



Adaptive Learning and Quranic Values for Generation Alpha

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Abstract

Generation Alpha grows up in a digital environment where artificial intelligence increasingly shapes access to information and learning experiences. This condition requires Islamic education to develop adaptive learning models that address learners' needs while remaining grounded in Quranic values. This article aims to develop an adaptive learning model integrating artificial intelligence and Quranic values for Generation Alpha. The study employed a qualitative approach using *content analysis* of 30 peer-reviewed articles, books, and scholarly documents published between 2020 and 2025. Data were analyzed through data reduction, categorization, interpretation, and thematic synthesis. The findings resulted in the development of the PAQ-AI model, consisting of six main components: learner diagnosis, verified knowledge architecture, adaptive systems, integration of Quranic values, teacher supervision, and multidimensional assessment. The model positions artificial intelligence as a learning support tool rather than a religious authority while incorporating the values of *amanah*, *tabayyun*, *'adl*, *rahmah*, and *sidq* into learning and assessment processes. These findings provide implications for developing more adaptive, personalized, and ethically grounded Islamic education in the digital era.

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INTRODUCTION

Generation Alpha is growing up in a digital ecosystem characterized by high-intensity interaction with mobile devices, social media, digital learning platforms, and algorithm-based systems. The characteristics of this environment shape a learning experience that differs from that of previous generations, as access to information is rapid, personalized, and continuous. However, the characteristics of this generation cannot be used to generalize about all students, as each individual still has diverse needs, abilities, and learning styles. Therefore, education must adaptively respond to changes in the digital environment without neglecting pedagogical principles oriented toward student development. Ziatdinov & Cilliers, (2021) emphasize that the development of digital technology is one of the primary

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contexts shaping Generation Alpha's expectations and learning experiences; consequently, educational institutions are required to develop learning approaches that are more flexible and responsive to the changing times.

These developments have occurred in tandem with the increasingly widespread application of Artificial Intelligence in Education (AIED). Artificial intelligence is no longer used solely for administrative purposes but has evolved to support learning processes, assessment systems, digital tutoring services, learning data analysis, and personalized learning (Chen et al., 2020). In the context of education, artificial intelligence enables the provision of learning experiences that are better tailored to the individual needs of students through the analysis of behavior, learning outcomes, and learning preferences. However, for Islamic education, the integration of artificial intelligence is not only about the effectiveness of the technology but also concerns how it is used to support the development of students' manners, moral responsibility, and character in accordance with the goals of Islamic education.

One of the most widely developed approaches in the application of artificial intelligence is adaptive learning. Adaptive learning allows the system to tailor content, difficulty levels, learning paths, and feedback based on learners' needs and progress. A study by Kabudi et al., (2021) shows that AI-based adaptive learning systems have great potential to improve effectiveness, personalization, and learner engagement in the learning process. These findings are reinforced by Wang et al., (2024), who revealed that the use of artificial intelligence in education can help improve the learning experience through more individualized, data-driven learning support. Nevertheless, the effectiveness of adaptive learning still depends on the quality of pedagogical design, the validity of knowledge sources, and teacher involvement in the educational decision-making process.

At the same time, the emergence of generative artificial intelligence and large language models opens up new opportunities while also presenting more complex challenges. Lo, (2023) found that the use of generative technology can support the learning process, the creation of instructional materials, and the rapid provision of feedback, but it also poses risks such as misinformation, learner dependency, and issues of academic integrity. In Islamic education, these challenges have a broader dimension because the information generated may relate to the interpretation of the Quran, hadith, fiqh, akhlak, and other religious matters that require valid sources and scholarly authority. Therefore, the use of artificial intelligence in Islamic education must not be limited to technological efficiency alone but must be accompanied by adequate oversight and verification mechanisms.

The need for ethical governance of artificial intelligence is receiving increasing attention in various recent studies. Nguyen et al., (2023) explain that the development of artificial intelligence in education must be based on the principles of transparency, fairness, accountability, privacy, and a human-centered approach. These principles align with fundamental Islamic values such as amanah, tabayyun, 'adl, rahmah, and sidq, which emphasize the importance of moral responsibility, verification of information, justice, compassion, and honesty in all human activities. In line with this, Ali et al., (2025) assert that the use of artificial intelligence from an Islamic ethical perspective must continue to place humans as the stewards and primary parties responsible for all decisions generated by technology. Thus, the integration of artificial intelligence into Islamic education requires a framework that is not only pedagogically adaptive but also grounded in

Quranic values as its ethical foundation.

