International Journal of Learning, Teaching and Educational Research
Vol. 23, No. 11, pp. 423-443, November 2024
https://doi.org/10.26803/ijlter.23.11.22
Received Sep 24, 2024; Revised Oct 18, 2024; Accepted Nov 29, 2024

Challenges and Opportunities of Artificial Intelligence Adoption in Islamic Education in Indonesian Higher Education Institutions

Achruh*, Muh Rapi, M. Rusdi and Ridwan Idris
Universitas Islam Negeri Alauddin Makassar
Jl. H.M. Yasin Limpo No. 36 Romangpolong South Sulawesi, Indonesia

Abstract. This article aims to explore the challenges and opportunities of integrating Artificial Intelligence (AI) in Islamic education within Indonesian Higher Education Institutions (IHEIs). Using qualitative interviews with scholars, the study examines the complexities involved in reconciling AI's personalized learning potential with traditional Islamic pedagogical methods, which emphasize the teacher's central role in fostering holistic spiritual and moral student development. It addresses ethical concerns such as data privacy, algorithmic bias, and transparency, underscoring the need for equitable AI systems that align with Islamic ethical principles. Additionally, the research highlights the digital divide as a significant barrier to AI adoption, urging stakeholders to invest in improved infrastructure, digital literacy, and teacher training. Despite these challenges, scholars acknowledge AI's potential to enhance educational quality by enabling more adaptive learning experiences, streamlining administrative processes, and fostering collaboration and innovation across IHEIs. The study emphasizes the need for a balanced and culturally sensitive approach, one that empowers educators and respects Islamic values, thereby ensuring that AI is not only a tool for learning enhancement but also one that preserves the integrity of traditional Islamic teachings. Finally, the research advocates for further exploration into contextually relevant AI tools, innovative pedagogical strategies, and collaborative frameworks to shape a future in which AI and Islamic education harmoniously support each other, enriching students' learning experiences without compromising core values.

Keywords: Artificial Intelligence; Islamic Education; Indonesian Higher Education; Challenges; Opportunities

*Corresponding author: Achruh; *andi.achruh@uin-alauddin.ac.id*

1. Introduction

The 21st century has seen rapid advancements in technology, with Artificial Intelligence (AI) emerging as a powerful force reshaping industries such as healthcare, finance, and education (Aminizadeh et al., 2024; Allioui et al., 2024; Khan et al., 2024). Education, as a foundation of societal development, is increasingly affected by these changes, particularly through the integration of AI tools that personalize learning and streamline administrative processes (Khan et al., 2024). Globally, AI integration in education is a rising topic of discussion, with both potential benefits and challenges, especially within Islamic educational contexts where cultural, religious, and ethical considerations are paramount. This article explores these dynamics within Indonesia's Higher Education Institutions (HEIs), where AI is beginning to influence Islamic educational practices, raising questions about the preservation of traditional values in the face of technological progress (Bécue et al., 2021). Additionally, the current state of Islamic education in Indonesia, home to the largest Muslim population worldwide, is deeply rooted in values of holistic personal development, moral education, and teacher-centered approaches that prioritize the student-teacher relationship as a cornerstone of learning. However, the rapid adoption of AI in education has presented both challenges and opportunities for Indonesia's Islamic HEIs, which seek to incorporate AI's benefits without compromising these core educational principles (Sebastian & Alkaff, 2024). In this context, AI's ability to provide personalized learning through adaptive platforms and intelligent tutoring systems could potentially enhance students' understanding and engagement. Yet, it also poses a risk of disrupting traditional pedagogies that emphasize memorization, rote learning, and moral guidance, as AI-driven methodologies may shift the teacher's role to a more facilitative one (Lin et al., 2023; Bécue et al., 2021). Such changes have spurred concerns that AI might undermine Islamic education's teacher-centric philosophy, diluting the holistic development goals central to the system.

In addition to transforming pedagogical practices, AI integration in education raises significant ethical concerns, particularly around data privacy, algorithmic bias, and cultural alignment. In Islamic educational contexts, these issues are heightened by the need to protect religious values while adopting new technologies. Data collection, a cornerstone of AI functionality, poses privacy risks and the potential for misuse, necessitating robust safeguards and transparent practices (Aswathy & Tyagi, 2022). The issue of algorithmic bias is another major concern; if not carefully managed, AI systems can perpetuate existing inequalities and reinforce social biases. For instance, biased algorithms may disproportionately affect certain groups, as demonstrated in studies of algorithmic fairness in non-religious educational systems, where data-driven decisions have sometimes led to biased academic recommendations and differential treatment (Ferrara, 2024). Such outcomes are incompatible with the values of equity and fairness central to Islamic educational principles. Furthermore, while AI-related ethical concerns are broadly relevant across global educational systems, religiously-based institutions face unique challenges, as they must ensure that AI applications align with specific ethical frameworks and values. This alignment is crucial in Islamic education to avoid compromising core tenets and to ensure AI serves as a respectful, supportive tool rather than a

disruptive force (Elmahjub, 2023). In non-religious settings, ethical AI use often focuses on regulatory compliance and fairness, whereas in Islamic education, it must additionally align with values of respect, community well-being, and spiritual integrity.

The Indonesian context, characterized by the world's largest Muslim population and a rich mix of cultural and religious traditions (Sebastian & Alkaff, 2024), adds a significant dimension to the exploration of AI in Islamic education. Indonesia's diverse educational landscape includes both secular and religious institutions (Sukirman, 2022), each with distinct pedagogical approaches. Integrating AI requires understanding these cultural, social, and religious nuances to ensure that it complements existing traditions. Additionally, Indonesia's socio-economic disparities and varying levels of technological infrastructure across regions pose challenges that must be addressed to ensure equitable access to AI-powered educational opportunities for all students, regardless of their geographical location or socio-economic background (Hornok & Raeskyesa, 2024; Sebastian & Alkaff, 2024). Then, as a nation with a deep-rooted Islamic heritage, Indonesia's approach to AI integration can serve as a model for other Muslim-majority countries (Sebastian & Alkaff, 2024) facing similar challenges. By examining the specific cultural, social, and religious factors that influence AI adoption in IHEIs, this research aims to provide valuable insights and lessons that can be adapted and applied in other contexts. The Indonesian experience can highlight how AI can enrich Islamic education while preserving core values, demonstrating how technology can meet the spiritual and intellectual needs of students in a way that balances tradition with the demands of the 21st century (Hmoud et al., 2023).

