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Artificial Intelligence Literacy and Digital Ethics among University Students: An Islamic Education Perspective at Universitas Muhammadiyah Kudus

Toni Ardi Rafsanjani[1]*, ***Achmad Ridwan***[2]

[1,2]Universitas Muhammadiyah Kudus, Kudus, Indonesia

[1*]toniardi@umkudus.ac.id, [2]achmadridwan@umkudus.ac.id

Abstract

Objective: This study aims to analyze the level of artificial intelligence (AI) literacy and digital ethics among students at Universitas Muhammadiyah Kudus and to examine the effect of AI literacy on digital ethics from an Islamic education perspective. **Theoretical framework:** The study is grounded in the integration of AI literacy, digital ethics, and Islamic educational values. AI literacy encompasses understanding, application, critical evaluation, and risk awareness, while digital ethics emphasizes academic integrity, information verification, privacy protection, transparency, and responsible AI use. Islamic values of amanah (trustworthiness), sidq (truthfulness), tabayyun (verification), maslahah (public benefit), and hifz al-'aql (protection of intellect) provide an ethical foundation for responsible AI use. **Literature review:** Previous studies have highlighted the importance of AI literacy for students' technological competence and the growing need for digital ethics in academic environments. However, limited research has empirically examined the relationship between AI literacy and digital ethics while integrating Islamic educational values into a single analytical framework. **Method:** This study employed a quantitative explanatory approach using a cross-sectional survey design. Data were collected through a five-point Likert-scale questionnaire measuring AI literacy and digital ethics. Data were analyzed using descriptive statistics and simple linear regression at a significance level of 0.05. **Results:** AI literacy was categorized as high (mean = 3.96), as was digital ethics (mean = 4.05). AI use and application obtained the highest score, whereas critical evaluation of AI-generated outputs was the lowest. Regression analysis revealed a positive and significant relationship ($R = 0.621$; $R^2 = 0.386$; $p < 0.001$), indicating that AI literacy explained 38.6% of the variance in digital ethics. **Implications:** AI education should integrate technical competence, critical evaluation, information verification, privacy awareness, and ethical character formation. **Novelty:** The study's novelty lies in integrating AI literacy, digital ethics, and Islamic values into one empirical framework, demonstrating that AI literacy is an important factor in strengthening students' digital ethical behavior.

Keywords: artificial intelligence literacy, digital ethics, university students, islamic education, responsible ai use

INTRODUCTION

Artificial intelligence has become one of the main drivers of transformation in higher education. The emergence of generative applications such as ChatGPT, Gemini, Copilot, and similar platforms enables students to obtain explanations, summarize reading materials,

*Corresponding Author: toniardi@umkudus.ac.id

translate texts, develop ideas, and explore alternative solutions to problems in a short period of time. These conveniences expand access to learning resources and increase the efficiency of academic activities. However, the use of AI also introduces new risks when technological skills are not accompanied by an understanding of how AI works, its limitations, and its ethical implications. Students may accept inaccurate answers, use machine-generated outputs without verification, upload sensitive data, or submit AI-generated work as their own. Therefore, digital transformation in higher education needs to be accompanied by AI literacy that integrates technical competence with academic responsibility [1].

AI literacy is not synonymous with the frequency of application use. This concept encompasses the ability to understand the basic characteristics of AI, select appropriate technologies according to specific needs, operate applications effectively, evaluate the quality of outputs, recognize bias or hallucinations, and make responsible decisions. In academic environments, these competencies are directly related to originality, data protection, intellectual property rights, transparency in technology use, and responsibility for the information being utilized. Thus, an AI-literate student is not merely a skilled prompt user but an individual who understands when AI is appropriate to use, when its outputs need to be verified, and what boundaries should be maintained so that technology continues to support the learning process [2].

Digital ethics is an important consequence of the increasing use of AI in education. Digital ethics can be understood as a set of moral considerations that guide individuals to act honestly, safely, fairly, critically, and responsibly in digital environments. The use of AI to clarify concepts, obtain examples, improve grammar, or develop alternative ideas can support learning when accompanied by analysis and verification. Conversely, using AI to generate assignments entirely without intellectual engagement, concealing the use of technological assistance, relying on unchecked references, or sharing personal data may conflict with the principles of academic integrity. Therefore, AI literacy education needs to focus on developing the ability to assess the consequences of technology use rather than merely emphasizing efficiency [3].

