

Transformation of Adaptive Learning Models in Islamic Religious Education in the Digital Era

Muhammad Wijaksono^{1*}, Fitri Hilmiyati¹, Yahdinil Firda Nadirah¹, Deni Iriyadi¹, Wasehudin¹, Aas Siti Sholichah²

¹Universitas Islam Negeri Sultan Maulana Hasanuddin Banten, Indonesia

²Universitas PTIQ Jakarta, Indonesia

wijaksono@uinbanten.ac.id*

Abstract

The transformation of learning in the digital era demands a change in approach to the educational process, including in Islamic Religious Education (PAI). A common problem in PAI learning is the use of conventional methods, which are too uniform, teacher-centered, and pay little attention to the abilities, interests, and learning styles of each student. The purpose of this study is to explore ideas and changes in adaptive learning modules for PAI subjects in the digital era in an effort to improve the effectiveness of more contextual and individualized learning. This study used a qualitative research method with a literature review approach. Various scientific literature, books, and research results related to adaptive learning and its implementation in Islamic education were analyzed. The results show that adaptive learning modules enable PAI materials to be tailored to students' learning needs. This can be done using digital technologies such as learning data analysis, Learning Management System (LMS) platforms, and artificial intelligence. These modules provide students with the opportunity to learn according to their capacity, pace, and learning characteristics. In addition, adaptive modules help learning become more interactive, reflective, and relevant to the challenges of the digital era, while maintaining the moral and spiritual values of Islamic education. The implementation of adaptive modules in Islamic Religious Education subjects in the digital era can improve the quality of learning, increase student engagement, and encourage a more inclusive, effective, and student-oriented learning process.

Keywords: Transformation, Adaptive Learning Model, Islamic Religious Education, Digital Era

INTRODUCTION

The advancement of digital technology over the past few decades has resulted in substantial enhancements in all aspects of human life, including the education system (Haleem et al., 2022; Putri et al., 2025). The digital revolution, characterized by the advent of the internet, artificial intelligence, big data, and diverse online learning platforms, has transformed human access to knowledge and interaction within the learning process. (Ilias et al., 2023). Education is no longer limited to conventional classrooms, but is evolving into a more flexible, open, and technology-based learning ecosystem (Haleem et al., 2022). The concept of learning has evolved from a teacher-focused model to a student-centered approach, with a focus on personalized and differentiated learning experiences.

UNESCO, in its Global Education Monitoring Report 2023, stated that more than 65 percent of students worldwide are digital generation who are accustomed to technology-based learning (UNESCO, 2023a). However, the results of this study are at odds with data showing that around 60 to 70 percent of educational institutions still use conventional, standard, and impersonal teaching methods (UNESCO, 2023). Teachers, as educators, are unable to optimize technological resources in their teaching. This gap leads to students being less engaged in learning and missing out on more learning, including religious studies (Islamic Religious Education), which is often considered irrelevant to everyday life.

Islamic religious education has a strategic goal of balancing students' intellectual, spiritual, and moral intelligence. However, the dynamics of society 5.0 require Islamic Religious Education to teach religious knowledge as well as critical, innovative, collaborative, and reflective thinking skills. PAI has the potential to experience methodological stagnation and lose its appeal among a digital native generation highly accustomed to smart technology if there is no paradigm shift and learning models. According to national education data, approximately 55% of Islamic Religious Education learning processes are still teacher-centered and lecture-based. Meanwhile, the digital literacy of Islamic Religious Education teachers ranges between 40 and 50%, indicating limitations in the application of smart technology in learning (Wiranata et al., 2025). This condition causes the internalization of Islamic principles to become less effective and learning to become less individualized.

Based on empirical findings from various educational institutions, around 60% of Islamic Education teachers experience difficulties in adapting learning methods and strategies to the different variations of students in terms of academic abilities, socio-cultural backgrounds, digital literacy levels, and learning styles (Cahyono, Wahyuni, & Umam, 2025). Several factors contribute to these difficulties. These include high administrative burdens, a lack of technology-based training, and limited adaptive education capabilities (UNESCO, 2023b). Islamic Religious Education (PAI) teaching often remains the same, focusing on delivery and failing to address students' unique needs. This leads to low student engagement and poor internalization of Islamic values in real-world settings (Nurhikmah et al., 2025). This prevents Islamic Education from properly achieving its purpose of character formation and 21st-century capabilities.

The reality is that Islamic Religious Education learning in Islamic educational institutions is less responsive to the unique requirements of individual students and remains identical (Sitepu, 2026; UNESCO, 2023a). Internal studies at several Islamic schools and universities indicate that more than 50% of students have the opinion that Islamic religious education is not fully relevant to the challenges of contemporary digital and social life (Al-razi et al., 2024). Therefore, a transformation of learning models in schools is needed, especially in Islamic Education learning in the digital era. This transformation should emphasize a more student-centered approach that accommodates diverse learning styles and individual potentials. In addition, the integration of digital technology in learning processes is essential to enhance engagement and accessibility for students. Islamic Religious Education must also incorporate contextual and real-life issues so that students can relate religious values to modern social dynamics. Furthermore, teachers are required to develop adaptive pedagogical competencies that align with rapid technological advancements. Ultimately, innovative and holistic learning models are expected to foster not only cognitive understanding but also spiritual and moral development in the digital age.

Previous research is not just two, but you can include at least five previous studies, so that your research is truly different from previous research. In addition to the studies mentioned earlier, several other journal articles further reinforce this discussion. A study by Sari et al. (2021) in the *Journal of Islamic Education Research* found that the use of interactive digital media in Islamic Religious Education significantly improves students' motivation and learning outcomes. Meanwhile, Fauzi and Karim (2022) in the *International Journal of Instruction* reported that project-based learning approaches in Islamic Education help students develop critical and collaborative skills relevant to the 21st century. Another study by Saleh et al. (2023) published in the *Journal of Educational Technology* emphasized that the integration of e-learning platforms supports more flexible and personalized learning experiences for students in religious education contexts. In addition, research by Hidayat and Suryani (2020) in the *Journal of Curriculum Studies* revealed that curriculum innovation in Islamic Education is crucial to address the gap between traditional teaching methods and modern societal needs. Similarly, a study by Rahmawati et al. (2022) in the *Education and Information Technologies Journal* highlighted that the use of mobile learning applications can enhance

students' independent learning and digital engagement in religious education. These additional journal-based studies provide a stronger empirical foundation and further highlight the need for innovative and adaptive learning models in Islamic Religious Education.