This article explores how AI can empower educators and learners in Islamic education by personalizing learning experiences to meet diverse student needs, fostering a more inclusive environment. Through tailored feedback, adaptive content, and intelligent tutoring systems, AI helps students deepen their understanding of Islamic teachings and cultivate a lifelong love for learning. Additionally, AI facilitates immersive experiences with virtual and augmented reality, enabling students to simulate historical events, explore sacred sites, and engage with virtual characters, thus enhancing their appreciation of Islam's rich heritage. Tools like quizzes, games, and simulations also encourage active exploration of Islamic concepts. Furthermore, the research examines AI's role in enhancing critical thinking and problem-solving skills (Jabali et al., 2024), essential in today's information-rich world, where students must evaluate sources and tackle complex problems. AI can challenge students with simulations that apply knowledge to real-world scenarios, thereby reinforcing the relevance of Islamic principles. It also promotes teamwork and communication through collaborative problem-solving, preparing students to be effective leaders. However, the integration of AI in education raises ethical concerns, necessitating a robust ethical framework to guide its implementation. Key issues include data privacy, algorithmic bias (Ferrara, 2024), and the potential impact on human autonomy. Protecting data privacy is crucial, as is addressing algorithmic bias to ensure fairness and equity. Ultimately, the research underscores that AI should support, not replace, human judgment in Islamic education.

This research proposes guidelines grounded in Islamic values (Elmahjub, 2023) for the responsible and ethical use of AI in Islamic education. Key elements include clear data handling rules and an emphasis on transparency and accountability in AI systems (Ferrara, 2024). The guidelines stress the importance of human involvement in decision-making, ensuring AI supports rather than replaces educators. Additionally, the framework encourages ongoing discussions about the ethical use of AI among educators and students. By addressing the specific challenges and opportunities of AI in Indonesian Islamic education, this study considers not only technological and economic factors but also the region's cultural, social, and religious aspects. The analysis aims to inform policy decisions and contribute to global discussions on ethical AI use in education, assisting educators, policymakers, and researchers in Indonesia and other Muslim-majority countries. Ultimately, the research envisions a future where AI and Islamic education coexist, empowering students and teachers to thrive in the modern world while upholding their faith and values.

2. Research Questions

Based on the elaborated introduction, the following research questions emerge as central to the investigation of AI adoption in Indonesian Islamic Higher Education Institutions:

1. How do Scholars in Indonesian HEIs perceive the challenges and opportunities associated with AI adoption in Islamic education?
2. How can AI be leveraged to enhance teaching and learning experiences in Islamic education, while preserving traditional pedagogical approaches and upholding Islamic values?
3. How can Indonesian HEIs address the infrastructural and technological challenges associated with AI adoption, particularly in terms of the digital divide and access to resources?

3. Research Methodology

Research Design

This study adopted a qualitative approach to investigate the complex dynamics of AI adoption in Islamic education within Islamic Higher Education Institutions (IHEIs). A qualitative methodology, centered on gathering detailed, context-specific information and understanding personal experiences (Kilinç et al., 2020), was well-suited to examining the multiple layers of this issue. This approach aimed to uncover the perspectives, beliefs, and practices of individuals involved at the intersection of AI and Islamic education, thereby providing valuable insights into this emerging field.

The choice of a qualitative approach was supported by several key considerations (Bazen et al., 2021). First, the adoption of AI in Islamic education is not merely a technological issue; it involves significant intersections with cultural, social, and religious values. A qualitative approach enables an in-depth exploration of these nuanced dimensions. Second, Indonesia’s unique cultural and religious landscape necessitates a sensitive research method, and qualitative research facilitates capturing these specific contextual details. Third, given the limited research on the integration of AI within Islamic education, particularly in Indonesia,

qualitative methods allow for the exploration and development of new ideas that may contribute to the field. Finally, it was essential to prioritize the voices of those directly impacted by AI in Islamic education. Qualitative methods emphasize participants' perspectives, ensuring that their experiences and insights remain central to the study.

Research Participants

Participants were chosen through purposeful sampling to ensure that each had relevant expertise and experience for the research (Campbell et al., 2020). The study involved 35 scholars specializing in Islamic education and AI, capturing a wide array of perspectives. Most participants were male (23), with 12 females, and their ages varied: primarily mid-career scholars (40-49 years), followed by early-career (30-39 years) and senior scholars (50-59 years), with a few over 60, adding historical insights into Islamic education. All had PhDs in fields like Islamic Studies, Education, and Computer Science, fostering a multidisciplinary approach.

The participants' experience in Islamic education ranged from 5 to over 21 years, contributing to a comprehensive view of the challenges and opportunities in AI adoption. They represented various institutions, including public, private, and Islamic universities, which helped illustrate different perspectives on AI implementation based on available resources and institutional priorities. Scholars were selected from across Indonesia, including major cities, urban areas, and rural regions, allowing for exploration of how geographic and infrastructural differences affect AI adoption and scholars' viewpoints. This diversity provided a rich and nuanced understanding of AI's integration into Islamic education at Indonesian HEIs.

Table 1. An overview of the participant demographics

Demographic Category	Sub-categories (if applicable)	Number of Participants	Additional Considerations
Gender	Male	23	
	Female	12	
Age	30-39 years	8	Early-career scholars with potential exposure to AI during their education
	40-49 years	15	Mid-career scholars likely bridging traditional and modern approaches
	50-59 years	9	Senior scholars with established perspectives on Islamic education
	60+ years	3	Highly experienced scholars, potentially providing historical context
Academic Qualifications	PhD in Islamic Studies	12	Deep understanding of Islamic principles and their application in education

Table 2. An overview of the participant demographics (continued)

Demographic Category	Sub-categories (if applicable)	Number of Participants	Additional Considerations
	PhD in Education	10	Expertise in pedagogical approaches and curriculum development
	PhD in Computer Science	5	Technical understanding of AI and its potential applications
	Other relevant PhD (e.g., Religious Studies, Philosophy)	8	Broader perspectives on ethics, social impact, and cultural implications
Years of Experience in Islamic Education	5-10 years	7	Newer perspectives, potentially more open to technological integration
	11-15 years	12	Established in the field, likely aware of current challenges and needs
	16-20 years	10	Experienced educators, potential to have witnessed previous tech shifts
	21+ years	6	Vast experience, valuable insights into the evolution of Islamic education
Institution Type	Public University	18	Reflects the broader Indonesian HEI landscape
	Private University	10	May offer insights into differing resource availability and autonomy
	Islamic University	7	Specialization in Islamic education, potentially deeper theological insights
Geographic Location	Major city (e.g., Jakarta, Surabaya)	20	Greater access to technology and infrastructure
	Other urban area	10	Moderately developed infrastructure, potential mix of perspectives
	Rural area	5	May face greater challenges with technology access and adoption

Data Collection

The primary data source for this research was in-depth, semi-structured interviews with selected scholars experienced in both Islamic education and AI. Potential participants were found through academic databases, university websites, and professional networks. Those who met the criteria were contacted via email and invited to take part. Interested individuals then went through a brief screening interview to confirm their eligibility. The interviews were designed to encourage trust and open communication (Adeoye-Olatunde & Olenik, 2021). Participants could choose between in-person interviews at their institutions or virtual interviews via video conferencing, ensuring convenience. Before each interview, they received an information sheet outlining the research goals, procedures, potential risks and benefits, and their right to withdraw at any time. Informed consent was obtained from all participants, either electronically or in person.

