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Managing AI Adoption in Islamic Higher Education: A Diffusion of Innovation Perspective

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Abstract

This research analyzes AI adoption and its managerial implications among Islamic higher education undergraduates through the lens of the Diffusion of Innovation (DOI) framework. This study utilized a qualitative case study approach, involving 50 participants who provided written interviews and reflective responses. These datasets were analyzed thematically to explore adoption trends, perceived challenges, and ethical dimensions. The findings show that students adopt AI primarily for efficiency, task structuring, and personalized learning support, while peer influence and trialability accelerate adoption. However, concerns regarding academic integrity, information accuracy, and digital literacy disparities persist as barriers. From a management perspective, the study reveals the emerging need for institutional regulation, ethical-digital leadership, and Islamic value-based guidelines to manage the use of AI in classrooms. This study contributes to Islamic educational management by proposing a value-oriented model of AI governance grounded in amanah (trustworthiness), sidq (truthfulness), and adab (ethical conduct), highlighting how Islamic higher education institutions can strategically regulate AI to ensure responsible and ethical learning practices.

Keywords: AI adoption, learning management, Diffusion of Innovation, digital ethics, Islamic higher education.

A. INTRODUCTION

The rapid development of digital technologies in the era of the Industrial Revolution 4.0 has transformed educational management systems across higher education institutions, including Islamic universities. Artificial Intelligence (AI) has emerged as one of the most influential innovations, offering new approaches to teaching, learning, and administrative processes. However, unequal digital access, particularly between urban and rural areas in Indonesia, continues to challenge the implementation of technology-enhanced learning (Omweri, 2024; Smit et al., 2025). Within this context, Islamic higher education institutions must not only adopt digital tools but also manage them effectively in accordance with Islamic values and institutional missions.

Within this uneven landscape, Artificial Intelligence (AI) has emerged as one of the most transformative technologies in education. AI enables personalized learning through data-driven analysis, automated feedback systems, and intelligent tutoring applications that enhance flexibility and academic efficiency (Vorobyeva et al., 2025; Yarlagadda, 2025). University students increasingly use AI to improve their learning performance and manage academic workloads effectively (Klimova & Pikhart, 2025). However, adoption levels remain varied. While digitally literate students eagerly integrate AI tools into their learning, others encounter barriers such as limited device access, insufficient understanding of AI's functions, and scepticism regarding its reliability (Kohnke et al., 2025; Ruiz et al., 2024). In addition, ethical issues such as plagiarism and reduced creativity raise further challenges (Sozon et al., 2024).

In several studies on the use of technology in learning, Mukhsin et al. (2025) reported numerous positive impacts. A survey by Jaya (2024) that integrates principles of technological systems into education encourages adaptive, responsive, and appropriate learning. Nurohman et al. (2024) found that leveraging digital transformation alongside current developments in information and communication technology is necessary to improve the quality of education, particularly in Islamic higher education. In this case, Artificial Intelligence is becoming a new tool in education. According to Afrita (2023), Artificial intelligence can improve the efficiency and effectiveness of the education system by accelerating and facilitating the learning process, providing personalized recommendations, predicting student behavior, and improving data management. Zahara et al. (2023) also found that the AI System helps create a learning profile for each student, enabling the tailoring of learning materials to each student's abilities, learning style, and experience.

These disparities underscore that AI adoption among students extends beyond technological considerations and is fundamentally shaped by sociocultural and ethical factors. Rogers' (2003) Diffusion of Innovations (DOI) theory offers a robust analytical lens for elucidating these dynamics, categorizing adopters into innovators, early adopters, early majority, late majority, and laggards. Each cohort possesses distinct attributes that modulate the rate of innovation diffusion. Applying this framework within the Islamic higher education context facilitates the identification of both facilitators and barriers to AI integration. Consequently, targeted interventions, such as structured training and institutional support, may expedite adoption among the late majority and laggard cohorts.

Consequently, this study investigates the multifaceted implications of Artificial Intelligence (AI) adoption among students within the Islamic higher education in Indonesian. By employing the Diffusion of Innovations (DOI) framework, the research examines acceptance levels, adoption trajectories, and subsequent pedagogical impacts, thereby providing a comprehensive understanding of how AI is integrated into Islamic academic environments.