Studies on Islamic education also indicate that the successful utilization of learning technology is largely determined by its relevance to educational objectives. [Huda et al., \(2024\)](#) found that the use of technology in Islamic Religious Education must be viewed as a pedagogical tool that supports the achievement of learning objectives, rather than as an end in itself. This means that the integration of artificial intelligence into Islamic education needs to shift from a technology-driven approach toward a value-driven and pedagogy-driven approach. Through this approach, technology not only serves to enhance the effectiveness of learning but also supports the process of internalizing Islamic values within students' learning experiences.

Various previous studies have addressed Generation Alpha, artificial intelligence in education, adaptive learning, the ethics of artificial intelligence, and the use of technology in Islamic education separately ([Chen et al., 2020](#); [Kabudi et al., 2021](#); [Lo, 2023](#); [Nguyen et al., 2023](#); [Rifah et al., 2024](#); [Wang et al., 2024](#)). However, there are still very few studies that integrate all these aspects into a single learning model that simultaneously connects AI-based personalized learning, the validation of Islamic knowledge sources, teacher supervision, data governance, and the operationalization of Quranic values. Consequently, there is a gap between the development of adaptive learning technology and the needs of Islamic education for a pedagogical framework that maintains ethical, spiritual, and scholarly dimensions.

The novelty of this article lies in the development of the PAQ-AI (Artificial Intelligence-Based Adaptive Quranic Learning) model, which integrates two dimensions of adaptation simultaneously: pedagogical adaptation based on students' learning needs and normative adaptation based on Quranic values. Unlike previous studies, which have focused more on the effectiveness of technology or the ethics of artificial intelligence in isolation, this article offers a conceptual model that connects student diagnosis, verified knowledge architecture, adaptive learning systems, Quranic values, teacher supervision, and multidimensional assessment within a single integrated framework.

Theoretically, this article contributes to the development of digital Islamic education studies by presenting a conceptual model that integrates adaptive learning approaches and Quranic ethics in the use of artificial intelligence. Practically, the PAQ-AI model can serve as a reference for curriculum developers, Islamic Religious Education teachers, educational institution administrators, and learning technology developers in designing learning systems that are more personalized, adaptive, and ethical. Furthermore, this model is expected to support the development of a generation that not only possesses digital competencies and independent learning skills but also exhibits moral awareness, social responsibility, and Quranic character in utilizing artificial intelligence technology.

METHODS

This study employs a qualitative approach using an integrative literature review combined with a structured design synthesis. This method was chosen because the study does not focus on testing the effectiveness of the model in educational practice, but rather on developing a conceptual model based on a synthesis of published empirical and theoretical findings. An integrative literature review allows for the integration of various perspectives, concepts, and research

findings across disciplines to produce a comprehensive understanding of a phenomenon, while structured design synthesis is used to translate these findings into a systematic and implementable model framework (Engkizar et al., 2024; Kasheem et al., 2025; Snyder, 2019). Through this approach, this study aims to formulate an adaptive learning model that integrates artificial intelligence and Quranic values within the context of Islamic education for Generation Alpha.

Data Sources

The research data sources consist of scientific literature obtained from journal articles, conference proceedings, academic books, and reputable scientific documents relevant to the research topic. The main corpus of the study comprises 30 peer-reviewed scientific publications issued between 2020 and 2025. The literature was selected purposefully based on several criteria: relevance to the themes of Generation Alpha, artificial intelligence in education, adaptive learning, generative artificial intelligence, ethics of artificial intelligence, and Islamic education; clear publication identifiers; and empirical or conceptual contributions to the development of the model under study. This time frame was selected to ensure that the data used reflects the latest developments in the application of artificial intelligence in the field of education (Chiu et al., 2023; Wang et al., 2024).

Instruments

In literature reviews, the researcher serves as the primary instrument (human instrument), responsible for identifying, selecting, evaluating, interpreting, and synthesizing the data sources used (Creswell & Poth, 2018; Engkizar et al., 2017, 2026; Ibrahim et al., 2025). To support the analysis process, a data extraction sheet was used, which included publication details, research focus, key concepts, artificial intelligence functions, ethical aspects, research findings, pedagogical implications, and their relevance to the development of an adaptive learning model based on Quranic values. This instrument was used to ensure consistency in the process of collecting and categorizing data from the various analyzed literature sources.