The interviews were conducted using a semi-structured format, guided by a protocol featuring open-ended questions to encourage detailed responses about AI adoption in Islamic education. Probing and follow-up questions were employed to clarify specific topics. The researcher maintained a respectful and

culturally sensitive approach, ensuring questions were appropriate for the Indonesian context. All interviews were audio-recorded with participants' consent and transcribed verbatim by trained transcribers to ensure accuracy. The transcripts and relevant field notes were securely stored in password-protected digital files and regularly backed up. To protect participants' privacy, identifying information was removed, and unique codes were assigned for anonymity. The data collection adhered to strict ethical standards, obtaining informed consent and maintaining confidentiality. Researchers were aware of power dynamics, ensuring participants felt comfortable and empowered throughout the process. This thorough approach aimed to gather rich insights into the complexities of AI adoption in Islamic education at Indonesian HEIs.

Data Analysis

The qualitative data from the in-depth interviews were analyzed using thematic analysis (Braun & Clarke, 2012; Rodriguez et al., 2024; Stolz, 2023). This process aimed to identify patterns and themes within the data. First, all interview recordings were transcribed verbatim for accuracy. Researchers then read the transcripts closely to understand the participants' perspectives and experiences. Next, they coded the data by identifying meaningful segments and labelling them based on relevance to the research questions. These codes were organized into broader themes reflecting common patterns and ideas. Developing these themes was an ongoing process, with researchers refining them to capture the complexities of the data accurately. The researchers interpreted the themes in light of the research questions and existing literature on AI and Islamic education. They paid attention to participants' language, noting key phrases that revealed their beliefs and values. They also looked for contradictions or ambiguities within the data, acknowledging the complex nature of AI adoption in Islamic education.

To strengthen the findings, the researchers used triangulation by comparing interview excerpts and conducting follow-up interviews to clarify any unclear responses (Sukirman & Kabilan, 2023). This approach helped provide a deeper understanding of participants' views (Rodriguez et al., 2024). Additionally, they conducted member checking, allowing participants to review the analysis to ensure their perspectives were accurately represented. Finally, the findings were presented clearly, using rich descriptions and quotes from the interviews. The themes were discussed in relation to the research questions, highlighting important insights for policy and practice. The researchers also acknowledged the study's limitations and suggested areas for future research.

4. Findings

Challenges and Opportunities in the Adoption of AI in Islamic Education

The first phase of this research, which gathered insights from Indonesian scholars on integrating AI into Islamic education, revealed both challenges and opportunities. While scholars acknowledged AI's potential to transform teaching and streamline administration, they maintained a cautious optimism. They stressed the importance of addressing ethical, cultural, and infrastructural challenges specific to the unique context of Islamic education in Indonesia's higher education institutions (HEIs).

Perceived Challenges: Tradition, Ethics, and Access

A key theme among scholars was the "potential tension" (S23) between AI's "data-driven" (S2) and "personalized learning paradigm" (S20) and the traditional pedagogical approaches in "Islamic education" (S9). The longstanding emphasis on memorization, rote learning, and teacher-centered instruction in Islamic practices could conflict with AI's focus on "individualized learning pathways" (S8) and "adaptive content delivery" (S16). This raises questions about how to integrate AI without compromising the core values of Islamic education, which emphasizes holistic individual development, including intellectual, spiritual, and moral growth.

> "*AI's emphasis on individualized learning might inadvertently diminish the significance of collective learning and the shared experience of memorizing and reciting sacred texts, which are deeply ingrained in Islamic educational traditions.*" (S8)

Scholars highlighted significant ethical concerns surrounding AI adoption, focusing on issues like "data privacy" (S5), "algorithmic bias" (S20), and effects on "human agency" (S31) and "autonomy" (S23). While student data can enhance personalized learning, it raises worries about "privacy breaches" (S34) and the misuse of sensitive information (S2). There were also fears that "algorithmic bias" (S3) could deepen existing inequalities and disadvantage certain groups. Scholars emphasized the importance of maintaining human oversight to ensure AI enhances rather than replaces human abilities, safeguarding the crucial role of educators in mentoring students.

> *"AI's use of student data raises concerns about privacy breaches. Robust data protection and transparency are essential." (S5)*

> *"While AI can enhance learning, we must not over-rely on it. Human agency and critical thinking remain crucial in Islamic education." (S31)*

The lack of access to technology in some parts of Indonesia is a major obstacle to using AI in Islamic education. Scholars noted that internet access, devices, and technical support are much better in cities than in rural areas, which could widen educational inequalities. Additionally, many educators lack the training needed to use AI tools effectively. Overcoming these challenges is key to making sure all students, no matter where they live or their financial situation, can benefit from AI in education.

> *"The digital divide in Indonesia hinders equitable AI adoption. Many schools lack the infrastructure for effective implementation." (S11)*

> *"Many teachers lack the skills to utilize AI effectively. Capacity building is crucial for successful AI adoption." (S25)*

Perceived Opportunities: Enhancing Learning, Streamlining Processes, and Fostering Innovation

Despite these challenges, scholars also expressed optimism about the transformative potential of AI to enhance Islamic education. The ability of AI to personalize "learning experiences" (S8), provide "adaptive assessments" (S24), and offer "intelligent tutoring systems" (S17) was seen as "a key opportunity to

cater to the diverse needs and abilities of students" (S11), fostering a more inclusive and engaging learning environment. By tailoring instruction to individual learning styles and paces, AI can empower students to take ownership of their learning and achieve their full potential. Additionally, AI-powered assessment tools can provide "real-time feedback to students" (S20), helping them identify their "strengths and weaknesses" (S31) and track their "progress over time" (S21), thus promoting "self-directed learning and continuous improvement" (S28).

> *"AI-powered tutoring systems can offer individualized support and guidance, complementing the role of the teacher. This can be particularly beneficial for students who may struggle with certain concepts or require additional practice, ensuring that no one is left behind."* (S26)

The automation of various "administrative tasks" (S32), such as "grading" (S19), "attendance tracking" (S4), and "data analysis" (S21), was also perceived as "a significant opportunity afforded by AI" (S35). This could free up valuable time for educators, allowing them to dedicate "more time" (S23) to their "core mission of teaching and mentoring students" (S10), fostering deeper connections and individualized support. Moreover, AI-powered tools can assist in "resource management" (S9), ensuring that educational materials, facilities, and funding are utilized effectively and efficiently, maximizing the impact of "limited resources" (S27) and "promoting sustainability" (S17) in Islamic education.