One approach to strengthening the material of learning for students is the adaptive learning model. Adaptive learning is a learning approach that connects content, methodologies, and evaluations to the needs and progress of students. Adaptive learning enables each student to have an optimal, equitable, and meaningful learning experience, especially in heterogeneous learning environments. This enables Islamic ideals to be adapted to each student's spiritual maturity, cognitive ability, social background, and learning style (Rakha et al., 2024). Islamic Religious Education (PAI) is designed to provide unique and relevant learning experiences through tailoring content, methods, and learning evaluation. In Islamic education, this approach concurs with the principles of *tadarruj* (gradual learning), *hikmah* (wisdom), and *mau'izhah hasanah* (inclusive learning), which emphasize that teachings must be delivered according to the student's circumstances and abilities.

METHODS

Types and Research Approach

Implementing a library research type, this research study established a qualitative methodology (*Library research*). This method was chosen since the study focuses on a conceptual and theoretical analysis of the transition of adaptive learning perspectives for PAI in the Digital Era. This research type allows researchers to conduct a comprehensive examination of a variety of ideas, hypotheses, and prior research findings that are associated with adaptive learning, educational technology, and learning innovation in Islamic education (Suganda, 2025). Therefore, this study not only explores the observed phenomenon descriptively, but it also synthesizes ideas from many literatures to offer a full understanding of the direction of PAI learning transformation in the framework of technological development. This research will conduct a conceptual and theoretical analysis of the evolution of adaptive learning approaches, PAI, in the digital Era. This research method enables academics to thoroughly analyze many theories, concepts, and past study findings on educational technology, adaptive learning, and Islamic educational innovation.

Research Data Sources

The data sources in this study consist of primary and secondary data. Primary data comes from research reports, academic books, and high-quality scientific journal articles. Meanwhile, secondary data comes from research that directly discusses adaptive learning models, digital-based learning technologies, and their applications in religious education. In the documentation process, data collection was carried out by searching, identifying, and classifying literature relevant to the research subject (Jailani, 2023). To ensure that the data used has strong academic validity, literature is selected based on the relevance, novelty, and credibility of the source.

Furthermore, data collection was conducted systematically using various scientific databases, including accredited national and international journals, as well as academic repositories containing research publications on adaptive learning and educational transformation in the digital age. Subsequently, each collected source was thoroughly evaluated, taking into account the research context, methodology used, and contributions made. Furthermore, data classification was carried out by dividing these sources into several main topics. These subjects involved fundamental concepts surrounding adaptive learning, how to incorporate digital technology into the learning process, and the implementation of adaptive learning models in Islamic religious education (PAI). At this stage, researchers were able to create a more systematic analytical framework. This allowed researchers to comprehensively integrate various ideas and research findings contained in the literature and to explain how PAI learning is changing in the technological era.

Data Analysis Techniques

This study analyzed data using a descriptive-analytical method. The analysis began with a data reduction process, where important information was selected and presented from various previously collected literature (Haryoko, 2020). Categorization was then conducted to group key concepts related to adaptive learning, digital transformation in education, and the characteristics of Islamic Religious Education (PAI) learning. Furthermore, researchers conducted comparative and interpretive analyses by comparing various expert perspectives and previous research findings to identify patterns, trends, and the relevance of adaptive learning concepts in Islamic education. The goal of this stage is to enhance our understanding of how adaptive learning models can be used and developed for PAI learning in the digital era.

After the comparative and interpretive analyses are completed, the next step is to create a conceptual synthesis. This synthesis combines the various findings from the evaluated literature. At this point, researchers explore how the concepts of adaptive learning, advances in digital technology, and learning needs in PAI relate to each other. The goal of this research effort is to provide a comprehensive description of how adaptive learning models can be used to improve PAI learning flexibility, responsiveness, and learner-centeredness. Furthermore, this investigation takes into account pedagogical features, technology, and Islamic values associated with PAI learning. Thus, the analysis's findings provide a theoretical knowledge and conceptual foundation for developing important advances in PAI learning these days.

Data Validity

To determine the validity of the research findings, this study applies source triangulation techniques, comparing multiple publications from different authors and studies (Nurfajriani et al., 2024). Through triangulation, researchers were able to test the consistency of information and acquire an objective assessment of this idea and the application of adaptive learning. Furthermore, the analysis was carried out in a methodical and critical manner, taking into account the context of educational technology breakthroughs and the characteristics of Islamic religious learning.

To ensure that all information used aligns with the research focus, in addition to source triangulation, data validity was also strengthened through a repeated and thorough literature review process. The researcher reviewed the selected references to avoid unfair interpretations and ensure that the conclusions were based on strong, relevant theories. Furthermore, this process involved thoroughly evaluating the methodological quality of the previous research used as references. Therefore, the research results are not only descriptive but also have adequate academic validity and can provide a more comprehensive picture of how adaptive learning models in Islamic Religious Education (PAI) are developing amid the educational transformations of the digital era.

RESULTS AND DISCUSSION

Results

Adaptive Learning Model

Adaptive learning, as described above, does not merely represent a technical shift in instructional delivery but reflects a paradigmatic transformation in how knowledge, learners, and the learning process itself are understood. At a deeper analytical level, adaptive learning challenges the long-standing dominance of standardized, teacher-centered pedagogy by repositioning students as dynamic subjects of learning whose cognitive, emotional, and social dimensions must be continuously recognized. This implies that learning is no longer viewed as the transmission of fixed knowledge, but as a fluid, personalized, and evolving process that responds to real-time learner data and contextual conditions.

From a critical perspective, the strength of adaptive learning lies in its ability to integrate data-driven decision-making with pedagogical sensitivity. The use of artificial intelligence and learning analytics allows educators to identify patterns that are often invisible in conventional classrooms, such as micro-level misconceptions or fluctuations in motivation. However, this also raises an important epistemological question: to what extent can quantitative data

fully represent the complexity of human learning, especially in domains such as Islamic Religious Education that involve values, spirituality, and moral internalization? Therefore, adaptive learning should not be reduced to algorithmic personalization alone, but must be balanced with humanistic and ethical considerations.

