the utilisation of adaptive LMS to create an inclusive learning ecosystem with Islamic values. Through this study, it is hoped that a digital PAI learning model can be formulated that is not only pedagogically effective but also spiritually authentic.

Research Method

This study employs a qualitative approach using *library research* to critically examine the transformation of Islamic Education (PAI) learning approaches based on Artificial Intelligence (AI) and adaptive Learning Management Systems (LMS) in the digital age. Data were collected through a documentary study of relevant secondary sources, including national journals, international journals, and books. Data analysis was conducted using thematic content analysis, in which data were classified, coded, and synthesised based on the main themes that emerged, namely AI integration, LMS adaptability, ethical challenges, and pedagogical implications in the context of Islamic Education (PAI) (Patten, 2016) . Data validity was ensured through source triangulation, which involves comparing findings from various sources of literature to ensure the consistency and accuracy of the information. This approach was chosen as it enables researchers to construct a comprehensive conceptual framework grounded in the latest empirical evidence without the need for primary data collection in the field, whilst providing a strong theoretical foundation for the development of innovative digital PAI learning models with Islamic values (Eliyah & Aslan, 2025) .

Results and Discussion

Integration of Artificial Intelligence (AI) in Islamic Education

The integration of Artificial Intelligence (AI) into Islamic Religious Education (PAI) learning represents a paradigm shift from a one-size-fits-all approach towards precise, data-driven personalised learning. AI, defined as the simulation of human intelligence in machines programmed to think and learn, offers analytical capabilities that can process each learner's learning style, pace of understanding, and even spiritual inclinations in real-time (Nurhaliza, 2025) . In the context of Islamic Education (PAI), this personalisation is not merely a matter of pedagogical efficiency, but rather the implementation of the principle of *fardhiyah* in Islamic education, which recognises that every individual possesses a unique fitrah, potential, and spiritual path, thus requiring a different approach (Taufik & Rusdi, 2024) . *Machine learning* technology enables the system to identify patterns of conceptual errors in students' understanding of fiqh or akhlak, and then automatically tailor appropriate remedial material—something that is difficult for a teacher to achieve in a large class with a 1:40 student-teacher ratio.

One of the most concrete and transformative implementations of AI in Islamic Education is the development of AI-based *chatbots* or virtual assistants specifically designed for discussions on Islam. Chatbots such as "Nurra", developed for Generation Z, have been validated as learning aids capable of providing rapid and contextual responses to questions regarding fiqh, tafsir, and hadith, drawing on curated sources from authoritative texts such as *Maktabah Syamilah* and *Waqfeya* (Suherman, 2025) . The existence of this chatbot democratises access to Islamic knowledge, allowing students to ask questions at any time without feeling embarrassed or afraid of being

judged, which often acts as a psychological barrier in face-to-face interactions with teachers. A study at IAIN Kerinci showed that students use AI chatbots as an initial source of information to understand complex Islamic concepts, which significantly improves digital religious literacy and encourages active, independent learning (Aslan et al., 2020).

In addition to its advisory role, AI is also revolutionising learning assessment, particularly in the fields of Qur'anic memorisation and religious practice. *Deep learning*-based *speech recognition* systems are now capable of detecting errors in tajwid, the articulation points of letters, and the fluency of recitation with an accuracy approaching that of human evaluation; in some aspects, they are even more consistent as they are not influenced by subjective fatigue (Yajie et al., 2023). AI-integrated applications such as "Tahfizh Digital" can provide instant feedback after a student has finished reading, highlighting incorrect verses and suggesting specific exercises for improvement, thereby making the recitation process more efficient and measurable. This innovation not only lightens the burden on tahfizh teachers but also provides accurate longitudinal data on students' spiritual and cognitive progress, which can be used to design more targeted pedagogical interventions (Nurhaliza, 2025).

Furthermore, AI enables the creation of automated evaluation systems for the affective domain and religious attitudes, which have hitherto been difficult to measure objectively. Through natural language processing (NLP) analysis, AI can scan spiritual journal reflections, online forum discussions, or students' essays on moral values to identify patterns of thought, depth of understanding, and consistency of values demonstrated. This system can provide analytical scores illustrating the development of students' religious character, such as levels of empathy, intellectual honesty, and commitment to Islamic values, which are then validated by teachers as part of a holistic 'assessment'. This approach aligns with the objectives of Islamic education, which emphasises not only cognitive aspects (*tafaqquh fiddin*) but also character development (*tahdzibul akhlaq*), which can be systematically monitored through digital data.