> *"AI automating tasks like grading frees us from paperwork, allowing more time for meaningful student interactions." (S9)*

> *"AI-powered tools can optimize resource management, maximizing impact and promoting sustainability." (S18)*

Furthermore, scholars recognized the potential of AI to foster innovation in Islamic education, leading to the creation of "new educational tools" (S19), "resources" (S27), and "approaches" (S29). The ability of AI to analyze vast amounts of data and uncover new insights into "student learning and behaviour" (S1) was particularly highlighted. These insights can inform the development of more effective "pedagogical strategies" (S6), personalized "learning experiences" (S8), and "innovative educational technologies" (S22) that cater to the specific needs and contexts of Islamic education. AI can also be leveraged to create interactive and immersive "learning experiences" (S8), leveraging "virtual reality" (S33), "augmented reality" (S17), and other emerging technologies to bring Islamic teachings to life and foster a deeper understanding of the faith.

> *"AI enables the creation of innovative tools like interactive simulations and VR experiences, making Islamic teachings more engaging."* (S29)

> *"Immersive technologies powered by AI can bring Islamic teachings to life, fostering deeper understanding and connection."* (S35)

In conclusion, Indonesian scholars view AI adoption in Islamic education with cautious optimism, recognizing both its challenges and potential. They see AI as a valuable tool that, if used responsibly and ethically, can improve teaching and learning, streamline administration, encourage innovation, and enhance global

connectivity. This perspective highlights the need for a thoughtful approach to AI integration that aligns with Islamic values and is sensitive to the cultural, social, and technological context of Indonesian HEIs.

Leveraging AI in Islamic Education: A Harmonious Integration

The second research question explored the potential of AI to enhance teaching and learning experiences within the context of Islamic education, while simultaneously preserving traditional pedagogical approaches and upholding core Islamic values (S5, S11, S16, S23, S28, S34, S35). Scholars offered a range of insights into the strategic integration of AI, emphasizing "a balanced approach" (S7) that leverages "technological advancements' S33) without compromising the rich heritage and ethical foundations of Islamic teachings (S4, S8, 17, 23, 32).

AI as a Pedagogical Complement, Not a Replacement

A common view among scholars is that AI should complement, not replace, traditional teaching methods (S11, S19, S28, S31, S32, S34). While AI can provide "personalized learning pathways and adaptive assessments" (S4), many warn against relying too much on technology (S26, S28, S32). They emphasize the irreplaceable role of teachers in developing "character" (S10), instilling "moral values" (S14, S21, S29), and fostering "a love for learning" (S2)—key elements of Islamic education. As S15 put it, "AI should not replace teachers but support and enhance their role. The teacher's wisdom, guidance, and spiritual connection with students are invaluable and cannot be replicated by machines." In this sense, AI is seen as "an empowering tool" (S35) that frees teachers from routine tasks so they can focus on "higher-order objectives" (S20) and build "a deeper, more meaningful connection with their students" (S8).

Culturally Relevant and Ethically Sound AI Design

Scholars stressed the need for AI applications that are both technologically advanced and culturally and ethically appropriate (S2, S6, S7, S13, S19, S26, S30). They highlighted the importance of "infusing Islamic perspectives and values" (S33) into the "design and implementation of AI tools" (S18) to ensure they align with Islamic principles. This requires a joint effort between technologists, educators, and religious scholars to "create AI solutions" (S32) that fit the "cultural and religious context of Indonesian Islamic education" (S11). As S7 stated passionately, "AI should be designed and implemented to respect and uphold Islamic values, addressing both the spiritual and intellectual needs of students. It's not just about knowledge but also about fostering character and developing a strong moral compass."

Empowering Educators through Capacity Building

The successful integration of AI hinges on the empowerment of educators (S10, S19, S21, S26, S34). Scholars stressed the necessity of comprehensive training and professional development programs to equip teachers with the skills and knowledge to effectively utilize AI tools (S6, S9, S27). By investing in "teacher capacity building" (S8), institutions can ensure that AI is seamlessly woven into "pedagogical practices" (S3, S28, S33), enhancing the learning experience without undermining the "teacher's central role" (S1). As one participant insightfully

observed, "Teachers need to be empowered to use AI confidently and creatively in their classrooms. This requires investment in their professional development and ongoing support to ensure that they can leverage AI's potential to its fullest extent" (S28).

> *"Empowering teachers to use AI creatively requires ongoing professional development beyond technical skills".* (S18)

> *"Teachers should see AI as an ally, not a threat. Training and support are key to seamless classroom integration".* (S31)

Critical Reflection and Future Direction

While scholars were optimistic about AI's potential, they recognized the importance of continuous critical reflection and evaluation (S3, S5, S10, S23, S24, S28, S35). As AI technologies evolve "at a rapid pace" (S2), it's crucial to "monitor" (S33) their "impact on Islamic education" (S10) and ensure alignment with "the core values and principles of the faith" (S22). Ongoing dialogue among stakeholders, including educators, technologists, and religious scholars, will be vital in "shaping the future of AI in Islamic education" (S19), ensuring it acts as "a force for good" (S3) and helps learners and educators navigate "the complexities of the 21st century" (S21) while staying grounded in their "faith and values" (S12).

> *"AI in Islamic education is an ongoing journey. We must constantly evaluate its impact and adapt our approaches".* (S13)

> *"The future of AI in Islamic education depends on open dialogue between educators, technologists, and religious scholars".* (Scholar 32)

The research findings reveal the complex relationship between tradition and innovation in AI adoption within Islamic education. While AI holds promise for enhancing teaching, improving administrative efficiency, and fostering innovation, it also highlights the importance of addressing ethical, cultural, and infrastructural challenges. By adopting a balanced and context-aware approach, Indonesian HEIs can effectively leverage AI to provide a more dynamic, inclusive, and enriching educational experience that aligns with the core principles of Islamic education.

Addressing Infrastructural and Technological Challenges in AI Adoption

The integration of AI in Indonesian Islamic Higher Education Institutions is not without its hurdles. The research findings reveal a complex landscape of infrastructural and technological challenges that must be navigated to ensure the equitable and effective adoption of AI in Islamic education (S4, S19, S21, S26, S28, S30, S32, S35). Scholars emphasized the digital divide, the lack of adequate teacher training, and the need for collaboration and resource sharing as key areas that require attention.