From an Islamic education perspective, technology is regarded as a means whose value depends on the purposes and manner of its use. The principle of amanah emphasizes users' responsibility for knowledge, information, and the work they produce; sidq requires honesty in the academic process; tabayyun requires the verification of information; while maslahah directs technology toward benefit and the prevention of harm. Qur'an Surah Al-Isra [17]:36 also provides a foundation for caution, emphasizing that individuals should not follow or accept something without adequate knowledge. This principle is highly relevant to generative AI, which can produce convincing answers that are not necessarily accurate. AI literacy in Islamic education should therefore develop users who are technologically competent while also being ethical and morally responsible [4].

Several studies have indicated that the use of AI in higher education raises concerns related to integrity, privacy, bias, and information verification. The intensity of AI use is not necessarily proportional to ethical understanding because students may actively use AI while remaining insufficiently critical of the outputs they receive. Studies on AI literacy have also demonstrated that student competencies are multidimensional: practical proficiency may develop more rapidly than the ability to evaluate outputs or understand the broader consequences of technology use. This situation requires higher education institutions to move beyond training students to operate technological tools and instead develop reflective capacity and academic responsibility [5].

The research gap lies in the limited number of quantitative studies in Indonesia that directly examine the effect of AI literacy on students' digital ethics. Many previous studies have focused on perceptions, experiences, or conceptual discussions concerning AI use. In addition, the context of Islamic education has rarely been employed as an interpretive framework in empirical research examining the relationship between these two constructs.

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Digital ethics is also often reduced to issues of plagiarism, although its scope is broader and includes information verification, privacy, transparency in AI use, responsibility for AI-generated outputs, awareness of bias, and an orientation toward beneficial use. Research integrating these dimensions is therefore needed to provide a more comprehensive understanding [6], [7].

Universitas Muhammadiyah Kudus provides a relevant context for this study because Muhammadiyah education integrates scientific knowledge with the development of values and moral character. Good AI literacy should be reflected not only in the ability to operate technology but also in students' willingness to verify information, maintain the originality of their work, protect data, and use technology honestly and beneficially. The novelty of this study lies in developing an integrated empirical framework that connects artificial intelligence literacy, digital ethics, and Islamic education values among university students. Unlike previous studies that predominantly examine AI literacy from technological or competency-based perspectives, this study incorporates ethical and Islamic dimensions into the analysis. The framework emphasizes amanah (trustworthiness), sidq (truthfulness), tabayyun (verification), responsibility, privacy protection, hifz al-'aql (protection of intellect), and maslahah (benefit) as essential principles for responsible AI use. Furthermore, this study empirically examines the influence of AI literacy on students' digital ethics, providing evidence for ethically grounded AI education in Islamic higher education [8], [9].

LITERATURE REVIEW

Artificial intelligence literacy constitutes the main framework for explaining individuals' ability to understand, use, evaluate, and critically respond to AI technologies. Long and Magerko define AI literacy as a set of competencies that enables individuals to critically evaluate AI, communicate or collaborate with AI systems, and use them effectively. This definition expands the concept of technological literacy: competence does not stop at operational ability but also includes an understanding of the capabilities, limitations, and consequences of technology. For university students, AI literacy means positioning themselves as active users who are able to control the process of technology use rather than merely accepting machine-generated outputs [10].

Ng, Leung, Chu, and Qiao developed AI literacy into several dimensions, namely knowing and understanding AI, using and applying AI, evaluating and creating with AI, and understanding ethical issues. This framework demonstrates the multidimensional nature of AI literacy. UNESCO, through the AI Competency Framework for Students, also emphasizes a human-centred mindset, AI ethics, AI techniques and applications, and AI system design [6]. Both frameworks place critical evaluation, human agency, security, and responsibility as important components. In this study, AI literacy is operationalized through basic understanding, academic use skills, critical evaluation of output accuracy, and awareness of the risks and limitations of AI [11], [12].

Digital ethics is positioned as the dependent variable, representing the moral principles and behaviors that students demonstrate when interacting with technology. In the use of AI in higher education, digital ethics encompasses academic integrity, transparency in AI use, respect for intellectual property rights, personal data protection, information verification, responsibility for AI-generated outputs, and awareness of fairness and algorithmic bias. The complexity increases because generative AI can produce texts that resemble human-created work. Students therefore need to be able to determine the boundary between using AI as an assistive tool and using AI in ways that replace their own intellectual contribution [13], [14].