B. RESEARCH METHODS

This study employed a qualitative case study approach to explore students' adoption of Artificial Intelligence (AI) in learning, viewed through the Diffusion of Innovation (DOI) theory (Rogers, 2003). This design was chosen because it allows for an in-depth understanding of the social and contextual dynamics underlying technology adoption. This study was conducted at a private Islamic higher education institution in East Java, Indonesia. Participants were 50 active undergraduate students, aged 17–20, selected through purposive sampling. The inclusion criteria were: (1) intermediate to high digital literacy, (2) experience using AI in learning for at least one semester, and (3) voluntary participation.

Data was collected through written interviews and open-ended reflections with 50 participants to capture their perceptions, motivations, and challenges. All data were recorded with informed consent and supported by field notes. Data were analyzed using thematic analysis (Braun & Clarke, 2006) through processes of coding, theme generation, and interpretation aligned with the DOI framework.

Trustworthiness was ensured following Lincoln & Guba's (1985) criteria of credibility, transferability, dependability, and confirmability through member checking, triangulation, and audit trails. All participants received written

information about the study's purpose, confidentiality, and voluntary participation, and provided informed consent before taking part. Pseudonyms were used to protect participants' identities and institutional anonymity.

C. RESULT AND DISCUSSION

This study involved 50 active students from various study programs, aged 19 to 22 years. The demographic data is presented as follows.

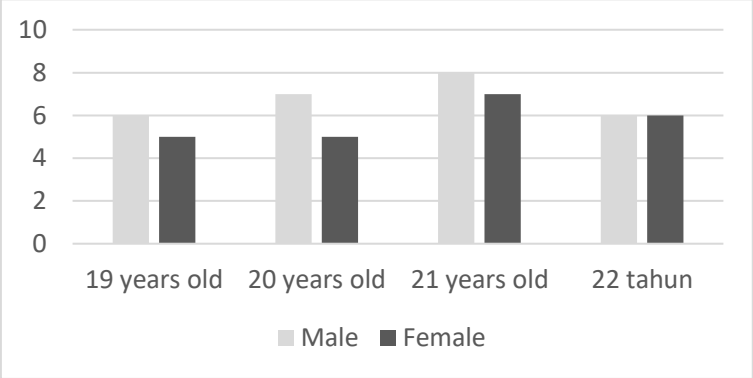

Figure 1. Research Respondent Demographics

The findings from fifty student participants revealed five main themes that reflect students' patterns of adopting Artificial Intelligence (AI) technology in learning.

Table 1. Summary of Main Themes and Supporting Evidence

Theme	Key Insight	Respondent's statement
Gender and Digital Behavior	Most male students used AI to complete assignments quickly and efficiently. In contrast, some female students indicated a preference for conventional learning methods, such as reading books or searching for information manually.	"*My friends, the girls, often read books, but I prefer to ask AI directly. It is practical and easy to access as long as I have internet data or Wi-Fi.*" (R6, male, 19 years old) "*I feel more comfortable studying using traditional methods, not because AI cannot handle it, but I just feel more at ease reading directly. However, yeah, that is just a shame... Because my friends use it, and I sometimes use it too, but only*

		when I am in a pinch." (R17, female, 21 years old)
Types and Functions of AI Used	ChatGPT and Perplexity dominate; AI is primarily used to address information gaps among students. Respondents' concepts and applications of AI technology are limited to immediately visible functional aspects, such as helping users find more information and complete tasks more quickly.	"*I use Quillbot and ChatGPT to avoid plagiarism. I mostly use AI to search for information. Even then, it is information that is not listed in my professor's textbook, so it is easier to complete.*" (R37, male, 19 years old) "*I only recently learned that AI can also help with various assignments. Until now, I have only used it to find answers to assignments. So far, I have only used Gemini or MetaAI.*" (R41, female, 20 years old)
Perceived Benefits (Relative Advantage)	Integrating AI into educational activities offers several benefits over traditional approaches, particularly by enhancing process effectiveness and efficiency.	"*I have many papers to do, so I like using AI to develop my writing outline. It is faster and more focused.*" (R5, male, 21 years old) "*I like writing, but now with AI, it is easier. I tell them what I want to write about, and then ask them what would be a good topic. The idea immediately comes to me from AI.*" (R12, female, 22 years old)
Ethical and Technical Challenges	AI can provide fast and accurate information; however, it remains essential to verify and curate that information, given that not all data presented by AI is entirely reliable or	"*Sometimes the answers are not accurate, so I compare them with other sources. I have to be careful.*" (R9, male, 22 years old) "*I have experienced AI providing incorrect data. Luckily, I double-checked it first. Otherwise, I do not know what*