The Digital Divide: A Persistent Challenge

The digital divide, referring to differences in internet access, device availability, and technical support between urban and rural areas, emerged as a significant challenge. Scholars highlighted the severity of this issue, with one participant

stating, "The disparity in internet connectivity between urban and rural areas is a major hurdle. We need to invest in expanding broadband access to ensure that all students, regardless of their location, have the opportunity to benefit from AI-powered learning" (S21). Others pointed out "the financial barriers" (S29, S32, S33) to accessing technology, even in areas with good internet service. Many students and institutions, particularly in low-income regions, struggle with the high cost of devices and software. As one scholar noted, "even in areas with decent connectivity, the cost of devices and software can be prohibitive... Without access to the necessary technology, AI's benefits remain out of reach" (S7). Furthermore, "the lack of adequate technical support" (S19, S25) was seen as "a potential impediment" (S33) to "successful AI integration" (S22). Many educators and students, especially in underserved areas, may struggle to "troubleshoot and resolve technical issues" (S11) associated with new technologies. "Many educators and students may struggle with troubleshooting and resolving technical issues," S14 observed. "Establishing dedicated support centers within HEIs can help to address this challenge and ensure that technical difficulties do not hinder the learning process" (S4).

Collaboration and Resource Sharing: A Path to Sustainability

Collaboration and resource sharing among Indonesian HEIs were also highlighted as essential strategies for maximizing the impact of limited resources and accelerating the adoption of AI in Islamic education (S3, S7, S10, S30, S35). By pooling resources and expertise, HEIs can jointly develop "AI-powered educational tools and platforms" (S18) that can be used across multiple institutions, reducing duplication of efforts and promoting efficiency. Sharing best practices in AI adoption can also accelerate the learning process and avoid reinventing the wheel. As one scholar noted, "sharing best practices in AI adoption can accelerate the learning process and avoid reinventing the wheel. We need to create platforms and networks where educators and administrators can exchange ideas and learn from each other's experiences" (S29). Establishing "mentorship programs" (S31) where experienced educators can guide and support their colleagues in navigating the "challenges of AI integration" (S15) was also seen as "a valuable strategy" (S3). These programs can foster "a culture of knowledge sharing" (S5) and "continuous learning" (S9), empowering educators to confidently embrace AI and utilize it effectively in their teaching practices.

> *"Collaboration enables us to jointly develop AI resources, maximizing their impact and avoiding duplication of efforts".* (S19)

> *"Mentorship programs foster knowledge sharing and empower educators to confidently embrace AI".* (S31)

In conclusion, addressing the infrastructural and technological challenges of AI adoption in Indonesian HEIs requires a comprehensive strategy. This should involve investing in infrastructure, building capacity, fostering collaboration, and ensuring equal access for all students and educators. By doing so, Indonesian HEIs can effectively integrate AI in Islamic education, empowering both educators and learners to utilize this transformative technology.

5. Discussion

The Complexities of AI Adoption in Islamic Education

The introduction of Artificial Intelligence (AI) in Indonesian Islamic Higher Education Institutions (HEIs) has sparked a range of opinions among scholars, mixing excitement with concerns. This research explores these perspectives, showing both the potential of AI to transform education and the challenges of integrating it into Islamic education.

A key issue is the conflict between AI's data-driven, personalized learning approach and the traditional methods of Islamic education, which focus on memorization, rote learning, and teacher-centered instruction (Espartinez, 2024; Singh, 2024). These traditional practices not only support intellectual growth but also aim to build spiritual and moral character through shared learning experiences. Scholars worry that AI's focus on individual learning might undermine these important aspects. The challenge is to balance the benefits of AI's personalized learning with the preservation of Islamic educational traditions that promote community and spiritual connection (Bécue et al., 2021; Aminizadeh et al., 2024). Further, ethical concerns are also significant. Scholars are particularly worried about algorithmic bias in AI, which could lead to unfairness and discrimination, contradicting Islamic principles of equality and justice (Ferrara, 2024). To address this, there must be a focus on fairness and inclusivity in AI systems. Another concern is the over-reliance on AI, which could reduce the role of teachers as mentors and guides. Islamic education values critical thinking, independent thought, and decision-making (Jabali et al., 2024; Van Le & Chong, 2024), so it is crucial that AI supports, rather than replaces, human capabilities to maintain the important relationship between students and teachers (Sanyal, 2021).

The digital divide in Indonesia poses a major challenge (Aswathy & Tyagi, 2022) to the fair use of AI in Islamic education (Sebastian & Alkaff, 2024). Differences in access to technology and infrastructure, especially between urban and rural areas, risk deepening educational inequality, leaving students from disadvantaged backgrounds behind in the AI-driven learning shift (Suhrab et al., 2024). Many regions face issues like poor internet access, lack of devices, and limited technical support (Correa et al., 2024), which can block students from benefiting fully from AI in education. This highlights the need for infrastructure investment, financial aid to help students access technology (Correa et al., 2024; Suhrab et al., 2024), and support centers in HEIs to provide technical help and training. Addressing the digital divide is not just a technical issue but a moral obligation that requires urgent action to ensure all students, regardless of their background or location, can benefit from AI in education. Despite these challenges, scholars remain cautiously optimistic, seeing AI's great potential to improve Islamic education (Musolin et al., 2024). AI can personalize learning, offer adaptive assessments, and provide tutoring systems tailored to different student needs, creating a more inclusive and engaging learning environment. It can also automate administrative tasks, allowing educators to focus more on teaching and mentoring (Ng et al., 2021). Scholars also recognize AI's potential to foster innovation by creating new educational tools and approaches suited to Islamic education. Furthermore, AI can support collaborative learning and knowledge sharing across different HEIs,

helping build a more connected and dynamic Islamic education ecosystem that promotes collaboration and shared goals within the global Islamic community.

In conclusion, the perspectives of Indonesian scholars on AI adoption in Islamic education paint a picture of cautious optimism tempered by a profound awareness of the complexities involved. The path forward requires a balanced and contextually sensitive approach that leverages AI's potential while preserving the essence of traditional Islamic pedagogical approaches (Espartinez, 2024), upholding ethical standards, and addressing the challenges of the digital divide. By engaging in ongoing dialogue and collaboration, educators, technologists, and religious scholars can shape a future where AI serves as a catalyst for enriching and enhancing Islamic education, fostering a generation of learners who are not only intellectually equipped but also spiritually grounded and ethically conscious.