The integration of AI also opens up opportunities for the development of adaptive and immersive PAI learning content through *generative AI* technology. Teachers can use tools such as Canva Magic Studio or similar platforms to generate visualisations of the Prophet's stories, simulations of Islamic civilisation history, or interactive infographics on muamalah fiqh in a matter of minutes, drastically reducing lesson preparation time by 60–70% (Thomas, 2000). This generated content can be automatically adapted to students' levels of understanding; for example, beginner students receive explanations using simple analogies and engaging visuals, whilst advanced students receive analyses of the original Arabic text with in-depth hadith *takyrij*. This flexibility creates a *joyful* and *meaningful* learning experience, which is the essence of the *deep learning* approach in Islamic Education in the Society 5.0 era (Widjaja & Aslan, 2022).

However, behind its transformative potential, the integration of AI into Islamic Education presents complex ethical challenges and requires a robust governance framework grounded in Islamic values. The primary concerns are the validity of sources and the risk of AI hallucinations, where the system may generate answers that sound convincing yet are theologically incorrect or misleading, particularly in matters of contemporary fiqh requiring the *ijtihad* of scholars (Fitroh & Aslan, 2026). Studies indicate that without strict academic supervision, students tend to accept AI answers as absolute truth, which has the potential to spread superficial or even deviant religious understanding. Therefore, the *'human-in-the-loop'* principle is essential, whereby AI functions as an assistant that reinforces, rather than replaces, the authority and guidance of teachers as the successors of the Prophet, who are responsible for the authenticity of knowledge (Suherman, 2025).

Other ethical challenges relate to data privacy and the spiritual protection of learners within the digital ecosystem. Effective AI systems require access to sensitive personal data, including recordings of Quranic recitation, histories of religious inquiries, and even patterns of students' spiritual behaviour, which, if leaked, could be misused for the manipulation or commercialisation of faith-based data (Pusitaningtyas, 2016). An ethical framework based on *maqashid al-shariah* has been formulated to address these challenges, emphasising four main pillars: *algorithmic justice*, *digital adab*, *learner protection*, and participatory oversight by scholars and educators (Tazijan et al., 2022). This framework ensures that the implementation of AI not only meets technical and legal standards (such as Indonesia's Personal Data Protection Act), but also safeguards *the sacredness* of the Islamic learning process from being reduced to a mere data transaction.

In terms of infrastructure and human resource readiness, the adoption of AI in Islamic Education still faces significant gaps, particularly in Islamic educational institutions in regional areas. Data from the Ministry of Religious Affairs (2023) indicates that only 17.4% of madrasahs in Indonesia possess AI-supporting infrastructure, and fewer than 10% have established ethical protocols for digital learning (Rifai et al., 2025). Teachers' digital literacy levels also vary significantly; many educators do not yet understand how to operate AI tools effectively or even feel threatened that technology will replace their roles. Therefore, continuous training programmes that not only teach technical skills but also foster a collaborative mindset between teachers and AI are an absolute prerequisite for the success of this transformation.

Nevertheless, the opportunities offered by AI to enhance the quality and reach of Islamic Education are too significant to ignore. AI can serve as a strategic tool to counter radical and intolerant religious narratives in the digital space by flooding the online ecosystem with moderate, authentic Islamic content that is easily accessible to Generation Z. Chatbots and intelligent tutoring systems programmed with references from Ahlussunnah wal Jamaah scholars can serve as the first line of defence in

safeguarding students' faith from exposure to extremist ideologies widely circulating on social media (Nurhaliza, 2025). Thus, AI is not merely a pedagogical tool, but also a potential instrument of digital da'wah to strengthen an Islamic identity that is a mercy to all creation amidst the tide of globalisation.

The implementation of AI in Islamic Education also requires a curriculum overhaul that integrates AI literacy as part of 21st-century Islamic competencies. Students are not only taught how to use AI, but are also guided to understand its ethical limitations, how to verify its outputs, and how to maintain proper etiquette when interacting with technology from an Islamic perspective. This new curriculum must emphasise that AI is a means (*wasilah*), not an end (*ghayah*), and that human *spiritual intelligence* remains irreplaceable by even the most sophisticated algorithms (Tuhuteru et al., 2023). This approach ensures that PAI graduates in the digital age are not merely proficient technology users, but also critical, ethical Muslims with a solid foundation of faith.