Furthermore, in the context of Islamic Religious Education, adaptive learning offers a strategic opportunity to bridge the gap between normative religious teachings and contemporary realities. By tailoring content and approaches to students' lived experiences in the digital era, this model enables the internalization of Islamic values in a more contextual and meaningful way. Nevertheless, the challenge lies in ensuring that adaptation does not lead to fragmentation or relativization of core religious principles, but instead strengthens students' understanding through relevant and guided interpretation. Another important analytical dimension is the role transformation of teachers. While adaptive learning positions teachers as facilitators, in practice, this role becomes more complex rather than diminished. Teachers are required not only to interpret learning data but also to exercise pedagogical judgment, ethical awareness, and spiritual guidance. This indicates that the success of adaptive learning is highly dependent on teachers' competencies, particularly their ability to integrate technology with reflective and value-based teaching practices.

Finally, adaptive learning can be seen as a sustainable educational strategy only if it is supported by systemic readiness, including infrastructure, curriculum flexibility, and institutional policy. Without these supports, adaptive learning risks becoming a fragmented innovation rather than a transformative approach. Therefore, a mature understanding of adaptive learning must place it within a broader educational ecosystem that integrates technology, pedagogy, and values, ensuring that it contributes not only to academic achievement but also to the holistic development of learners in the digital era.

A further critical dimension of adaptive learning lies in its potential to create what can be termed a "datafication of learners", where students are increasingly reduced to datasets, performance metrics, and behavioral patterns. While such data can enhance instructional precision, it also risks oversimplifying the richness of human learning into measurable indicators. In the context of Islamic Religious Education, this reduction becomes even more problematic, as aspects such as faith (iman), sincerity (ikhlas), and moral consciousness (akhlaq) cannot be fully captured through analytics or algorithmic systems. Therefore, an overreliance on data-driven adaptation may unintentionally marginalize the transcendental and affective dimensions of learning, which are central to religious education. This calls for a critical balance where data is used as a supporting tool, not as the sole determinant of educational decisions.

In addition, adaptive learning must be interrogated through the lens of ethical responsibility and pedagogical accountability. The integration of artificial intelligence in learning systems raises questions about bias, transparency, and control over educational content. Algorithms are not neutral; they are designed based on particular assumptions, datasets, and priorities that may not always align with the ethical and spiritual objectives of education, especially in Islamic contexts. Consequently, educators and institutions must play an active role in critically mediating technology, ensuring that adaptive systems uphold values of justice, inclusivity, and moral integrity. Without such critical oversight, adaptive learning risks becoming a technologically sophisticated system that is pedagogically efficient, yet ethically and spiritually shallow.

Islamic Religious Education Subjects

Islamic Religious Education topics are one of the key components of the education system that function to implant the principles of faith, piety, and noble morals in students (Alyana et al., 2025). In the broader context of national education, Islamic Religious Education has been defined not only as an option for transmitting religious knowledge but also as an effort to shape character and personality in accordance with Islamic principles (Saleh et al., 2025). Through Islamic Religious Education (PAI), students are expected to understand Islamic teachings comprehensively, encompassing faith, worship, morals, and social interactions. As a result, PAI plays an important role in developing individuals who are not only intellectually gifted but also have strong moral and spiritual integrity in their daily lives.

Islamic Religious Education consists of a wide range of integrated material, including the Qur'an and Hadith, faith, morals, juridical theory, and the history of Islamic civilization (Manan et al., 2025). Each component performs complementary tasks to build a solid understanding of Islam for students. Learning about the Koran and Hadith is intended to improve the ability to read, understand, and practice the values

contained in the main sources of Islamic teachings. Learning Aqidah centers on strengthening belief in Allah SWT and the pillars of faith, and learning *fiqh* provides an understanding of how worship and Islamic laws are applied in everyday life. Learning about morals and the history of Islamic civilization is intended to instill moral examples and provide insight into the dynamics of Muslim development throughout history (Jamaluddin, 2022).

Islamic education prioritizes students' affective and psychomotor aspects, in addition to cognitive ones. Therefore, the major purpose of Islamic education is to internalize Islamic values in everyday attitudes and behaviors (Hapsari et al., 2025). The Islamic Religious Education learning process should be designed in a contextually applicable manner so that students not only comprehend religious principles conceptually but can also apply them in actual life. PAI teachers serve as educators, mentors, and moral role models, combining Islamic beliefs with the social realities that students confront at school and in their communities.

Islamic Religious Education (PAI) learning in the digital era presents both challenges and opportunities. Teaching strategies must be adapted to a context where students have broad access to digital information. By utilizing technology, the Islamic Education curriculum can become more engaging, flexible, and responsive to the needs of the digital generation. At the same time, the curriculum can maintain its fundamental goal of instilling essential values by effectively using technology.

However, from an analytical perspective, the digital transformation of Islamic Religious Education should not be limited to the instrumental level (the use of technology). However, it must also address its epistemological and axiological dimensions. The digital era has shifted the authority of knowledge from being teacher-centered to being widely distributed across digital platforms. This condition requires Islamic Education not merely to function as a transmitter of normative content but also as a critical filter and moral guide amid the overwhelming flow of information that is not always valid or aligned with Islamic principles. Without this shift, Islamic Education risks losing its relevance, as it may be outpaced by more dynamic and accessible digital learning sources.

Furthermore, the author argues that the main challenge of Islamic Religious Education in the digital era lies not in the lack of technology, but in the inability to integrate values with digital realities in a contextual manner. Many learning practices remain textual, repetitive, and focused on memorization, making them inadequate in addressing real-world issues such as digital ethics, identity formation, and moral degradation in virtual spaces. Therefore, Islamic Education must evolve into a reflective, contextual, and transformative learning process, where Islamic values are not only understood cognitively but also internalized and practiced in students' everyday digital lives.

In addition, the use of technology in Islamic Education must be accompanied by critical awareness of its potential negative impacts. Uncontrolled digitalization can lead to the superficialization of religious understanding, where students consume fragmented information without depth or critical reflection. In this regard, the role of the teacher becomes increasingly crucial as a *murabbi* (holistic educator) who not only masters technology but also nurtures students' spiritual and moral development. Thus, technology should be positioned as a means (*wasilah*) rather than an end in itself.