Leveraging AI in Islamic Education: A Harmonious Integration

Scholars interviewed in this study emphasize the need for a nuanced approach that transcends the mere adoption of technology, focusing instead on leveraging AI as a tool that complements, rather than supplants, the deeply ingrained practices and principles that have shaped Islamic education for centuries. A recurring theme in the scholarly discourse is the recognition that AI should serve as an enabler, rather than a substitute, for the multifaceted role of the educator in Islamic education. While AI holds the promise of personalized learning pathways, adaptive assessments, and intelligent tutoring systems (Kaswan et al., 2024), it cannot replicate the intangible qualities that define the human touch in education: the wisdom, guidance, and spiritual connection that educators foster with their students. These qualities are integral to the holistic development envisioned within Islamic education, encompassing not only the acquisition of knowledge but also the cultivation of character, moral values, and a lifelong love for learning. AI, therefore, should be viewed as a tool that empowers educators (Alwaqdani, 2024), automating mundane tasks and freeing them to focus on fostering deeper student engagement, providing individualized support, and nurturing the spiritual and ethical dimensions of learning.

Integrating AI into Islamic education requires deep respect for cultural and religious sensitivities (Sebastian & Alkaff, 2024). Scholars stress the need to incorporate Islamic perspectives and values into AI applications, making them appropriate for the unique context of Indonesian HEIs. This requires collaboration between technologists, educators, and religious scholars to create AI tools that improve learning while upholding Islamic principles. Key ethical aspects include ensuring transparency, fairness, and accountability in AI algorithms. Scholars call for clear explanations of AI-generated results and efforts to eliminate biases in the data used to train AI systems. These ethical practices are vital for building trust, promoting equality, and ensuring AI supports social justice and Islamic values (Elmahjub, 2023). Additionally, integrating AI into Islamic education is an ongoing process of adaptation and reflection. As AI technologies rapidly evolve, it's important to continuously monitor their impact on Islamic education, ensuring they align with the core values of the faith. This requires ongoing dialogue

between educators, technologists, and religious scholars to evaluate AI's role, identify challenges, and address emerging issues. Such collaboration will ensure AI continues to benefit Islamic education, empowering learners and educators while staying true to Islamic traditions and values (Memon et al., 2021).

To sum up, the integration of AI in Indonesian Islamic HEIs presents a unique opportunity to leverage technology for the advancement of Islamic education while preserving its rich heritage and values. The research findings underscore the importance of adopting a nuanced and contextually sensitive approach that balances innovation with tradition, addresses ethical concerns, and empowers educators. By embracing AI responsibly and strategically, Indonesian Islamic HEIs can pave the way for a future where technology serves as a catalyst for enriching and enhancing Islamic education, fostering a generation of learners who are not only intellectually equipped but also spiritually grounded and ethically conscious.

Addressing Infrastructural and Technological Challenges in AI Adoption

The research highlights the urgent need to address infrastructure and technology challenges (Correa et al., 2024; Suhrab et al., 2024) for successful and fair AI integration in Indonesian Islamic Higher Education Institutions (HEIs). Scholars point out key issues such as the digital divide, inadequate teacher training, and the need for collaboration and resource sharing. The digital divide, especially in rural areas, poses a significant barrier to AI adoption, as many students lack access to reliable internet, devices, and technical support. This gap threatens to deepen educational inequality, leaving marginalized students behind in the AI revolution (Correa et al., 2024; Suhrab et al., 2024). To tackle this, a comprehensive approach is needed, including infrastructure development and capacity building. Expanding broadband access in underserved areas is essential, along with financial aid programs to provide affordable devices for low-income students. Establishing support centers within HEIs, staffed by trained technicians, can help resolve technical issues and ensure that technology barriers do not disrupt learning.

The integration of AI in Islamic education depends heavily on empowering educators. The research shows that many teachers, especially in underserved areas, lack the skills and confidence to use AI tools effectively, which can hinder its seamless integration and limit its potential to improve teaching and learning (Espartinez, 2024). To address this, a comprehensive approach to building teacher capacity is essential. Training programs need to cover not only technical skills but also the pedagogical impact of AI, helping educators confidently incorporate AI into their teaching (Espartinez, 2024). Creating communities where teachers can share experiences, challenges, and best practices will promote collaboration and continuous learning. Encouraging teachers to experiment with AI tools in their classrooms (Suhrab et al., 2024) can also help them find innovative ways to enhance their teaching. Then, collaboration and resource sharing among Indonesian HEIs are key to making the most of limited resources and speeding up AI adoption in Islamic education. By pooling resources and expertise, HEIs can jointly develop AI-powered educational tools that benefit multiple

institutions, reducing duplication and increasing efficiency. Sharing best practices can help speed up learning and avoid repeating mistakes. Mentorship programs where experienced educators guide others in AI integration can create a culture of knowledge sharing, empowering teachers to embrace and use AI effectively in their classrooms.

In conclusion, overcoming the infrastructural and technological challenges of AI adoption in Indonesian Islamic HEIs requires collaboration among policymakers, educators, technologists, and the community. It necessitates investments in infrastructure, capacity building, and partnerships to ensure equitable access to AI's benefits for all students and educators. By addressing these challenges proactively, Indonesian HEIs can facilitate the successful integration of AI in Islamic education, empowering educators and learners while upholding core Islamic values and principles.

Research Implications

The findings of this research present significant implications for policymakers, educators, and technologists in shaping the future of Islamic education in Indonesia through AI integration. A successful approach requires a nuanced, culturally mindful strategy that honors Islamic values, addresses ethical considerations, and builds a supportive infrastructure for educators. Firstly, this study highlights the pressing need for policymakers to establish comprehensive ethical and legal frameworks guiding AI use in Islamic education. These frameworks should prioritize principles of transparency, fairness, and accountability while ensuring that AI systems align with the cultural and religious context. Policymakers should work closely with Islamic scholars to design AI policies that explicitly uphold Islamic ethical principles, such as respect for human dignity, compassion, and justice. Specific actions could include creating oversight bodies to regularly review AI systems for cultural alignment and instituting guidelines that mandate algorithmic transparency and fairness in AI applications used in educational settings. This approach would foster public trust and position AI as a credible tool to advance educational goals within Islamic institutions.

Secondly, findings suggest that for AI to be used effectively in Islamic education, there must be substantial investment in teacher training and professional development programs tailored to Islamic pedagogy. Educators often lack the technical skills and ethical training necessary to incorporate AI while preserving Islamic values. Tailored professional development should blend technical skills with ethical and pedagogical training, equipping educators to thoughtfully use AI as a complement to traditional teaching methods and uphold the moral and spiritual dimensions of Islamic education. These programs should cover practical strategies for using AI responsibly, including the handling of sensitive data, ethical concerns around bias, and maintaining the teacher-student relationship integral to Islamic learning.