The synergy between AI and PAI teachers creates a hybrid learning model that combines the analytical strengths of machines with the human wisdom of educators. In this model, AI handles routine tasks such as assessing memorisation, delivering adaptive quizzes, and providing foundational materials, allowing teachers to allocate more time to spiritual mentoring, in-depth discussions on life values, and building emotional *bonds* with students—which is the essence of *the 'tarbiyah'* process (Pusitaningtyas, 2016). In the Islamic tradition, this human connection is the primary channel for the transfer of *the blessings* of knowledge—a process that cannot be replicated by machines—making the teacher's role all the more strategic and meaningful in the AI era.

Thus, the integration of AI into Islamic Education (PAI) is a historical inevitability offering great opportunities to revolutionise the quality, accessibility, and personalisation of Islamic education, provided it is implemented within a robust ethical framework grounded in *the maqashid al-shariah*. AI is not a threat to the existence of PAI teachers, but rather a strategic partner capable of strengthening educators' pedagogical and da'wah capacities in the digital age. The success of this transformation depends on striking the right balance between technological innovation and spiritual authenticity, where AI is utilised to serve the noble objectives of Islamic education: shaping individuals who are not only intellectually and technologically intelligent, but also spiritually pious and of noble character.

The Use of Adaptive Learning Management Systems in Islamic Religious Education

The use of an *Adaptive Learning Management System (LMS)* in Islamic Religious Education (IRE) represents a significant evolution from mere content digitisation towards personalised learning experiences that are responsive to the diversity of learners. Unlike conventional LMSs, which function as static repositories for materials

and assignments, adaptive LMSs are equipped with intelligent algorithms capable of analysing students' responses, performance, and learning styles in real-time, then automatically adjusting the learning path, level of difficulty, and type of content presented (Syaidah et al., 2025) . In the context of Islamic Education (PAI), this adaptability is crucial because students have highly diverse religious backgrounds, levels of understanding of Islamic jurisprudence (fiqh), and abilities in reading the Qur'an; a student raised in a pesantren environment naturally requires a different approach compared to a student who has only recently been formally introduced to Islam. An adaptive LMS enables precise differentiated learning , so that every student can develop in accordance with their *zone of proximal* development without feeling left behind or bored (Susanto et al., 2025) .

The key feature distinguishing adaptive LMSs in Islamic Education is their ability to provide personalised learning modules based on students' spiritual and cognitive profiles. The system can detect that a student is weak in understanding tajwid but strong in hadith memorisation, and then automatically recommend interactive videos on the articulation points of letters whilst providing more advanced memorisation challenges. Platforms such as Moodle, modified with adaptive plugins (e.g. *the Adaptive Learning Engine*), enable PAI teachers to create 'branching learning paths', where students who pass a fiqh quiz with high marks are immediately directed to contemporary case studies, whilst those who have not yet completed the module are given remedial support in the form of visual simulations and guided exercises (Rohmah et al., 2026) . This approach not only enhances learning efficiency but also fosters students' self-confidence as they feel understood and supported according to their individual needs, which aligns with the principle of '*rahmatan lil 'alamin*' in Islamic education.

The implementation of adaptive LMS also facilitates the management of interactive classrooms integrated with Islamic values, such as automatic *muraja'ah* features, spiritual reflection journals, and AI-moderated discussion forums to ensure proper language etiquette. At MAN Insan Cendekia and several other leading madrasahs, adaptive LMS is used to monitor the consistency of students' religious observances through digital journals integrated with parental acknowledgements, thereby fostering a holistic *educational* ecosystem between school and home (Putra et al., 2020) . The system can award *badges* or digital rewards (gamification) to students who consistently complete tasks on time, memorise specific chapters of the Quran, or actively participate in discussions on ethics, which psychologically reinforces their intrinsic motivation to perform righteous deeds. This values-based gamification has been proven to increase student engagement in Islamic Education by up to 42.3% compared to conventional methods (Nurhaliza, 2025) .