Data Collection Techniques

Data collection was conducted through a literature review by searching various relevant scientific sources via academic databases and reputable scientific publications. Literature meeting the inclusion criteria was then collected, read in depth, and analyzed based on the research focus. The documentary review technique was chosen because it allows researchers to obtain rich conceptual and empirical data to construct a comprehensive model framework (Aryasutha et al., 2025; Bowen, 2009; Engkizar et al., 2025). All selected documents were subsequently classified based on research themes to facilitate the analysis and synthesis process.

Data Validity

Data validity was ensured through a process of source quality evaluation and literature triangulation. Source evaluation is conducted by selecting literature based on the publication's reputation, the relevance of its content, the author's credibility, and its scientific contribution to the research topic. Additionally, the study employs source triangulation by comparing and confirming findings from various literature sources across different fields of study, such as Generation Alpha, Artificial Intelligence in Education, adaptive learning, the ethics of artificial intelligence, and Islamic education. This process aims to enhance the credibility, consistency, and conceptual validity of the developed model (Miles & Saldaña, 2015; Snyder, 2019).

Data Analysis Tools

Data analysis was conducted using a conceptual synthesis matrix to map the relationships among themes, concepts, and research findings. This matrix enabled the identification of patterns, interconnections, and research gaps, thereby facilitating the development of a conceptual model. The use of synthesis matrix-based analysis tools is a common approach in literature review research to produce a systematic and structured integration of knowledge (Sukmawati, 2024).

Data Analysis Techniques

Data analysis was conducted in four stages. First, the data coding process, which involved identifying and grouping information based on the focus of the study, the functions of artificial intelligence, the role of teachers, ethical aspects, technological risks, and educational implications. Second, the thematic categorization process, which involved grouping codes with similar meanings into broader themes. This stage yielded six main themes: student diagnosis, verified knowledge architecture, adaptive systems, integration of Quranic values, teacher supervision, and multidimensional assessment. Third, an interpretive analysis was conducted, which involved examining the relationship between each theme and Quranic values such as *amanah*, *tabayyun*, *‘adl*, *rahmah*, and *sidq* as the ethical foundation of the model. Fourth, a structured design synthesis was conducted, which involved organizing the relationships among components into the PAQ-AI (Artificial Intelligence-Based Adaptive Quranic Learning) conceptual model, which describes the workflow, operating principles, and implementation indicators of the model. The analysis process was conducted iteratively until a model framework was obtained that was coherent, systematic, and possessed sufficient conceptual validity to be tested in follow-up research (Chiu et al., 2023; Creswell & Poth, 2018).

Table 1. Framework for Literature Selection and Synthesis

Dimension	Criteria/Unit of Analysis	Contribution to the Model
Generation Alpha	Learning needs, digital behavior, and individual differences	Foundation for diagnosis, multimodality, and the avoidance of stereotypes
Artificial Intelligence in Education (AIED) and Adaptivity	Personalization, feedback, learner modeling, and human–AI collaboration	Adaptation mechanisms and role distribution
AI Ethics	Explainability, fairness, privacy, accountability, and integrity	Governance safeguards and decision auditing
Islamic Education	Value internalization, Islamic Religious Education media, Islamic ethics, and digital transformation	Qur’anic value safeguards and teacher authority

Design Synthesis	Alignment of functions, risks, values, and roles	Architecture, instructional syntax, assessment, and implementation indicators
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RESULT AND DISCUSSION

Generation Alpha: Adaptive Based on Data, Not Stereotypes

The synthesis findings indicate that the starting point for a model should not be the assumption that all members of Generation Alpha prefer a certain format or are automatically digitally proficient. A systematic review of Generation Alpha’s education shows that the characteristics of this generation must be interpreted carefully and linked to diverse educational evidence. PAQ-AI therefore employs a multi-layered diagnostic approach that encompasses prerequisite knowledge, conceptual mastery, error patterns, response speed, support needs, and learning reflections. These profiles are provisional and subject to revision (Höfrová et al., 2024).