Ultimately, the author emphasizes that the future of Islamic Religious Education in the digital era depends on its ability to integrate technology, pedagogy, and values holistically. Successful Islamic Education is not defined by technological sophistication alone, but by its capacity to deliver learning that is meaningful, character-building, and relevant to students' real lives. This transformation requires the courage to move beyond stagnant traditional approaches and adopt more adaptive, critical, and human-centered models to form a complete individual (*insan kamil*) in the complexity of the digital age.

Transformation of Adaptive Learning Models in Islamic Education Subjects in the Digital Era

The transformation of education in the digital era demands a paradigm shift in the learning process, including in Islamic Religious Education (PAI), specifically in the subject of the Qur'an and Hadith. The theory of the transformation of adaptive learning models in Islamic Religious Education (PAI) in the digital era is based on the integration of constructivism, humanism, connectivism, and Islamic education theories as a comprehensive conceptual framework. Constructivist theory emphasizes that students actively construct knowledge through meaningful learning experiences, thus becoming the basis for the implementation of student-centered adaptive learning (Marta & Lawal, 2026). Furthermore, humanist theory reinforces the importance of developing students' potential as a whole, not only in the cognitive domain, but also in the affective and spiritual domains, which aligns with the objectives of PAI learning in shaping character and noble morals. In the context of the digital era, connectivism theory provides a foundation for understanding that learning occurs through information and technology networks, making the use of e-learning, learning management systems (LMS), and artificial intelligence an integral part of creating flexible and personalized learning (Siemens, 2005). Meanwhile, Islamic education theory serves as a normative foundation that emphasizes that the entire learning process must be oriented towards the formation of a perfect human being, namely a person who is faithful, knowledgeable, and moral, so that adaptive learning transformation does not only focus on pedagogical and technological innovation, but also on the internalization of Islamic values in the lives of students holistically (F. M. Safitri & Ajjahidi, 2025).

The growth of technology in education implies significant modifications in learning processes, particularly in Islamic Religious Education. Advancements in information and communication technology have altered how students acquire knowledge, interact with learning resources, and develop an understanding of the many subjects they study. In this scenario, uniform, teacher-centered learning methods can no longer adequately meet students' increasingly diverse learning needs. As a result, creative learning methods that are more flexible, responsive, and adaptable to each learner's unique qualities are required. The adaptive learning model is one way that addresses these criteria. This methodology tailors information, tactics, and the learning pace to students' abilities, interests, and learning styles (Saputra, 2025). Adaptive models are increasingly essential in Islamic Religious Education because their primary purpose is to promote cognitive understanding of Islamic teachings and foster the internalization of religious principles in a more contextual and personal manner (Ananda et al., 2025). Adaptive learning enables teachers to employ a range of learning platforms and media to provide a more dynamic, creative, and student-centered learning experience. The implementation of digital technology enables PAI learning activities to be conducted more efficiently, relevantly, and in alignment with the changing structure of education in the digital era. The following diagram demonstrates the evolution

of the adaptive learning paradigm in PAI in the digital age. The graphic below depicts the transformation scheme of the adaptive learning model in Islamic Religious Education in the digital era.

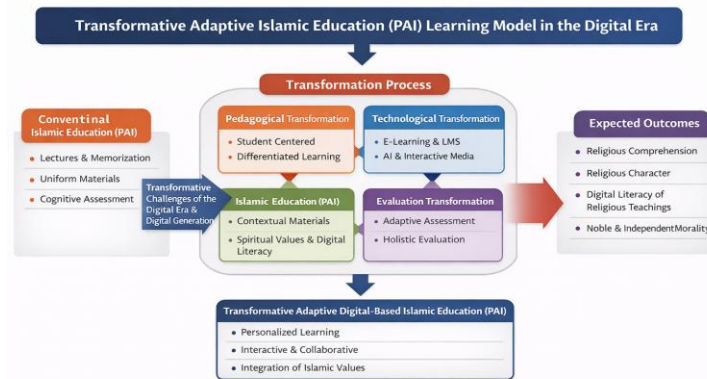


Figure 1. Transformative Adaptive Islamic Education Learning Model in the Digital Era

Researchers created a visualization that explains the transformation of adaptive learning models in Islamic Religious Education (PAI) in the digital era, demonstrating a shift from conventional to more personalized, interactive, and technology-based learning systems. Overall, the image demonstrates that learning transformation does not occur suddenly, but rather through a series of processes involving changes in pedagogy, technology, learning materials, and evaluation systems. The transition can be explained by both advancements in digital technology and changes in the preferences of a generation of students who have become increasingly linked to information technology (D. Safitri et al., 2024). This shows that the adaptive learning model is an appropriate approach for addressing contemporary educational challenges while significantly improving the overall quality of Islamic education.

The figure or chart shows the criteria for conventional Islamic Religious Education, which is widely employed in educational settings. Traditional education is often characterized by a teacher-centered approach (teacher-centered learning), in which the teacher serves as an essential source of knowledge during the learning process. The methods commonly used in conventional Islamic Religious Education are lectures and memorization, leaving students largely passive recipients of information. Furthermore, learning materials are typically delivered uniformly to all students, without accounting for differences in ability and learning style. Assessment systems also tend to focus on cognitive qualities, such as knowledge of content and memorization, whereas affective factors and practical skills are frequently given insufficient emphasis (Aris M. (ed), 2020).

The restrictions of the digital era, along with the characteristics of the generation that uses technology, are driving the shift to adaptive learning, as illustrated in the figure. Today's students live in an environment saturated with digital technologies, such as the internet, social media, and various technology-based learning applications. This impacts how students obtain information, interact, and learn. Students tend to prefer interactive, visual, and flexible learning over one-way learning methods. Therefore, learning systems need to adapt to these developments to remain relevant and meet the learning needs of the digital generation.

The transformation process depicted in the diagram involves four main components: pedagogical transformation, technological transformation, learning materials transformation, and evaluation transformation. These four components are interrelated and form a learning system that is more adaptive to student needs. Pedagogical transformation involves a shift from teacher-centered to student-centered learning

(Alam, 2023). This technique encourages students to become more involved in the educational process by combining activities such as discourse, exploration, and cooperation.