	relevant to the broader learning context. However, respondents felt that AI technology did not pose significant challenges in applying it to learning activities.	*would have happened to my assignment.*" (R11, female, 20 years old)
Social Influence and Trialability	Peer behavior and observation motivate students to try to adopt AI. Trialability enables students to explore the potential of personalised AI in supporting their learning styles, test new features, and assess whether the technology can effectively enhance learning outcomes.	"*I was sceptical at first, but after trying it two or three times, I got used to it. Before, I just relied on Google, miss. But then AI boomed, and I felt, 'Oh, I can try this.'*" (R14, male, 19 years old) "*Seeing my friends discussing using AI made me more confident to use it too.*" (R13, female, 22 years old)

The data indicate that AI adoption among students reflects not only the practical benefits of technology but also the influence of gender, social norms, and ethical awareness. Students tend to adopt AI after a brief trial phase, motivated by curiosity and peer encouragement. However, critical awareness remains essential, as some students rely on AI without verifying its accuracy.

From an educational management perspective, data analysis also revealed a key theme directly related to academic management: the management of AI use in classroom learning. This theme emerged consistently across student statements and reflects how the presence of AI is reshaping students' management of learning activities, engagement with materials, and responses to academic demands. The following are themes, sub-themes, and illustrative evidence of AI use management in Islamic Higher Education.

Table *2*. Thematic Table of Themes, Sub-Themes, and Illustrative Evidence of AI Use Management in Islamic Higher Education

Main Theme	Sub-Themes	Description
Self-Managed Learning Practices	Task Structuring through AI	Students use AI to break down complex assignments into more structured sections, aiding time management and study planning.
	Personalized Learning Pathways	The use of AI allows students to independently adjust their learning pace to suit individual needs and preferences.
	Autonomous Information Searching	AI becomes a primary source for rapid information retrieval, reducing reliance on lecturers.
Managerial Challenges in Class Regulation	Variation in Digital Literacy	The digital literacy gap leads to significant differences in the utilization of AI features.
	Need for Standardized Academic Policy	Students recognize the absence of clear institutional rules governing the limits of AI use.
	Adjustment in Assignment Design	The use of AI forces lecturers to adjust assignment types to assess authentic abilities.
Ethical-Academic Integrity Considerations	Accuracy Verification Behavior	Students demonstrate awareness of the need to verify information provided by AI.
	Fear of Plagiarism or Misconduct	Moral and ethical concerns arise regarding the use of AI for writing.
	Need for Islamic Ethical Guidance	Students emphasize the need for ethical guidance grounded in Islamic values regarding the use of AI.

Peer-Driven Adoption and Learning Culture	Observational Learning	Students learn to use AI by observing their peers.
	Social Norm Formation	AI is becoming the norm in classroom learning and is influencing academic culture.
	Collaborative AI Practices	Students frequently discuss together to check or optimize AI responses.
Emerging Needs for Islamic-Based Learning Management	Institutional Regulation	The findings indicate an urgent need for AI policies in the classroom.
	Ethical-Digital Leadership	Lecturers need to act as ethical guides in the use of AI.
	Integration of Islamic Values into Digital Practices	The values of trustworthiness, integrity, and good manners are necessary to maintain academic integrity in the use of AI.

Findings reveal distinct gender-based patterns in AI adoption. Male students generally demonstrate higher enthusiasm and adaptability, prioritizing speed and efficiency. Field findings indicate that male students tend to be more enthusiastic and adaptable in using AI technology for academic purposes. These results align with previous research, such as that by Fadhillah & Lestari (2024), which involved two male and one female students. Female students, while open to technology, often balance the use of AI with traditional study habits. This pattern aligns with research by (Alexopoulos & Saxena, 2023), showing gender as a moderating factor in digital adoption. In the context of Islamic education, such diversity reflects the principle of ikhtiar ilmiah, whereby both men and women pursue knowledge in ways that align with their capacities and responsibilities, upholding amanah (trust) and adab (proper conduct) in the use of digital tools.