This principle distinguishes personalization from generational segmentation. Studies on the challenges teachers face with Generation Alpha highlight the need for strategies that are responsive to students’ learning behaviors and the evolving digital environment. If a student needs illustrations to understand cause-and-effect relationships, the system can present a concept map; another student might benefit from a case study or step-by-step exercises. Preferences are not treated as fixed abilities, and teachers retain the ability to modify the pathways recommended by the system.

PAQ-AI Architecture: Six Interlocking Layers

PAQ-AI is structured as a six-layer architecture: learner diagnosis, verified knowledge base, Artificial Intelligence adaptation engine, Quranic values filter, teacher-in-the-loop supervision, and multidimensional assessment. This structure leverages the evolution of the AIED paradigm, which is shifting from an Artificial Intelligence-directed approach toward one that is more centered on human interaction and empowerment. The six layers do not operate as a closed sequence; AI recommendations must pass through source and value boundaries, teachers can modify or reject recommendations, and assessment results can update the learner model (Ouyang & Jiao, 2021).

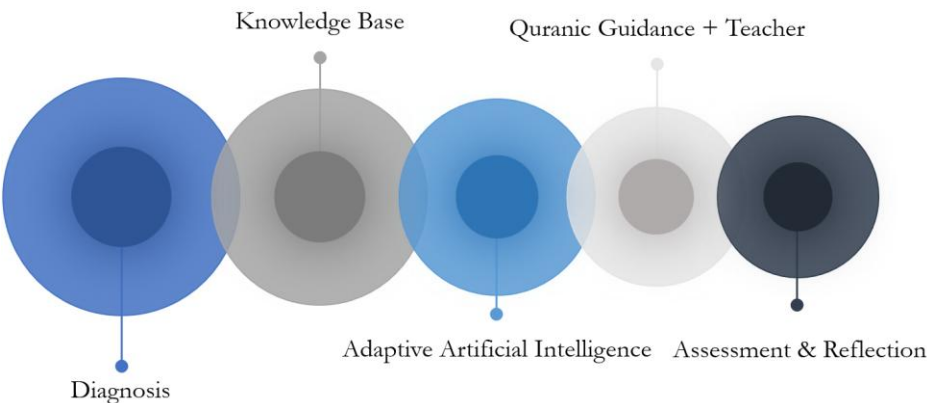


Fig 1. Conceptual Flowchart of the PAQ-AI Model

The diagnostic layer constructs a minimal yet useful learning profile. The data used is limited to information that is strictly necessary for pedagogical purposes. PAQ-AI rejects the practice of inferring a person’s faith, piety, or moral character

from click patterns or automated scores. The concept of human-AI learning positions technology as a partner that expands educational decision-making capacity, while meaningful judgment still requires human involvement. Therefore, teachers can review, correct, or delete inaccurate conclusions made by the learner model (Molenaar, 2022).

A verified knowledge base sets PAQ-AI apart from general chatbots. The core content is derived from the curriculum, the Quran, and official translations established by institutions; religious texts or commentaries selected by the academic team; textbooks; and curated scholarly sources. Explainable Artificial Intelligence in education emphasizes the importance of ensuring that the basis for outputs and recommendations is understandable to users. Therefore, Artificial Intelligence responses regarding religious material must be accompanied by a source trail; if the sources are insufficient, the system must indicate uncertainty and escalate the question to a teacher (Khosravi et al., 2022).

The adaptation engine layer controls the difficulty level, sequence of activities, representation format, amount of scaffolding, and form of feedback. However, the engine is not authorized to alter core competencies or normative conclusions. Studies on the role and challenges of AIED emphasize that the use of Artificial Intelligence is always tied to the division of roles among technology, teachers, and pedagogical design. Thus, what is adapted is the path toward learning outcomes, not the Quranic values that guide the learning process (Hwang et al., 2020).

The layers of Quranic values translate these values into design principles: *amanah* relates to responsibility for data and sources; *tabayyun* to verification; *adl* to fairness audits; *sidq* to transparency regarding the limits of Artificial Intelligence knowledge; and *rahmah* to feedback that does not humiliate learners. Studies on the gap between AIED theory and practice indicate that technological advancements must be balanced with a stronger pedagogical foundation. PAQ-AI adds a normative foundation to ensure that adaptive decisions do not deviate from the goals of Islamic education (Chen et al., 2020).