Furthermore, pedagogical transformation also emphasizes the importance of implementing differentiated learning. Differentiated learning is a strategy that allows teachers to adapt learning methods, materials, and activities to suit students' abilities and needs (Goyibova et al., 2025). Differentiation in Islamic Religious Education can be achieved by incorporating several types of learning activities, such as group discussions, Islamic value-based projects, and spiritual reflections, that allow students to gain a more comprehensive understanding of religious principles. This technique allows students to learn at their preferred pace and style, thereby increasing learning efficiency.

Differentiated learning in Islamic Religious Education (PAI) is a strategic step toward creating a more inclusive, flexible, and student-centered learning process. Through differentiation, teachers no longer impose the same approach on all students; instead, they provide opportunities for each student to develop according to their individual potential, abilities, and characteristics. This not only enhances understanding of religious material but also strengthens the internalization of Islamic values in everyday life. Thus, differentiated learning is a crucial foundation for transforming PAI pedagogy to meet the challenges of the digital era while simultaneously developing students who are faithful, moral, and competent.

The next component is technological transformation, which emphasizes the use of digital technology in the learning process. The chart mentions e-learning and learning management systems (LMS) as tools to support adaptive learning. These digital platforms enable teachers to manage learning materials, assign assignments, and monitor student progress more systematically. Furthermore, technological developments such as artificial intelligence and interactive learning media can also be used to create more engaging and personalized learning experiences for students.

The use of technology in Islamic Religious Education (PAI) learning serves not only as an administrative tool but also as a means of transforming the learning experience into a more meaningful one. Through e-learning and an LMS, teachers can provide a variety of learning resources, such as instructional videos, interactive simulations, and digital quizzes, that can be accessed anytime, anywhere. This provides students with the flexibility to learn independently while deepening their understanding of religious material. Furthermore, technology enables faster, more accurate feedback, enabling teachers to adjust learning strategies to meet students' needs quickly.

Additionally, pedagogical and technological innovations in adaptive learning require the transformation of Islamic Religious Education learning materials. Learning materials are no longer offered solely in textual or theoretical form, but are better contextualized to reflect students' experiences in the digital age. The picture demonstrates how instructional materials must mix spiritual values with digital literacy (Suwarma, 2025). This is required to ensure that students not only comprehend religious teachings but also apply Islamic principles to address the numerous social and cultural challenges arising in the digital era.

By transforming Islamic Religious Education (PAI) learning materials into an adaptive learning framework, it becomes clear that collaboration between pedagogical and technological elements is crucial for delivering relevant and meaningful learning. Material is no longer structured statically and textually; instead, it is structured contextually by linking Islamic religious principles to the digital situations students face. With technologies such as digital platforms and interactive media, content can be presented in a more engaging, understandable format for students, while encouraging them to think critically about social phenomena in cyberspace. This integration also enhances digital literacy grounded in Islamic values, so that students are not only proficient in using technology but also have a strong moral and spiritual foundation for wisely engaging with digital culture, interactions, and information.

Another important aspect of the transformation process is the transformation of the learning evaluation system. In the adaptive learning model, evaluation focuses not only on measuring cognitive learning

outcomes but also on a more comprehensive, holistic assessment (Lin et al., 2025). Adaptive assessment allows teachers to adjust the evaluation format to students' abilities and learning development. In addition, holistic assessment also takes into account affective and spiritual aspects, such as religious attitudes, morals, and students' ability to apply Islamic values in everyday life (Fatimah, 2024).

In adaptive Islamic Religious Education (PAI) learning, changes to the assessment system underscore the importance of shifting toward more comprehensive, holistic evaluations. Through this approach, teachers assess not only students' cognitive understanding of the material but also the development of their attitudes, values, and religious practices in everyday life. Adaptive assessment enables the use of diverse evaluation methods tailored to students' abilities and characteristics, such as project-based tasks, self-reflection, portfolios, and behavioral observations. Therefore, assessment functions not merely as a measurement tool, but as a means to understand the entire learning process in a more integrative manner. This is particularly essential in PAI learning, where the ultimate goal is not only conceptual mastery but also the formation of moral character and the internalization of Islamic values in students' lives.

The result of this transformation process is the development of digital-based, adaptive Islamic education. This paradigm emphasizes personalized learning, in which instructional design is aligned with each student's needs, potential, and learning pace (Putra, 2024). However, this study offers a distinctive contribution by introducing the integration of akhlaq (moral character) and spiritual dimensions as essential components that must be embedded within adaptive learning in the digital era. Unlike previous studies that tend to focus on technological and pedagogical adaptation, this research emphasizes that true adaptability in Islamic Education must also include moral and spiritual transformation, ensuring that technological advancement does not detach learning from its ethical and transcendental foundations.

Several prior studies further strengthen this argument. Research by Sabagh et al. (2021) highlights that adaptive learning improves cognitive outcomes but often lacks emphasis on affective and moral dimensions. Similarly, Nurhayati (2024) demonstrates the effectiveness of AI-based learning systems in personalizing instruction, yet notes the limited integration of value-based education within them. Meanwhile, Hidayat and Suryani (2020) emphasize the importance of curriculum innovation in bridging traditional Islamic teachings with contemporary contexts, although their focus remains largely structural rather than spiritual. In addition, Rahmawati et al. (2022) show that digital learning enhances student independence, but does not automatically guarantee character formation. These findings indicate a significant gap, namely the absence of a holistic framework that integrates cognitive, technological, moral, and spiritual aspects simultaneously.

Therefore, this study positions itself as an effort to fill that gap by proposing an adaptive learning model in PAI that is not only technologically responsive and pedagogically innovative, but also ethically grounded and spiritually oriented. In this perspective, assessment becomes a strategic instrument not only to measure learning outcomes but also to trace the internalization of akhlaq and spiritual awareness within students. Consequently, adaptive learning in Islamic Education is redefined not merely as personalization of content and methods but as a comprehensive transformation process that shapes students into individuals who are intellectually capable, morally grounded, and spiritually conscious in navigating the complexities of the digital era.