Variations in AI acceptance are reflected in the types of applications used, with students predominantly using text-based tools such as ChatGPT and Perplexity due to their accessibility and responsiveness. Diantama (2023) highlights that such engagement fosters higher motivation and the development of 21st-century skills, while mitigating learning-related anxieties. Zein (2023) posits that these

technologies are evolving into reliable collaborative partners in human activity; this potential remains tempered by emergent ethical dilemmas. Beyond pedagogical benefits, AI also serves critical administrative and advisory roles; Fitri and Dilia (2024) observe that chatbots effectively streamline access to curricular information, academic guidance, and career counseling. Furthermore, AI's capacity to provide instantaneous feedback enables rapid error correction, surpassing the efficiency of traditional manual instructional methods (Putri et al., 2023).

From an Islamic perspective, the use of AI applications such as ChatGPT and Perplexity should be viewed not only as a means of enhancing academic efficiency but also as a test of akhlaq and integrity in the pursuit of knowledge. Islam encourages the pursuit of knowledge (*thalabul 'ilm*) while upholding honesty and responsibility. The Prophet Muhammad (peace be upon him) emphasized that every Muslim is accountable for how they acquire and utilize knowledge. Therefore, while AI can enhance engagement, motivation, and learning productivity, its use must be accompanied by *niyyah shalihah* (good intention) and *amanah* (trustworthiness) to prevent academic dishonesty, plagiarism, and overdependence on automated thinking.

The study highlights the role of peers and social environments in motivating students to use AI. However, this adoption is not without ethical concerns. Students often experience tension between efficiency and honesty, particularly in avoiding plagiarism. Research by Alalwan et al. (2017) also confirms that technology that offers convenience and practical benefits tends to be adopted more quickly by users. Students who witness their peers benefit from tangible applications of AI develop an internal drive to use the same technology. As noted in research by Wardhana et al. (2024) AI training with peers increases students' enthusiasm for learning because they all utilise AI simultaneously to complete assignments. AI can help students find information more quickly, generate ideas for assignments, and improve their understanding of course material (Tejawiani et al., 2023). Many respondents admitted to adopting AI after seeing their classmates benefit from it, reflecting Rogers' (2003) concept of observability in the Diffusion of Innovation theory. However, Islamic higher education emphasizes *sidq* (truthfulness) and *amanah* (trustworthiness), guiding learners to maintain academic honesty and ethical responsibility. AI literacy in Islamic institutions must therefore include adab dalam berteknologi, digital etiquette rooted in moral awareness.

In practice, the barriers to AI adoption are not merely technical but are deeply connected to students' ethical discernment and social equity. Concerns about

the reliability and ethical use of AI often stem from the awareness that technology must be used responsibly, in accordance with the Islamic principles of maslahah (benefit) and adl (justice). Students' hesitation and anxiety, as found by Ayem et al. (2024) that can be interpreted not only as a lack of technical skill but also as a moral caution to ensure that their learning practices remain ethical and aligned with amanah ilmiah (academic trustworthiness). Furthermore, limited digital literacy and unequal access to technological resources underscore the need for ta'awun (mutual support) to close the digital divide. Islamic universities thus play a crucial role in ensuring equitable opportunities for technological empowerment, with AI adoption guided not only by efficiency but also by justice, ethics, and compassion, in line with Islamic educational values.

AI also plays a role in shaping more independent and user-centred learning styles. AI enables learning to be tailored to students' various learning styles, positively impacting those who require a more personalised approach (Firdaus et al., 2023). On the other hand, students who rely solely on AI as their learning resource, without a validation process, are at risk of developing misconceptions, especially if they lack basic knowledge or strong information literacy. Students need to verify the information presented, as not all data provided by AI is entirely reliable or relevant to the learning context (Saputra, 2023). Therefore, adequate digital education is crucial for maximising the potential of AI in learning. However, uncritical use risks reducing analytical thinking and creativity. This supports findings by (Melisa et al., 2025) that AI promotes convenience but may weaken higher-order cognitive processes if misused. Islamic educational philosophy values *ijtihad* (critical reasoning) and *hikmah* (wisdom), emphasizing that technology should assist the reflective learning process. Responsible AI use can thus enhance *tathwir al-ma'rifah* (the development of knowledge) while preserving intellectual integrity.