The “teacher-in-the-loop” layer emphasizes that teachers are both the designers and the ones responsible for pedagogy. On sensitive topics such as differences in fiqh, issues of faith, or personal questions, Artificial Intelligence only helps organize preliminary information. The mapping of Artificial Intelligence in higher education shows that the role of technology is expanding broadly, but implementation still requires human decisions regarding how, when, and for what purposes Artificial Intelligence is used. In PAQ-AI, final decisions of a pedagogical-religious nature rest with the teacher or the institution’s academic authorities (Crompton & Burke, 2023).

The multidimensional assessment layer evaluates conceptual mastery, the quality of argumentation, verification skills, reflection, collaborative processes, and the application of values in authentic tasks. PAQ-AI does not automatically score piety or inner moral character. The Artificial Intelligence education policy framework emphasizes the need for clear rules regarding usage, transparency, and accountability in the learning process. Therefore, final assessment still requires triangulation of teacher observations, assignment artifacts, student reflections, and dialogue (Chan, 2023).

Table 2. PAQ-AI Components, Artificial Intelligence Functions, Quranic Values, and Teacher Control

Component	Artificial Intelligence Function	Ethical Values/Safeguards	Teacher Control
Learning Diagnosis	Detecting mastery levels, error patterns, and scaffolding needs	‘ <i>Adl</i> (justice); data minimization	Determining which data may be used; correcting learner profiles
Knowledge Base	Information retrieval and content mapping	<i>Tabayyun</i> (verification); <i>sidq</i> (truthfulness)	Curating sources; verifying Quranic verses, hadith, and tafsir
Adaptation	Adjusting sequence, complexity, format, and feedback	<i>Rahmah</i> (compassion); <i>hikmah</i> (wisdom)	Setting learning objectives and adaptation boundaries
Quranic Guardrails	Filtering outputs based on human-designed rules	<i>Amanah</i> (trustworthiness); <i>tabayyun</i> (verification); ‘ <i>adl</i> (justice)	Establishing normative rules; handling sensitive cases
Human Supervision	Flagging risks and cases requiring escalation	<i>Amanah</i> (trustworthiness); <i>shura</i> (consultation)	Approving or rejecting recommendations
Assessment	Process analytics and formative feedback	<i>Sidq</i> (truthfulness); responsibility	Conducting final assessments and evaluating character dimensions

Learning Syntax: From Value Orientation to Reflection

This architecture translates into six phases of learning: goal and value orientation, adaptive diagnosis, personal exploration, dialogue and clarification, action or problem-solving, and assessment and reflection. In each phase, Artificial Intelligence is used to enhance exercises and feedback, but evidence of learning must still demonstrate the learner’s thought process. Studies on academic integrity in the ChatGPT era indicate that assessment design must address the potential use of AI to generate academic work without adequate learning processes (Cotton et al., 2024).

This framework ensures that Artificial Intelligence does not become a shortcut to obtaining answers. Instead, the system is designed to encourage epistemological questions: where does the information come from, what is the evidence, is the context appropriate, and who should be asked for clarification when uncertainty arises. A SWOT analysis of ChatGPT confirms that the benefits of generative technology are always accompanied by weaknesses and threats that must be managed through educational design. Therefore, PAQ-AI shifts the focus of

assignments from producing answers to producing reasoning, evidence, revisions, and reflection (Farrokhnia et al., 2024).

Table 3. Operational Syntax for PAQ-AI Learning

Phase	Teacher Activities	Student Activities	Role of Artificial Intelligence	Learning Evidence
Value Orientation	Establishing objectives, values, sources, and Artificial Intelligence boundaries	Understanding objectives and rules	Displaying objectives and guidelines	Brief learning agreement
Adaptive Diagnosis	Selecting prerequisite indicators	Responding to initial questions or case scenarios	Mapping initial learning needs	Preliminary mastery map
Personalized Exploration	Monitoring learning pathways and interventions	Learning through appropriate formats and difficulty levels	Adapting content and scaffolding	Process notes and responses
Dialogue and <i>Tabayyun</i> (Verification)	Facilitating verification and discussion	Checking sources and comparing reasoning	Presenting references and indicating uncertainty	Source verification worksheet
Action/Project	Providing authentic cases and assessment rubrics	Applying concepts and values	Providing formative feedback	Product, decision, and argumentation
Assessment and Reflection	Assessing outcomes, processes, and reflection	Revising work and explaining learning experiences	Summarizing patterns and providing reflection prompts	Portfolio and reflection