CONCLUSION

The transformation of adaptive learning models in Islamic Religious Education (PAI) in the digital era represents a fundamental shift toward a more flexible, student-centered, and technology-integrated learning paradigm that not only enhances cognitive achievement but also fosters the development of religious attitudes, character, and moral awareness. This study finds that integrating differentiated pedagogy, digital technologies such as LMSs and artificial intelligence, contextualized learning materials, and adaptive and holistic assessment significantly contributes to creating more meaningful and personalized learning experiences. Theoretically, this research contributes to the development of Islamic education by proposing an integrative framework that combines adaptive learning with the internalization of spiritual and moral values, thus bridging the gap between technological innovation and value-based education. The implications of these findings highlight the need for educators and institutions to redesign curricula, strengthen teachers' digital and pedagogical competencies, and ensure that technology is aligned with ethical and spiritual objectives. Therefore, future research is recommended to explore further the implementation of this model across diverse educational contexts, particularly to assess its effectiveness in shaping students' holistic development, including their spiritual and moral dimensions.

ACKNOWLEDGEMENT

The author would like to express sincere gratitude to UIN Sultan Maulana Hasanuddin Banten and Universitas PTIQ University of Jakarta for providing facilities, institutional support, and a supportive academic environment that enabled this research to be completed on time.

AUTHOR CONTRIBUTIONS STATEMENT

All authors, MW, FH, YFN, DI, W, and ASS, contributed to the writing and completion of this article.

REFERENCES

- A. M. (Ed.). (2020). *Sistem student center learning dan teacher center learning* [Student center learning and teacher center learning systems]. Media Sains Indonesia.
- Al-razi, M. F., Madjid, A., Hadziq, A., & Ilham, M. (2024). Reconstructing the Islamic education paradigm in Indonesia. *Edukasi*, 22(2), 294–310. <https://doi.org/10.32729/edukasi.v22i2.1918>
- Alam, M. A. (2023). From teacher-centered to student-centered learning: The role of constructivism and connectivism in pedagogical transformation. *Journal of Education*, 11(2), 154–167.
- Alfayumi, M. L., Usman, A. T., Munawaroh, N., & Masripah. (2025). Efektivitas pemanfaatan media artificial intelligence pada pembelajaran pendidikan agama Islam [The effectiveness of using artificial intelligence media in Islamic religious education learning]. *TARLIM: Jurnal Pendidikan Agama Islam*, 8(2), 211–220. <https://doi.org/10.32528/tarlim.v8i2.3157>
- Alyana, A., Sukmawati, M., Rizqotussofia, R., & Nuryati, T. (2025). Pengaruh pembelajaran pendidikan agama Islam terhadap perilaku keagamaan siswa [The influence of Islamic religious education learning on students' religious behavior]. *Jurnal Budi Pekerti Agama Islam*, 3(3), 217–227. <https://doi.org/10.61132/jbpai.v3i3.1227>
- Ananda, A. T., & Malik, M. U. I. (2025). Adaptive learning Islamic education: Literature review model pembelajaran PAI adaptif [Adaptive learning Islamic education: Literature review of the adaptive Islamic religious education learning model]. *Jurnal Pembelajaran dan Pengajaran*, 8(2).
- Anwar, R. N. (2024). Pelatihan pemanfaatan artificial intelligence pada guru pendidikan agama Islam (PAI) untuk meningkatkan efektivitas pembelajaran di Kota Kediri [Training on the use of artificial intelligence for Islamic religious education (PAI) teachers to improve learning effectiveness in

- Kediri City]. *Jumat Informatika: Jurnal Pengabdian Masyarakat*, 5(2), 119–124. <https://doi.org/10.32764/abdimasif.v5i2.4976>
- Baidoo-Anu, D., & Owusu Ansah, L. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, 7(1), 52–62. <https://doi.org/10.61969/jai.1337500>
- Bans-Akutey, M., & Tiimub, B. M. (2021). Triangulation in research. *Academia Letters*, Article 3392. <https://doi.org/10.20935/AL3392>
- Cahyono, A., Wahyuni, A. D., & Umam, M. K. (2025). Pembelajaran berdiferensiasi pada mata pelajaran PAI: Tinjauan literatur berbasis dimensi school well-being [Differentiated learning in Islamic religious education subjects: A literature review based on the school well-being dimension]. *Asas Wa Tandhim: Jurnal Hukum, Pendidikan Dan Sosial Keagamaan*, 4(2), 405–418. <https://doi.org/10.47200/awtjhpsa.v4i2.3117>
- Fahrudin, R., Sollikhin, R., & Masruroh, A. (2024). Inovasi pembelajaran pendidikan agama Islam melalui teknologi artificial intelligence untuk meningkatkan interaksi siswa [Innovation in Islamic religious education learning through artificial intelligence technology to increase student interaction]. *Mauriduna: Journal of Islamic Studies*, 5(1), 79–91. <https://doi.org/10.37274/mauriduna.v5i1.1298>
- Fatimah, S., & Sumarni, S. (2024). A holistic approach to Islamic basic education: Synthesizing the development of students' potential from intellectual, spiritual, and emotional aspects. *Pionir: Jurnal Pendidikan*, 13(2), 106–116. <https://dx.doi.org/10.22373/pjp.v13i2.24259>
- Fauziyati, W. R. (2023). Dampak penggunaan artificial intelligence (AI) dalam pembelajaran pendidikan agama Islam [The impact of using artificial intelligence (AI) in Islamic religious education learning]. *Jurnal Review Pendidikan dan Pengajaran (JRPP)*, 6(4), 2180–2187. <https://doi.org/10.31004/jrpp.v6i4.21980>
- Fitriyah, C. Z., & Wardani, R. P. (2022). Paradigma kurikulum merdeka bagi guru sekolah dasar [The independent curriculum paradigm for elementary school teachers]. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, 12(3), 236–243. <https://doi.org/10.24246/j.js.2022.v12.i3.p236-243>
- Goyibova, N., Muslimov, N., Sabirova, G., & Kadirova, N. (2025). MethodsX Differentiation approach in education: Tailoring instruction for diverse learner needs. *MethodsX*, 14(January), 103163. <https://doi.org/10.1016/j.mex.2025.103163>
- Hakim, F., Fadlillah, A., & Rofiq, M. N. (2024). Artificial intelligence (AI) dan dampaknya dalam distorsi pendidikan Islam [Artificial intelligence (AI) and its impact on the distortion of Islamic education]. *Urwatul Wutsqo: Jurnal Studi Kependidikan Dan Keislaman*, 13(1), 129–144. <https://doi.org/10.54437/urwatulwutsqo.v13i1.1330>
- Haleem, A., Javaid, M., Asim, M., & Suman, R. (2022a). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3(February), 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Haleem, A., Javaid, M., Asim, M., & Suman, R. (2022b). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3(May), 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Hapsari, T. T., Agus, M., & Sari, H. P. (2025). Peran pendidikan agama Islam dalam membentuk karakter siswa di era globalisasi [The role of Islamic religious education in shaping student character in the globalization era]. *Ikhlas*, 2(3). <https://doi.org/10.61132/ikhlas.v2i3.767>
- Haryoko, S. (2020). *Analisis data penelitian* [Research data analysis]. Badan Penerbit UNM.
- Ilias, K., Qolamani, B., & Mohammed, M. M. (2023). The digital revolution in higher education: Transforming teaching and learning. *Qalamuna*, 15(2), 837–846. <https://doi.org/10.37680/qalamuna.v15i2.3905>