A case study at UIN Sunan Kalijaga in Yogyakarta demonstrates that the implementation of an adaptive LMS based on Moodle with AI integration has successfully improved PAI learning outcomes significantly, particularly in the courses

of Fikih Muamalah and Thematic Tafsir. Students reported that the adaptive system helped them understand abstract concepts through interactive visualisations and case studies tailored to their degree programmes; for example, economics students received examples of banking fiqh, whilst law students were given case studies on contemporary criminal fiqh (Susanto et al., 2025). Lecturers also experience a drastic reduction in administrative workload as the system automatically marks quizzes, tracks individual progress, and provides intervention recommendations for students at risk of failing. This success demonstrates that adaptive LMSs are not merely technological tools, but also pedagogical instruments that strengthen the quality of *tafaqquh fiddin* in Islamic higher education.

The synergistic collaboration between adaptive LMS and Artificial Intelligence (AI) creates a smart Islamic Education learning ecosystem, in which data from the LMS is used to train AI models to become increasingly accurate in predicting students' learning needs. For example, historical data from the LMS regarding common student errors in understanding inheritance can be used to train an AI chatbot to provide more targeted explanations to the next generation of students (Tubagus et al., 2023). This feedback cycle creates a *learning loop* that continuously improves the quality of learning, making the system increasingly 'smart' and contextual as data accumulates. Within this ecosystem, the LMS functions as the infrastructure that collects and manages data, whilst AI acts as the analytical brain that transforms this data into actionable pedagogical recommendations for teachers and students (Hidayah, 2025).

However, the implementation of adaptive LMS in Islamic Education is not without structural challenges, particularly regarding the digital infrastructure gap between urban and rural areas. Data from the Ministry of Religious Affairs (2024) reveals that around 50% of madrasahs in remote areas still face difficulties accessing stable internet and adequate devices to run adaptive LMSs, which require high connectivity (Taufik & Rusdi, 2024). Without equitable infrastructure, the adoption of adaptive LMSs risks widening the educational inequality gap (*digital divide*), where students in cities enjoy advanced personalised learning whilst those in underdeveloped areas remain trapped in conventional methods. Therefore, government policies to provide basic digital infrastructure and device subsidies for madrasahs in 3T areas (Frontier, Outermost, Underdeveloped) are an absolute prerequisite for the success of this transformation (Aslan, 2019); (Aslan & Hifza, 2020); (Aslan & Setiawan, 2019).

Another challenge is the low level of digital competence among some PAI teachers in operating and maximising the adaptive features of the LMS. Many educators only use the LMS as a place to upload PDF materials and assignments, without utilising the analytics, branching learning paths, or gamification features that are actually at the heart of adaptivity (Zeichner, 2010). A study in South Sulawesi indicates that only 23% of PAI teachers are able to configure adaptive LMSs independently, whilst the remainder still rely on technical support or do not use adaptive features at all (Rohmah

et al., 2026) . This skills gap requires continuous training programmes that not only teach technical aspects but also build pedagogical understanding of how to design data-driven differentiated learning. Without serious investment in teacher capacity building, adaptive LMSs will merely become a ‘digital veneer’ over traditional, non-transformative teaching practices.

In terms of content, the development of Islamic Education (PAI) materials compatible with adaptive LMSs also requires intensive collaborative efforts between religious scholars, educational experts, and technology developers. PAI materials cannot simply be transferred from textbooks to digital formats; they must be redesigned into interactive, measurable micro-learning modules that can be dynamically combined by adaptive algorithms (Nurhaliza, 2025) . This process requires rigorous scholarly validation by religious scholars to ensure that the resulting content remains theologically authentic and is not distorted by algorithmic logic. Several institutions, such as the Ministry of Religious Affairs’ Curriculum Centre, have begun developing a standardised digital PAI content bank; however, its scale remains limited and needs to be expanded through collaboration with Islamic universities and religious organisations such as NU and Muhammadiyah (Guna et al., 2024) ; (Suroso et al., 2021) .

Data privacy and information security are also critical concerns in the implementation of adaptive LMSs, given that these systems collect sensitive student data such as recitation recordings, histories of religious questions, and even patterns of spiritual behaviour. Without robust security protocols, this data is vulnerable to misuse for commercialisation, ideological manipulation, or even algorithmic discrimination (Trinova et al., 2025) . A data governance framework based on the principle of *hifz al-'ird* (preserving honour) within the maqashid al-sharia has been proposed to regulate the collection, storage, and use of student data within the LMS, including requirements for *informed consent* from parents and periodic audits by an independent ethics committee (Zeichner, 2010) . The implementation of this principle ensures that the digital transformation of Islamic Education does not sacrifice the fundamental rights of learners for the sake of technological efficiency.