Implementation Scenario: *Tabayyun* in the Information Age

As an illustration, PAQ-AI can be applied to the topic of *tabayyun* for junior high school (SMP)/MTs students. The teacher begins with a case involving a viral message containing religious claims and asks students to determine the verification steps. The practical and ethical risks of LLMs in education include issues of reliability, bias, privacy, and the use of outputs without adequate scrutiny. After an initial assessment, the system adjusts the depth of the material, but all pathways are directed toward understanding Quranic Surah al-Hujurat [49]: 6 and the obligation to verify information (Yan et al., 2024).

During the dialogue phase, the Artificial Intelligence is prompted to display sources and highlight uncertain sections. Students compare the output with curated sources, assess credibility, and then discuss their reasoning with the teacher. Studies

on educational chatbots show that the same technology can yield benefits or problems depending on its design, usage, and accompanying oversight. Therefore, in this scenario, Artificial Intelligence only assists with content variation and feedback; epistemic decisions are still made through accountable human activity (Tili et al., 2023).

During the action phase, the group creates a brief protocol before sharing information and testing the protocol on several examples. A review of AI-based chatbots shows that conversational systems can provide more personalized practice opportunities and feedback when used in targeted learning designs. PAQ-AI leverages these advantages without isolating learners: individualized adaptive pathways are always reconnected to dialogue, discussion, practice, and teacher-student relationships (Du & Daniel, 2024).

Governance, Integrity, and Security as Part of Pedagogy

Artificial Intelligence governance is not treated as a technical afterthought once learning has been designed. Students need to know when Artificial Intelligence is being used, what data is being processed, and how recommendations influence their learning paths. Artificial Intelligence literacy in K–12 education also requires students to understand the principles, uses, and consequences of Artificial Intelligence systems not merely to be passive users. PAQ-AI therefore requires clear disclosure, data restrictions, human intervention, and correction mechanisms when recommendations are deemed inappropriate (Sanusi et al., 2023).

In Islamic education, digital transformation must be translated into learning tools that remain guided by educational objectives and scholarly sources. Studies on the development of AI-based teaching modules in Islamic education highlight opportunities to use Artificial Intelligence to enhance the interactivity and personalization of educational materials. PAQ-AI expands on this approach by incorporating a curated knowledge base, Qur'anic values as guardrails, and a “human religious authority lock” to ensure the system does not act as a religious authority (Zuhriyeh et al., 2025).

Integrity and security also require institutional norms. Studies on the implementation of Artificial Intelligence in Islamic education emphasize the importance of ethical and effective use so that technology supports rather than obscures educational goals. Students can use Artificial Intelligence for clarification, examples, practice, or to critique arguments, but Artificial Intelligence contributions must be acknowledged, sources verified, and the final answer remains the student's responsibility (Djazilan et al., 2024).

Novelty of the Model and Its Relationship to Previous Research

The novelty of PAQ-AI lies not merely in the use of Artificial Intelligence, but in the integration of personalization with source constraints and value constraints. A bibliometric study on the intersection of Islam and digital technology shows that the relationship between religion and technology has emerged as an increasingly important field of study. PAQ-AI brings this discussion to the micro-level of learning decisions: what data may be used, what sources may be referenced, how recommendations are filtered, and when humans must take over (Wahid et al., 2023).

PAQ-AI also incorporates a “human religious authority lock.” Artificial Intelligence is not granted the right to make final judgments regarding beliefs, personal morality, or sensitive fiqh decisions; such cases must be escalated to a teacher or academic authority designated by the institution. A comparative study on

the integration of Artificial Intelligence in Islamic higher education shows that Muslim institutions' responses to Artificial Intelligence are closely tied to context, policies, and institutional readiness. Therefore, the implementation of PAQ-AI must be tailored to the authority structure and policies of each school or madrasah (Syukur et al., 2024).

Compared to digital transformation approaches that merely add technological tools, PAQ-AI integrates technology with the internalization of values throughout the entire learning process. Studies on the internalization of digital technology in Islamic education emphasize the need to align digital development with an educational orientation that remains rooted in values. Values in PAQ-AI therefore influence learning profiles, resource selection, feedback formats, verification mechanisms, and assessment design (Muslim, 2024).