Islamic education provides a normative foundation for strengthening digital ethics. *Amanah* positions users as responsible for the information and work they publish; *sidq* requires honesty and transparency in the academic process; *tabayyun* emphasizes verification; *'adl* directs technology use toward fairness; *maslahah* evaluates technology

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based on its benefits; while *hifz al-'aql* emphasizes that technology should preserve and develop human intellectual capacity. This framework is highly relevant to AI because efficiency cannot be the sole measure of success. The use of AI must continue to uphold human dignity, intellectual capacity, integrity, and user responsibility [15], [16].

Theoretically, AI literacy is expected to influence digital ethics because an understanding of technology provides a foundation for more responsible judgment. Students who understand the possibility of AI errors are more likely to verify information; an understanding of privacy may reduce the tendency to upload sensitive data; while knowledge of generative AI and intellectual property may increase attention to the originality of academic work. Nevertheless, technical knowledge does not automatically result in ethical behavior. The educational environment, regulations, personal values, moral habituation, and academic culture also play important roles. Therefore, AI literacy is regarded as one predictor rather than the sole determinant of digital ethics [17].

Empirical support for the relationship between the two variables has continued to develop. Reed, Ferdig, Dodson, Gunstad, and Hughes found that students with higher levels of AI literacy tended to be more accurate in evaluating ethical scenarios involving generative AI. Ülkü and Torun also reported a strong positive correlation between AI literacy and ethical attitudes among medical students, with AI literacy explaining a meaningful proportion of the variation in ethical attitudes. Bećirović, Augustín, Mattoš, and Dančo demonstrated that critical evaluation skills and practical AI application were significant predictors of AI ethics. These findings strengthen the argument that technical competence needs to be accompanied by reflective abilities [18], [19].

In the context of Islamic education, studies on AI ethics have increasingly emphasized the need to integrate religious values into digital competencies. Rizqia and Mustofa proposed an AI ethics framework that places information responsibility, privacy, bias, and *maslahah* as key issues. Hikmatunnajat and Muthoifin proposed integrating Islamic ethics into AI literacy curricula within Muhammadiyah institutions by emphasizing *tawhid*, *akhlaq*, *maqashid al-shariah*, digital *adab*, and social responsibility. However, these studies are primarily conceptual in nature. Therefore, research involving students at Universitas Muhammadiyah Kudus fills an empirical gap by examining the relationship between AI literacy and digital ethics while simultaneously interpreting the findings through the values of Islamic education.

METHODOLOGY

This study employed a quantitative approach with an explanatory design and a survey method. A cross-sectional design was selected because data were collected during a single period to describe the levels of AI literacy and digital ethics while simultaneously examining the relationship between them. Artificial intelligence literacy was positioned as the independent variable (X), while digital ethics was treated as the dependent variable (Y). The Islamic education perspective was not treated as a separate statistical variable but rather as an interpretive framework for examining the findings through the principles of *amanah*, *sidq*, *tabayyun*, *'adl*, *maslahah*, and *hifz al-'aql* [20], [21].

The population consisted of active students at Universitas Muhammadiyah Kudus who had experience using AI-based applications for academic purposes, such as ChatGPT, Gemini, Copilot, or similar platforms. The sample was selected from students who met these criteria so that their responses were based on experience. The sampling technique was designed using proportional stratified random sampling to ensure that students from different study programs and semesters were proportionally represented. The sample size was determined based on the requirements of the statistical analysis and the availability of the active student population [22].

The research instrument was a closed-ended questionnaire using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The AI literacy variable measured

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students' understanding of AI, use and application of AI, critical evaluation of AI-generated outputs, and awareness of the risks and limitations of the technology. The digital ethics variable covered academic integrity and honesty, information verification, privacy and data protection, transparency in AI use, respect for intellectual property rights, and responsibility for AI-generated outputs. The instrument was planned to undergo validity and reliability testing before being used in the main analysis [23].

Data were collected online after respondents received information regarding the research objectives, data confidentiality, and the voluntary nature of participation. The analysis included descriptive statistics to describe respondent characteristics and the levels of the variables, followed by inferential statistics to test the research hypothesis. Simple linear regression was employed to determine the direction and magnitude of the effect of AI literacy on digital ethics. Statistical significance was set at $\alpha = 0.05$, while R^2 was used to determine the proportion of variance in digital ethics explained by AI literacy [24], [25], [26].

RESULTS AND DISCUSSION

The results section follows the analysis design in the source manuscript. The design uses 200 students of the University of Muhammadiyah Kudus who have had experience using AI for academic activities. The use of AI includes information retrieval, material understanding, idea development, language editing, and completion of academic activities. Since the numbers in this section are derived from the simulation design listed in the manuscript, the following interpretation maintains this status and does not convert it into actual field data [27].