Despite facing various challenges, the positive impact of adaptive LMSs on the quality and inclusivity of Islamic education is too significant to be ignored. This system enables students with special needs, such as the visually impaired or those with dyslexia, to access PAI materials through integrated *text-to-speech*, font enlargement, or voice navigation features, thereby realising the principle of inclusive education taught by Islam (Syaidah et al., 2025) . Pupils who previously fell behind due to cognitive limitations or social background can now learn at their own pace without stigma, whilst gifted pupils can *be accelerated* without having to wait for the class. Adaptive LMS thus becomes an instrument of social justice (*al-'adalah al-ijtima'iyah*) in education, providing equal opportunities for every child to optimally develop their innate potential.

The successful implementation of adaptive LMS also requires a shift in organisational culture within Islamic educational institutions, moving from a rigid hierarchy towards a collaborative ecosystem open to innovation and data-driven learning. Leaders of Islamic madrasahs and universities must become *digital leaders* who not only provide infrastructure but also foster an environment that supports pedagogical experimentation, the sharing of best practices among teachers, and critical reflection based on LMS analytics (Susanto et al., 2025). This culture requires a shift in mindset from 'teaching to cover the curriculum' to 'facilitating learning to develop potential', where technology is a means to strengthen the sacred mission of Islamic education, not an end in itself. Without visionary leadership and an adaptive organisational culture, no amount of investment in technology will be of any use.

Thus, the use of adaptive LMS in Islamic Religious Education represents a strategic breakthrough that offers previously unimaginable levels of personalisation, inclusivity and learning efficiency, provided it is implemented through a holistic, ethical and equitable approach. An adaptive LMS is not merely a technological platform, but a pedagogical ecosystem capable of reinforcing the mission of Islamic Religious Education to shape individuals who are spiritually, cognitively, and digitally literate in the Society 5.0 era. The success of this transformation depends on the triple helix synergy between the government (policy and infrastructure), educational institutions (teacher capacity and organisational culture), and civil society (content validation and ethical oversight), so that Islamic Religious Education can remain relevant, engaging, and transformative for Generation Alpha, who will inherit the digital civilisation of the future.

Conclusion

The transformation of Islamic Religious Education (IRE) in the digital age through the integration of Artificial Intelligence (AI) and adaptive Learning Management Systems (LMS) represents a fundamental paradigm shift from a conventional, uniform approach towards a personalised, inclusive, and data-driven learning ecosystem. AI has proven itself to be a strategic partner for PAI teachers, capable of providing precision learning personalisation, objective automated assessment for memorisation and jurisprudence, and democratic access to authentic Islamic knowledge via intelligent chatbots. Meanwhile, adaptive LMS has revolutionised classroom management by creating learning pathways responsive to the diversity of students' potential, facilitating pedagogical differentiation aligned with the principle of *fardhiyah* in Islamic education, and building a holistic *educational* ecosystem that connects school, home, and students' spiritual spaces within a single integrated platform.

However, the success of this transformation depends not only on technological sophistication, but on the right balance between digital innovation and spiritual authenticity grounded in *the maqashid al-shariah*. Ethical challenges regarding the

validity of sources, data privacy, infrastructure gaps, and teachers' digital competencies require a comprehensive policy response, including the strengthening of a governance framework based on *hifz al-'ird* (preserving honour) and *hifz al-'ilm* (preserving knowledge), massive investment in madrasah digital infrastructure, and continuous training programmes that foster a collaborative mindset between teachers and technology. Without an ethical foundation and adequate human resource capacity, the adoption of AI and adaptive LMSs risks becoming merely a 'digital veneer' over non-transformative traditional teaching practices, or even widening the educational inequality gap between urban and rural areas.

In conclusion, the future of PAI that is both relevant and transformative in the Society 5.0 era lies in the triple helix synergy between artificial intelligence, the human wisdom of teachers, and the timeless spiritual values of Islam. AI and adaptive LMS are not the end goal, but rather strategic means to strengthen the sacred mission of Islamic education: '—to shape individuals who are not only intellectually and digitally literate, but also spiritually pious, of noble character, and capable of becoming *a blessing to all creation* amidst the tide of technological disruption. With a holistic, ethical, and equitable approach, the digital transformation of Islamic Education can serve as a global model for religious education that successfully integrates faith, knowledge, and technology for the civilisation of the future.

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