- Isdayani, Thamrin, A. N., & Milani, A. (2024). Implementasi etika penggunaan kecerdasan buatan (AI) dalam sistem pendidikan dan analisis pembelajaran di Indonesia [Implementation of the ethics of using artificial intelligence (AI) in the education system and learning analysis in Indonesia]. *Digital Transformation Technology (Digitech)*, 4(1), 714–723. <https://doi.org/10.47709/digitech.v4i1.3789>
- Jailani, M. S. (2023). Teknik pengumpulan data dan instrumen penelitian ilmiah pendidikan pada pendekatan kualitatif dan kuantitatif [Data collection techniques and educational scientific research instruments in qualitative and quantitative approaches]. *IHSAN: Jurnal Pendidikan Islam*, 1(2), 1–9. <https://doi.org/10.61104/ihsan.v1i2.57>
- Jamaluddin, D. (2022). *Ilmu pendidikan Islam* [Islamic education science]. Rajawali Pers.
- Jatmiko, A., Koderi, K., & Fauzi, A. (2025). Implementasi kurikulum merdeka dalam pembelajaran pendidikan agama Islam: Tantangan dan inovasi di sekolah dan madrasah [Implementation of the independent curriculum in Islamic religious education learning: Challenges and innovations in schools and madrasas]. *JIIP - Jurnal Ilmiah Ilmu Pendidikan*, 9(1), 1227–1233. <https://doi.org/10.54371/jiip.v9i1.10280>
- Ministry of Education and Culture of the Republic of Indonesia. (2020). *Rencana strategis Kementerian Pendidikan dan Kebudayaan tahun 2020-2024* [Strategic plan of the Ministry of Education and Culture for the year 2020-2024].
- Khalijah, S., & Zuliana, Z. (2024). Analisis isi materi pendidikan agama Islam pada kurikulum merdeka [Content analysis of Islamic religious education materials in the independent curriculum]. *Journal of Education Research*, 5(1), 935–938. <https://doi.org/10.37985/jer.v5i1.956>
- Lin, K., Li, M., Lo, F., Huang, H., & Matsuno, K. (2025). Adaptive learning with human factors and artificial intelligence: Associations with training effectiveness in programming education. *International Journal of Industrial Ergonomics*, 110(June), 103834. <https://doi.org/10.1016/j.ergon.2025.103834>
- Lubis, S. H., Naldi, A., Reskina, R., Lubis, A. F., & Nurhayati, N. (2023). Inovasi penggunaan AI (artificial intelligence) dalam pembelajaran pendidikan agama Islam di MAN 4 Persiapan Kota Medan [Innovation in the use of AI (artificial intelligence) in Islamic religious education learning at MAN 4 Preparation Medan City]. *Jurnal Bilqolam Pendidikan Islam*, 4(2), 105–129. <https://doi.org/10.51672/jbpi.v4i2.213>
- Manan, M. A., & Faruqi, A. (2025). Rekonstruksi struktur kurikulum pendidikan agama Islam [Reconstruction of the Islamic religious education curriculum structure]. *Lisan Al-Hal*, 19(2), 240–252. <https://doi.org/10.35316/lisanalhal.v19i2.240-252>
- Marta, D. J., & Lawal, U. S. (2026). Transformation of Islamic religious education learning in the digital era: Learning modalities and educational challenges in the 21st century. *IJIJER*, 3(1), 23–34. <https://doi.org/10.58230/ijier.v3i1.488>
- Mubarok, D. (2021). Pelaksanaan upaya meningkatkan hasil belajar peserta didik pada mata pelajaran fiqh melalui metode demonstrasi berbasis ICT [Implementation of efforts to improve student learning outcomes in fiqh subjects through ICT-based demonstration methods]. *Tanzhimuna*, 1(1), 1–18. <https://doi.org/10.47466/tanzhimuna.v1i1.218>
- Muchlis, M. (2025). Penggunaan artificial intelligence (AI) dalam pembelajaran pendidikan agama Islam: Manfaat dan tantangan [The use of artificial intelligence (AI) in Islamic religious education learning: Benefits and challenges]. *Kreatif: Jurnal Pemikiran Pendidikan Agama Islam*, 23(1), 100–109. <https://doi.org/10.52266/kreatif.v23i1.3518>
- N. Ik. (Ed.). (2020). *Eksistensi pendidikan Islam* [The existence of Islamic education].
- Nurfajriani, W. V., Ilhami, M. W., Mahendra, A., Afgani, M. W., & Sirodj, R. A. (2024). Triangulasi data dalam analisis data kualitatif [Data triangulation in qualitative data analysis]. *Jurnal Ilmiah Wahana Pendidikan*, 10(17), 826–833. <https://doi.org/10.5281/zenodo.13929272>