Theoretically, this model proposes dual adaptation. The first adaptation is pedagogical: the system adjusts learning paths based on evidence of learning. The second adaptation is normative: Artificial Intelligence outputs are filtered through value-based rules and human-defined sources. Both adaptations must be reversible and auditable; teachers can modify the learner model, reject recommendations, or escalate cases when outputs do not align with sources and values. Dual adaptation also prevents personalization from devolving into a relativization of educational goals. Learners may receive different examples, levels of complexity, or forms of assistance, but the standards of source accuracy, core competencies, and fundamental values do not change based on algorithmic preferences. Thus, personalization is directed toward expanding access to the same learning outcomes, rather than creating different ethical standards for each learner.

In practical terms, schools or madrasahs can start with a curated body of knowledge, usage and verification protocols, and process-based assessment designs before building complex adaptive systems. The next phase can include the addition of diagnostic dashboards, recommendations, and analytics. This phased strategy reduces the risks associated with a "technology-first" design and allows time to test how well each component aligns with the needs of teachers and students. In the early stages, teachers can use Artificial Intelligence solely as a tool to generate question variations or provide feedback, with manual verification procedures. Once schools have established source and data protocols, adaptive features can be expanded albeit on a limited basis to low-risk content. This phased approach makes it easier for schools to assess the benefits, workload, system errors, and user acceptance before deploying Artificial Intelligence for more sensitive activities.

This model has limitations because the synthesis remains conceptual and has not yet demonstrated that PAQ-AI improves learning outcomes, Artificial Intelligence literacy, or the internalization of values. The constructs of *amanah*, *tabayyun*, *'adl*, *sidq*, and *rahmah* also require operational definitions that are sensitive to age, school culture, and subject-specific objectives. Future research should employ design-based research, expert reviews, quasi-experimental studies, or mixed methods, and incorporate assessments of bias, privacy, teacher experiences, and student experiences. Evaluations must also distinguish between technical effectiveness and educational effectiveness. A system may be computationally accurate but still fail pedagogically if its recommendations do not aid understanding, increase cognitive load, or reduce meaningful interaction with teachers. Conversely, a simple model may be more valuable if it reinforces students' habits of critical inquiry, argumentation skills, and sense of responsibility. Therefore, success

indicators for PAQ-AI must include cognitive outcomes, learning processes, resource quality, data security, and the user's ethical experience.

CONCLUSION

The findings of the analysis indicate that advancements in artificial intelligence have presented significant opportunities for the development of learning that is more adaptive, personalized, and responsive to the needs of Generation Alpha. However, the integration of technology into Islamic education cannot be oriented solely toward efficiency and the personalization of learning; it must also take into account ethical and spiritual dimensions, as well as the goal of character building. The results of the literature synthesis produced the PAQ-AI (Artificial Intelligence-Based Adaptive Quranic Learning) model, which consists of six main components: learner diagnosis, verified knowledge architecture, an artificial intelligence-based adaptive system, integration of Quranic values, teacher supervision, and multidimensional assessment. This model positions artificial intelligence as a learning support tool that helps personalize the learning process, while teachers continue to serve as guides, supervisors, and guarantors of the achievement of Islamic educational goals.

The novelty of this article lies in the development of a learning model that simultaneously integrates pedagogical and normative adaptation through the values of *amanah*, *tabayyun*, *'adl*, *rahmah*, and *sidq* as the operational foundation for the use of artificial intelligence in Islamic education. Unlike adaptive learning models, which generally focus on technology and personalization, PAQ-AI presents a conceptual framework that connects technology, pedagogy, and Quranic ethics within a single integrated system. The implications of this research indicate that Islamic education needs to develop a learning ecosystem that not only utilizes artificial intelligence to enhance learning effectiveness but also ensures that technology is used responsibly, humanistically, and with a focus on character development. This model can serve as a reference for educators, curriculum developers, and educational technology developers in designing adaptive, personalized Islamic learning that is relevant to the needs of Generation Alpha in the era of digital transformation.

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Author contribution

Dedi Arianto: data curation, writing-original draft preparation, **Ath Thaariq Marcel Syahwardi:** analysis, conceptualization, methodology, **Yosi Aryanti & Zayyid Muhammad Jiddan:** visualization, and editing.

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