An additional priority for policymakers and educational leaders is to address the digital divide that restricts access to AI tools, especially in rural and underserved areas. To ensure equitable access to AI, investments in expanding digital

infrastructure are essential, allowing students and educators across Indonesia to access AI resources. Bridging this gap is critical for achieving inclusive, AI-driven education in Islamic institutions, preventing educational inequities, and enabling all students to benefit from AI's potential. Moreover, the development of culturally relevant and ethically sound AI applications specific to Islamic education requires a collaborative effort among Higher Education Institutions (HEIs). A culture of collaboration among HEIs could facilitate shared resources, reduce redundant efforts, and enhance the relevance of AI solutions. Policymakers and institutional leaders should establish platforms that promote inter-institutional knowledge sharing, allowing HEIs to exchange best practices, research insights, and lessons learned from AI implementation. This collaborative network can help ensure that AI integration aligns with the educational goals and shared values of the Islamic community.

Finally, to maintain an adaptive and responsive approach to AI integration, HEIs and stakeholders should invest in ongoing research and regular evaluation of AI's impact on Islamic education. Establishing mechanisms for continuous feedback and assessment will enable educational institutions to monitor AI's effectiveness in enhancing learning outcomes and verify that it remains consistent with Islamic educational values. This iterative process will allow institutions to make necessary adjustments to safeguard ethical standards and foster responsible AI use. By encouraging further research into AI applications tailored for Islamic education, policymakers can refine practices and guide future AI-related policies and programs.

In summary, these findings underscore the need for a strategic, collaborative, and ethically anchored approach to AI integration in Islamic education. By addressing infrastructure, ethical, and pedagogical considerations, Indonesian Islamic educational institutions can leverage AI's transformative potential responsibly, supporting educators and students in a manner that aligns with Islamic values and enhances the educational experience.

6. Conclusion

The integration of AI in Indonesian Islamic Higher Education Institutions (HEIs) presents both promising opportunities and significant challenges. This study highlights Indonesian scholars' perspectives on the balance between AI's transformative potential and the traditions of Islamic education. While AI offers possibilities for revolutionizing learning and teaching, scholars approach its implementation with cautious optimism, recognizing the need to navigate various challenges. Specifically, the contrast between AI's personalized, data-driven approach and the traditional methods of Islamic education—which emphasize memorization, rote learning, and teacher-centered instruction—underscores concerns about maintaining the holistic nature of Islamic education. This educational philosophy nurtures intellectual, spiritual, and moral development. Furthermore, ethical concerns, such as data privacy, algorithmic bias, and the potential impact on human agency, need to be managed thoughtfully to ensure alignment with Islamic values. The digital divide, particularly in technology

access and infrastructure, also poses a barrier to equitable AI adoption, emphasizing the need for investments in both infrastructure and teacher training.

Despite these challenges, scholars see AI as a valuable tool when applied responsibly. AI can personalize learning, offer adaptive assessments, and provide intelligent tutoring systems, creating a more inclusive and engaging learning environment. Additionally, by automating administrative tasks, AI could allow educators to devote more time to teaching and mentorship. The potential for AI to facilitate collaboration and knowledge sharing among HEIs presents opportunities to build a more connected and dynamic Islamic educational ecosystem. This study also acknowledges limitations, given its qualitative focus on a specific group of scholars. Future research could expand to include diverse perspectives across the Indonesian Islamic HEI community through mixed-method approaches, integrating both qualitative and quantitative data. A broader approach could enhance our understanding of AI's challenges and benefits in Islamic education.

Looking forward, further research should focus on several key areas. First, more studies are needed to explore specific Islamic pedagogical methods that can be effectively adapted with AI support. For example, investigating AI's potential in enhancing the teaching of Islamic texts, promoting critical thinking, and supporting students' spiritual and moral growth would provide valuable insights. Research should also prioritize the development of culturally relevant and ethically sound AI tools tailored to the Indonesian context, ensuring that technological advancements respect local values. Additionally, examining the long-term effects of AI on student learning, teacher practices, and institutional structures in Islamic HEIs will be essential to inform sustainable and responsible AI integration. Collaborative research initiatives could further explore capacity-building, mentorship, and inter-institutional resource sharing, offering pathways for educators and institutions to navigate AI integration thoughtfully.

In conclusion, this study underscores the need for a contextually sensitive, ethically grounded, and strategically collaborative approach to AI in Islamic education. By focusing on infrastructure, ethical, and pedagogical considerations, Indonesian Islamic HEIs can harness AI's potential to enhance the educational experience in ways that are fully aligned with Islamic educational values.

7. References

Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the American College of Clinical Pharmacy, 4*(10), 1358-1367. https://doi.org/10.1002/jac5.1441

Alabdulatif, A. (2024). The Global Impact of Artificial Intelligence. In *Technical and Technological Solutions Towards a Sustainable Society and Circular Economy* (pp. 263-277). Cham: Springer Nature Switzerland. https://link.springer.com/chapter/10.1007/978-3-031-56292-1_21

Allioui, H., Allioui, A., & Mourdi, Y. (2024). Navigating transformation: unveiling the synergy of IoT, multimedia trends, and AI for sustainable financial growth in African context. *Multimedia Tools and Applications,* 1-45. https://doi.org/10.1007/s11042-024-19038-6

Alwaqdani, M. (2024). Investigating teachers' perceptions of artificial intelligence tools in education: potential and difficulties. *Education and Information Technologies,* 1-19. https://doi.org/10.1007/s10639-024-12903-9

Aminizadeh, S., Heidari, A., Dehghan, M., Toumaj, S., Rezaei, M., Navimipour, N. J., Stroppa, F., & Unal, M. (2024). Opportunities and challenges of artificial intelligence and distributed systems to improve the quality of healthcare service. *Artificial Intelligence in Medicine,* 149, 102779. https://doi.org/10.1016/j.artmed.2024.102779

Aswathy, S. U., & Tyagi, A. K. (2022). Privacy Breaches through Cyber Vulnerabilities: Critical Issues, Open Challenges, and Possible Countermeasures for the Future. In *Security and Privacy-Preserving Techniques in Wireless Robotics* (pp. 163-210). CRC Press. https://www.taylorfrancis.com/chapters/edit/10.1201/9781003156406-14/privacy-breaches-cyber-vulnerabilities-aswathy-amit-kumar-tyagi

Bazen, A., Barg, F. K., & Takeshita, J. (2021). Research techniques made simple: an introduction to qualitative research. *Journal of Investigative Dermatology, 141*(2), 241-247. https://doi.org/10.1016/j.jid.2020.11.029

Bécue, A., Praça, I., & Gama, J. (2021). Artificial intelligence, cyber-threats and Industry 4.0: Challenges and opportunities. *Artificial Intelligence Review, 54*(5), 3849-3886. https://doi.org/10.1007/s10462-020-09942-2

Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, Vol. 2. Research designs: Quantitative, qualitative, neuropsychological, and biological* (pp. 57– 71). American Psychological Association. https://doi.org/10.1037/13620-004.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of research in Nursing, 25*(8), 652-661. https://doi.org/10.1177/1744987120927206