- Nurhikmah, Tripitasari, D., & Muhdin. (2025). Rendahnya keterlibatan siswa dalam pembelajaran PAI pada materi akhlak dalam pergaulan sehari-hari dan dampaknya terhadap pemahaman konsep [The low level of student involvement in Islamic religious education learning on the material of morals in daily associations and its impact on conceptual understanding]. *Al-Mustaqbal: Jurnal Agama Islam*, 2(4). <https://doi.org/10.59841/al-mustaqbal.v2i4.345>
- Nurrohmah, N., Syaifurrahman, A., & Lestari, F. A. (2025). Implementasi pendidikan agama Islam dalam membentuk karakter peserta didik di era teknologi AI (artificial intelligence) [Implementation of Islamic religious education in shaping student character in the era of AI (artificial intelligence) technology]. *Jerkin: Jurnal Pendidikan Dasar dan Menengah*, 4(1). <https://doi.org/10.31004/jerkin.v4i1.1661>
- Putri, F., Rahmadhani, S., & Raisal, A. Y. (2025). The role of information technology in learning. *Proceedings of the International Seminar of Islamic Studies*, 1(1), 462–466. <https://jurnal.umsu.ac.id/index.php/insis/article/view/22892>
- Qolbiyah, A. (2022). Implementasi kurikulum merdeka dalam pembelajaran pendidikan agama Islam [Implementation of the independent curriculum in Islamic religious education learning]. *Jurnal Penelitian Ilmu Pendidikan Indonesia*, 1(1), 44–48. <https://doi.org/10.31004/jpion.v1i1.15>
- Rakha, A. P., Wildan, S. S., & Gusmaneli, G. (2024). Model pembelajaran adaptif: Untuk meningkatkan efektivitas pembelajaran di era digital [Adaptive learning model: To improve learning effectiveness in the digital era]. *ALFIHRIS: Jurnal Inspirasi Pendidikan*, 2(3), 1–9.
- Ramadhoni, Y., & Muchtar, Z. (2024). Development of an integrated smart apps creator media with a guided inquiry learning model on reaction rate material. *Jurnal Teknologi Pendidikan*, 9(3), 516–525. <https://doi.org/10.33394/jtp.v9i3.11998>
- Safitri, D., & Qodriyah, K. (2024). Digital transformation of student behavior. *International Conference on Education, Society and Humanity*, 02(02), 1100–1108. <https://ejournal.unuja.ac.id/index.php/icesh/article/view/10138>
- Safitri, F. M., & Ajjahidi, M. H. (2025). Conceptual analysis of the internalization of moral values in Islamic religious education through a humanistic approach. *AR-RASYID: Jurnal Pendidikan Islam*, 5(2), 213–221. <https://doi.org/10.30596/arrasyid.v5i2.26960>
- Saleh, A. R., Amaluddin, A., Lestari, U., Irma, I., & Tajuddin, T. (2025). Kontribusi Pendidikan Agama Islam terhadap Pengembangan Kecerdasan Spiritual Peserta Didik [The contribution of Islamic religious education to the development of students' spiritual intelligence]. *Journal of Innovative and Creativity*, 5(2), 1947–1959. <https://doi.org/10.31004/joecy.v5i2.432>
- Salsabila, U. H., Rifki, M., Oktavianda, T., Annisa, & Fauzan Abid, D. (2024). Integrasi teknologi pendidikan agama Islam dalam kurikulum merdeka [Integration of Islamic religious education technology in the independent curriculum]. *IHSAN: Jurnal Pendidikan Islam*, 2(1), 136–147. <https://doi.org/10.61104/ihsan.v2i1.133>
- Santrock, J. W. (2021). *Educational psychology* (7th ed.). McGraw-Hill Education.
- Saputra, E. C. (2025). Differentiated learning strategies: Creating an adaptive and inclusive Indonesian classroom. *Jurnal Onoma*, 11(4), 4204–4220.
- Sarinda, F., Martina, M., Noviani, D., & Hilmin, H. (2023). Pendidikan agama Islam berbasis teknologi (AI) artificial intelligence [Islamic religious education based on artificial intelligence (AI) technology]. *Jurnal Kajian Penelitian Pendidikan Dan Kebudayaan*, 1(4), 103–111. <https://doi.org/10.59031/jkppk.v1i4.268>
- Schunk, D. H. (2020). *Learning theories: An educational perspective* (8th ed.). Pearson.
- Sholehah, C. A., & Rachman, P. (2023). Dinamika transformasi pendidikan agama Islam: Sinergitas artificial intelligence dalam peningkatan pemahaman keagamaan [The dynamics of Islamic religious

- education transformation: The synergy of artificial intelligence in improving religious understanding]. *BAHTSUNA: Jurnal Penelitian Pendidikan Islam*, 5(2), 169–177. <https://doi.org/10.55210/bahtsuna.v5i2.317>
- Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2. http://www.itdl.org/Journal/Jan_05/article01.htm
- Sitepu, M. S. (2026). The role of Islamic religious education in character building of elementary school students. *Proceedings of the International Seminar of Islamic Studies*, 8, 2053–2060. <https://doi.org/10.3059/insis.v0i0.29666>
- Sodikin, S. (2024). Transformasi pendidikan agama Islam melalui artificial intelligence (AI): Upaya meningkatkan kemampuan berpikir kritis mahasiswa [The transformation of Islamic religious education through artificial intelligence (AI): Efforts to improve students' critical thinking skills]. *Academicus: Journal of Teaching and Learning*, 3(2), 78–89. <https://doi.org/10.59373/academicus.v3i2.65>
- Suganda, D. A. (2025). *Metode penelitian kualitatif* [Qualitative research methods]. Media Penerbit Indonesia.
- Suwarma, D. M. (2025). Adaptive education in the era of society 5.0: Integration of digital literacy technology and humanistic values. *Majority Science Journal*, 3(4), 11–19.
- Syafitri, A., Efriyanti, L., & Devi, I. (2024). The role of artificial intelligence in encouraging innovation and creativity in Islamic education. *Nizham Journal of Islamic Studies*, 12(1), 1–10. <https://doi.org/10.32332/nizham.v12i01.8602>
- Tantri, K. S., Aqilla, N. A., & Sukmawati, A. (2023). Pendidikan karakter di era digital: Mengajarkan etika dan tanggung jawab dalam penggunaan media sosial [Character education in the digital era: Teaching ethics and responsibility in the use of social media]. *ANWARUL: Jurnal Pendidikan dan Dakwah*, 3(4), 662–675. <https://doi.org/10.58578/anwarul.v3i4.1234>
- UNESCO. (2023). *Global education monitoring report 2023: Technology in education-A tool on whose terms?*
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wiranata, E., Aulia, F., Setiawan, J., & Idris, M. (n.d.). Tantangan dan peluang inovasi pembelajaran PAI di era digitalisasi Erik [Challenges and opportunities for innovation in Islamic religious education learning in the digitization era]. *Literasiologi*, 14(3), 1–16.