In line with these ethical and intellectual considerations, the initial exploration or trialability phase in AI adoption should also be guided by reflective judgment. Students may begin using AI due to curiosity or peer encouragement, but Islamic values encourage them to evaluate whether the technology truly supports their intellectual growth and integrity. When social norms exert pressure to conform to trends, learners are reminded of *istiqamah* (steadfastness) and the need to maintain personal discipline in knowledge-seeking practices. Thus, even as AI becomes more integrated into academic life and encourages exploration (Tarumasely et al., 2024), students in Islamic universities must ensure that its

adoption remains aligned with *adab al-'alim*, ethical conduct in learning, so that competition and conformity do not override honesty, responsibility, and the pursuit of meaningful understanding (Saduk & Chariri, 2024). Through this balance, AI adoption can foster innovation while safeguarding the spiritual and moral foundations of Islamic education.

The findings of this study demonstrate that students' decisions to adopt Artificial Intelligence (AI) in learning are not merely driven by technological convenience or peer influence, but are also intertwined with their moral and ethical awareness. In the context of Islamic higher education, this reflects the concept of digital akhlaq, ethical conduct, and responsibility in digital interactions (Diana et al., 2024). Students with stronger digital literacy were observed to exhibit a higher level of ethical reflection, particularly in verifying information accuracy and avoiding plagiarism (Chen, 2025). This indicates that digital competence and moral awareness develop synergistically when grounded in the ethical teachings of Islam, such as amanah (trustworthiness) and itqan (excellence in work).

Within the framework of Rogers' (2003) in line with Diffusion of Innovation Theory, these findings extend the model by incorporating a moral-ethical dimension into the innovation-decision process. According to Rogers, individuals adopt innovations based on perceived relative advantage, compatibility, complexity, trialability, and observability. However, among students in Islamic universities, the adoption of AI is also filtered through ethical reasoning shaped by religious education. The decision to adopt or reject AI is not only influenced by perceived usefulness and ease of use but also by internal moral considerations such as fairness, intellectual honesty, and responsibility toward knowledge (Kelly et al., 2023).

This moral dimension recontextualizes the innovation-decision process in Islamic education settings, suggesting that the "compatibility" of innovation extends beyond technological or pedagogical alignment to include alignment with religious and ethical norms. The implication is that Islamic universities hold a strategic role in cultivating AI literacy that is ethically and spiritually grounded. Integrating modules on digital akhlaq, for instance, responsible information verification, prevention of academic dishonesty, and the use of AI to promote social good, can guide students toward reflective and responsible technology use.

Consequently, the diffusion of AI innovation in Islamic universities does not merely represent technological adoption but also moral transformation. This study, therefore, contributes to the theoretical development of the Diffusion of Innovation

theory by situating it within the moral-ethical context of Islamic higher education, where both perceived usefulness and moral virtue shape adoption decisions.

D. CONCLUSION

This study concludes that students' adoption of AI in learning is shaped by perceived efficiency, peer influence, and individual trialability, yet moderated by ethical concerns, information accuracy issues, and uneven digital literacy. While AI enhances self-managed learning and task organization, its rapid uptake calls for more decisive managerial intervention within Islamic higher education. The findings demonstrate that effective management of AI use requires institutional policies, lecturer-led ethical guidance, and curriculum-based AI literacy to safeguard academic integrity. Importantly, the study highlights that AI adoption in Islamic higher education must be governed through Islamic educational values—*amanah*, *sidq*, *itqan*, and *adab*—ensuring that technological innovation aligns with moral responsibility and purposeful knowledge-seeking. Therefore, the integration of AI should be systematically managed through value-oriented frameworks that balance innovation with ethical and spiritual accountability, thereby contributing to the development of Islamic education management in the digital era.

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