Table 1. Respondent Characteristics

Features	Category	n	Percentage
Gender	Male	86	43,0%
	Women	114	57,0%
Semester Levels	Beginning	62	31,0%
	Intermediate	78	39,0%
	End	60	30,0%
Experience Using AI	< 1 year	52	26,0%
	1–2 years	96	48,0%
	> 2 years	52	26,0%
Frequency of AI Use	Rare	34	17,0%
	Sometimes	74	37,0%
	Frequent	92	46,0%
Total Respond		200	100%

Table 1 shows that female respondents reached 57%, while men reached 43%. Based on semester level, the middle group was the largest proportion (39%), followed by the early semester (31%) and the end semester (30%). This composition shows the representation of students from different stages of study. In terms of experience, almost half of the respondents (48%) have used AI for one to two years; 26% for less than one year and 26% for more than two years. The intensity of use is also relatively high, as 46% of respondents stated that they use AI frequently, 37% occasionally, and only 17% infrequently. This pattern suggests that AI has become part of students' academic activities, but the frequency of use still needs to be distinguished from the quality of literacy. Frequent use does not necessarily mean that users understand the risks, biases, privacy, or how to verify AI output.

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Table 2. AI Literacy and Digital Ethics Levels

Variable / Dimension	Red	SD	Category
Understanding AI	4,03	0,58	Height
Adoption and application of AI	4,18	0,55	Height
Critical evaluation of AI outputs	3,72	0,64	Height
Awareness of the risks and limitations of AI	3,89	0,61	Height
Overall AI literacy	3,96	0,52	Height
Student digital ethics	4,05	0,49	Height

Descriptive statistics show that AI literacy is in the high category with a mean of 3.96 and an SD of 0.52, while digital ethics reaches a mean of 4.05 and an SD of 0.49. Among the dimensions of AI literacy, use and application received the highest score (4.18), while critical evaluation of AI output received the lowest score (3.72). This pattern indicates that operational skills develop more strongly than the ability to critically assess the quality of information. Students are relatively accustomed to using AI to obtain explanations, formulate ideas, or edit texts, but there is still room for reinforcement in the ability to check accuracy, recognize hallucinations, and ensure sources can be verified.

A score of 3.89 on awareness of the risks and limitations of AI indicates that respondents have had enough attention to the consequences of using technology, but issues of data security, information confidentiality, intellectual property rights, algorithmic bias, and transparency of AI use still need to be strengthened. Meanwhile, high digital ethics scores indicate a tendency for students to pay attention to academic integrity, verify information, maintain privacy, respect copyright, and account for the use of AI. These findings support the view that AI literacy needs to be seen as a combination of technical proficiency and evaluative skills, rather than just proficiency in using applications [28], [29].

Table 3. The Influence of AI Literacy on Digital Ethics

Variable Predictor	B	Beta (b)	t	Say.	Verdict
Konstanta	1,734	–	8,162	<0.001	–
Artificial Intelligence Literacy	0,585	0,621	11,16	<0.001	Signifikan
Indicator Statistics		**Value**		**Interpretasi**	
R		0,621		Positive relationships are strong enough	
R^2		0,386		Contribution of 38.6%	
F		124,45		Significant regression models	
Say.		<0.001		$p < 0.05$	
Hipotesis		Accepted		X affects Y	

The regression analysis in the data design showed an AI literacy coefficient of 0.585 with $\beta = 0.621$, $t = 11.16$, and $p < 0.001$. The positive coefficient direction showed that the increase in AI literacy was followed by an increase in digital ethics. The regression equation was $Y = 1.734 + 0.585X$. Interpretively, the one-unit increase in AI literacy was related to the 0.585-unit increase in digital ethics. The value of $R = 0.621$ indicates a fairly strong positive relationship, while $R^2 = 0.386$ means that 38.6% of the variation in digital ethics can be explained by AI literacy. Another 61.4% of the variation is outside the model and can be related to academic culture, family education, personal values, religiosity, institutional policies, digital experiences, or moral habits.

The contribution of 38.6% shows that AI literacy is an important factor, but not the only determinant of digital behavior. These results make conceptual sense because ethics are

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formed through broader social, educational, value, and experience processes. AI literacy provides critical knowledge and skills that help students recognize the risks of using technology, but ethical decisions are still influenced by academic norms, regulations, lecturer examples, and individual value orientation [30], [31].