Correa, T., Valenzuela, S., & Pavez, I. (2024). For better and for worse: A panel survey of how mobile-only and hybrid Internet use affects digital skills over time. *New Media & Society, 26*(2), 995-1017. https://doi.org/10.1177/14614448211059114

Elmahjub, E. (2023). Artificial Intelligence (AI) in Islamic Ethics: Towards pluralist ethical benchmarking for AI. *Philosophy & Technology, 36*(4), 73. https://doi.org/10.1007/s13347-023-00668-x

Espartinez, A. S. (2024). Exploring student and teacher perceptions of ChatGPT use in higher education: A Q-Methodology study. Computers and Education: *Artificial Intelligence, 7*, 100264. https://doi.org/10.1016/j.caeai.2024.100264

Ferrara, E. (2024). The butterfly effect in artificial intelligence systems: Implications for AI bias and fairness. *Machine Learning with Applications, 15,* 100525. https://doi.org/10.1016/j.mlwa.2024.100525

Hmoud, H., Al-Adwan, A. S., Horani, O., Yaseen, H., & Al Zoubi, J. Z. (2023). Factors influencing business intelligence adoption by higher education institutions. *Journal of Open Innovation: Technology, Market, and Complexity, 9*(3), 100111. https://doi.org/10.1016/j.joitmc.2023.100111

Hornok, C., & Raeskyesa, D. G. S. (2024). Economic zones and local income inequality: Evidence from Indonesia. *The Journal of Economic Inequality, 22*(1), 69-100. https://doi.org/10.1007/s10888-023-09581-x

Jabali, O., Hamamra, B., & Ayyoub, A. (2024). Critical thinking, assessment, and educational policy in Palestinian universities. *International Journal for Educational Integrity, 20*(1), 12. https://doi.org/10.1007/s40979-024-00160-9

Kaswan, K. S., Dhatterwal, J. S., & Ojha, R. P. (2024). *AI in personalized learning. In Advances in Technological Innovations in Higher Education* (pp. 103-117). CRC Press. https://doi.org/10.1201/9781003376699

Khan, M. A., Khan, H., Omer, M. F., Ullah, I., & Yasir, M. (2024). Impact of Artificial Intelligence on the Global Economy and Technology Advancements. In *Artificial General Intelligence (AGI) Security: Smart Applications and Sustainable Technologies* (pp. 147-180). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-97-3222-7_7

Kilinç, A., Arslan, K., & Polat, M. (2020). Studying abroad: A phenomenological study of lived experiences of international students in Turkey. *Journal of International Students, 10*(4), 853–871. https://files.eric.ed.gov/fulltext/EJ1273492.pdf

Lin, C. C., Huang, A. Y., & Lu, O. H. (2023). Artificial intelligence in intelligent tutoring systems toward sustainable education: a systematic review. *Smart Learning Environments, 10*(1), 41. https://doi.org/10.1186/s40561-023-00260-y

Memon, N. A., Chown, D., & Alkouatli, C. (2021). Descriptions and enactments of Islamic pedagogy: Reflections of alumni from an Islamic Teacher Education Programme. *Pedagogy, Culture & Society, 29*(4), 631-649. https://doi.org/10.1080/14681366.2020.1775687

Musolin, M. H., Serour, R. O. H., Siregar, M., Hamid, S. A., Ismail, A., Huda, M., & Rohim, M. A. (2024, February). Developing personalised Islamic learning in digital age: pedagogical and technological integration for open learning resources (olr). In *International Congress on Information and Communication Technology* (pp. 11-25). Singapore: Springer Nature Singapore. https://link.springer.com/chapter/10.1007/978-981-97-3305-7_2

Ng, K. K., Chen, C. H., Lee, C. K., Jiao, J. R., & Yang, Z. X. (2021). A systematic literature review on intelligent automation: Aligning concepts from theory, practice, and future perspectives. *Advanced Engineering Informatics, 47*, 101246. https://doi.org/10.1016/j.aei.2021.101246

Parycek, P., Schmid, V., & Novak, A. S. (2023). Artificial Intelligence (AI) and automation in administrative procedures: Potentials, limitations, and framework conditions. *Journal of the Knowledge Economy,* 1-26. https://doi.org/10.1007/s13132-023-01433-3

Raquib, A., Channa, B., Zubair, T., & Qadir, J. (2022). Islamic virtue-based ethics for artificial intelligence. *Discover Artificial Intelligence, 2*(1), 11. https://doi.org/10.1007/s44163-022-00028-2

Rodriguez, M., Dooley, K. E., & Roberts, T. G. (2024). A Phenomenological study of intensive experiential learning for university faculty professional development. *Journal of Experiential Education.* https://doi.org/10.1177/10538259241235915

Sanyal, U. (2021). South Asian Islamic education in the precolonial, colonial, and postcolonial periods. In: Sarangapani, P.M., Pappu, R. (eds) *Handbook of education systems in South Asia. Global education systems.* Springer, Singapore. https://doi.org/10.1007/978-981-15-0032-9_67

Sebastian, L. C., & Alkaff, S. H. B. O. (2024). *Indonesia and Islam in Transition*. Springer Nature Singapore, Imprint: Palgrave Macmillan. https://link.springer.com/book/10.1007/978-981-97-1140-6

Singh, R. (2024). Navigating Through Education 5.0 Era: Imperative Competencies for Success. In *Preconceptions of Policies, Strategies, and Challenges in Education 5.0 (pp. 33-50)*. IGI Global. https://www.igi-global.com/chapter/navigating-through-education-50-era/351865

Stolz, S. A. (2023). The practice of phenomenology in educational research. *Educational Philosophy and Theory, 55*(7), 822–834. https://doi.org/10.1080/00131857.2022.2138745

Suhrab, M., Chen, P., & Ullah, A. (2024). Digital financial inclusion and income inequality nexus: can technology innovation and infrastructure development help in achieving sustainable development goals?. *Technology in Society, 76,* 102411. https://doi.org/10.1016/j.techsoc.2023.102411

Sukirman & Kabilan, M. K. (2023). Indonesian researchers' scholarly publishing: an activity theory perspective. *Higher Education Research & Development, 42*(8), 2030-2047. https://doi.org/10.1080/07294360.2023.2209522

Sukirman, S. (2022). The KKNI-based ELT curriculum applied in Islamic higher education in Indonesia: Global curriculum ideology perspectives. *Kasetsart Journal of Social Sciences, 43,* 311-322. https://so04.tci-thaijo.org/index.php/kjss/article/view/258488/175096

Van Le, H., & Chong, S. L. (2024). The dynamics of critical thinking skills: A phenomenographic exploration from Malaysian and Vietnamese undergraduates. *Thinking Skills and Creativity, 51*, 101445. https://doi.org/10.1016/j.tsc.2023.101445