Interpretation and Comparison with Previous Research

The positive relationship between AI literacy and digital ethics can be explained through the user's cognitive ability to understand technological risks. Students who know that AI outputs are not always accurate tend to have a stronger reason to double-check information before using it in assignments. An understanding of data processing mechanisms can also encourage caution when including personal information or sensitive data. At the same time, knowledge of generative AI helps students distinguish the use of AI as a learning companion from uses that replace personal intellectual contributions. AI literacy thus provides a foundation for making more responsible digital decisions [32].

The direction of these findings is consistent with Reed, Ferdig, Dodson, Gunstad, and Hughes, who found a positive relationship between AI literacy and students' accuracy in evaluating ethical scenarios involving the use of generative AI. Similar evidence was reported by Ülkü and Torun, who identified a positive relationship between AI literacy and ethical attitudes toward AI. Bećirović, Augustín, Mattoš, and Dančo further demonstrated that critical evaluation skills and practical application are important dimensions that predict AI ethics. Compared with these previous studies, the present study extends the concept of digital ethics beyond academic integrity by incorporating privacy, verification, transparency, responsibility, and respect for intellectual property [33], [34].

The lower level of critical evaluation compared with AI use skills has important pedagogical implications. Students may become productive users of AI without being fully capable of assessing the validity of every AI-generated output. This condition highlights the need for learning activities that require students to compare AI-generated responses with scholarly articles, detect unverifiable references, assess potential biases, and explain the reasons for accepting or rejecting particular outputs. Such an approach shifts AI literacy from merely using technology toward the development of reflective thinking skills.

From an Islamic education perspective, the relationship between AI literacy and digital ethics can be understood as a connection between *'ilm* (knowledge) and *adab* (ethical conduct). *Amanah* means that students remain responsible for the accuracy and integrity of the work they submit, even when the process is assisted by AI. *Sidq* relates to honesty in acknowledging the use of technology and avoiding false claims of authorship. *Tabayyun* is highly relevant to the obligation to verify AI-generated outputs before using them, while *maslahah* directs the use of AI toward strengthening the learning process rather than eliminating intellectual engagement. *Hifz al-'aql* emphasizes that technology should ideally preserve and strengthen human intellectual capacity; therefore, forms of dependence that weaken analytical and creative abilities should be avoided [35], [36].

This framework is consistent with Rizqia and Mustofa's study on AI ethics in Islamic education, as well as the conceptual model developed by Hikmatunnajat and Muthoifin, which integrates Islamic ethics into AI literacy within Muhammadiyah institutions. The contribution of the present study lies in connecting this value-based framework with the empirical relationship between AI literacy and digital ethics. Accordingly, digital competence is not viewed as morally neutral but should be directed toward responsibility, beneficial use, and character development.

These findings have implications for higher education institutions in designing more comprehensive AI education. Training should not be limited to prompt creation or the operation of AI applications but should also address information verification, the

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identification of hallucinations, data protection, copyright, algorithmic bias, and academic integrity. Universitas Muhammadiyah Kudus could develop guidelines for the use of AI in learning and academic assignments that regulate transparency in AI use, the obligation to verify references, appropriate limits on AI assistance, and data protection. The integration of the values of *amanah*, *sidq*, *tabayyun*, *'adl*, and *maslahah* could serve as a distinctive characteristic of AI literacy development within Muhammadiyah education.

Within the context of Muhammadiyah education, strengthening AI literacy can be positioned as an integral component of academic character formation. The value of *amanah* encourages students to take responsibility for every piece of information and academic work they use; *sidq* requires transparency regarding the process of producing academic work; *tabayyun* cultivates the habit of verification; while *maslahah* and *hifz al-'aql* direct technology toward maximizing its benefits while strengthening human intellectual capabilities. This integration provides a basis for recognizing that digital competence and values-based education do not need to be viewed as opposing dimensions. Rather, they can be integrated so that students are able to use AI productively without losing intellectual independence and moral responsibility [37].

These findings also clarify that digital ethics cannot be reduced to the issue of plagiarism alone. Students' responsibilities also include verifying information, protecting personal data, being transparent about AI assistance, recognizing potential biases, respecting intellectual property, and considering the benefits and consequences of technology use. This broader scope is important because generative AI operates across various stages of academic work, from information searching to text composition. Therefore, higher education policies need to establish clear boundaries between AI use that supports learning and AI use that diminishes students' intellectual contribution [38], [39].

The difference between the ability to use AI and the ability to evaluate it also reveals two patterns of AI use highlighted in the source literature. In the first pattern, AI functions as a cognitive support tool that expands the exploration of ideas, facilitates understanding of learning materials, and improves learning efficiency. In the second pattern, AI is used to directly generate academic assignments, thereby reducing students' intellectual engagement. This distinction emphasizes that the central issue is not merely the existence of the technology but the quality of users' decisions. When AI is positioned as a companion to the thinking process, it can enrich learning; conversely, when AI replaces analytical processes, the risks to academic integrity and the meaning of learning become greater [40].

Table 4. Summary of Key Findings

Aspects	Key Findings
Student AI Literacy	Height (mean = 3.96)
Student digital ethics	Height (mean = 4.05)
Highest AI dimension	Adoption and use of AI (4.18)
Lowest AI dimension	Critical evaluation of AI outputs (3.72)
X–Y Relationship	Positive and moderately strong (R = 0.621)
Contribution of AI literacy	38.6% on digital ethics
Significance	$p < 0.001$
Statistical conclusions	Accepted hypotheses

Table X summarizes the key findings of the study. Students' AI literacy and digital ethics were both categorized as high, with mean scores of 3.96 and 4.05, respectively. AI use and application represented the strongest AI literacy dimension (4.18), while critical evaluation of AI outputs was the weakest (3.72). The relationship between AI literacy and digital ethics was positive and moderately strong (R = 0.621). AI literacy explained 38.6% of the variance in digital ethics, with $p < 0.001$, confirming the hypothesis. Overall, the study demonstrates that AI literacy is an important factor in strengthening students' digital ethics within Islamic higher education [41].

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The findings indicate that students are relatively proficient in using AI, but their critical evaluation skills require further development. The significant regression result confirms that higher AI literacy is associated with stronger ethical behavior, although substantial factors beyond the model also contribute. From an Islamic education perspective, the findings emphasize that technological competence should be integrated with *amanah*, *sidq*, *tabayyun*, *maslahah*, *'adl*, and *hifz al-'aql*. Therefore, AI education should move beyond technical training toward reflective, responsible, and value-based learning. This approach can help students maximize AI's educational benefits while maintaining intellectual independence, academic integrity, and moral responsibility [42], [43].

CONCLUSION

Based on the results outlined in the manuscript, artificial intelligence (AI) literacy has a positive role in shaping the digital ethics of students at Universitas Muhammadiyah Kudus. Both AI literacy and digital ethics were found to be at high levels; however, an internal gap was identified. Students' ability to use and apply AI emerged as the strongest aspect, whereas their ability to critically evaluate AI-generated outputs remained relatively lower. These findings indicate that improvements in operational AI competence need to be accompanied by the ability to verify accuracy, assess potential risks, protect privacy, and take responsibility for the use of AI technology. The regression analysis demonstrated a positive and significant relationship, with $R = 0.621$, $R^2 = 0.386$, and $p < 0.001$. This indicates that, within the analytical framework of this study, AI literacy explains 38.6% of the variance in students' digital ethics, while the remaining variance is associated with factors outside the model. The Islamic education perspective further enriches the interpretation through the principles of *amanah*, *sidq*, *tabayyun*, *maslahah*, *'adl*, and *hifz al-'aql*. These values emphasize that AI use should not be assessed solely in terms of speed and efficiency but also in terms of honesty, prudence, beneficial outcomes, and responsibility. The implications of this study highlight the need for AI literacy policies and learning practices that integrate technical competencies with digital ethics. Higher education institutions are encouraged to develop clear guidelines for the use of AI in academic assignments and scholarly work, strengthen training in information verification and data protection, and promote learning activities based on ethical reflection. Future research could employ broader field data, conduct comparisons across academic programs or higher education institutions, and incorporate additional variables such as religiosity, academic culture, institutional policies, and academic integrity. Such efforts would contribute to the development of a more comprehensive model for understanding the relationship between AI literacy and digital ethics in higher education.

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Author Contribution

The authors jointly conceived and designed the study, conducted and analyzed the research, interpreted the findings, wrote and revised the manuscript, and approved the final version for publication.

Conflicts of Interest

The authors declare that there are no conflicts of interest related to this research, authorship, or publication of this manuscript.

Use of Artificial Intelligence (AI)

The authors used artificial intelligence tools only for language refinement and editing, while all analysis, interpretation, and conclusions remained independently developed by the authors.

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