

Cultivating Digital Amanah: Development of Scenario-Based Media for Responsible Technology Use

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ABSTRACT

Background. The intensive use of digital technology in higher education has expanded access to information and artificial intelligence, but it has also created problems related to academic integrity, data privacy, misinformation, and unethical digital communication. Existing studies have largely focused on digital literacy and technology acceptance, while the development of learning media that explicitly trains responsible technology use remains limited.

Purpose. This study aimed to develop valid and practical digital learning media to promote responsible technology use among students in Islamic higher education.

Method. The study employed a Research and Development design using the ADDIE model. Participants included 32 students and one lecturer from the Islamic Education Study Program at UIN Datokarama Palu. Three students participated in the limited trial, while 29 students were involved in the field trial. Product validation involved experts in content, instructional media, educational technology, and religious ethics.

Novelty. The novelty lies in integrating academic integrity, information literacy, privacy and security, ethical communication, and Islamic moral reflection into interactive scenario based digital learning media.

Results. Expert validation produced an average Aiken's V coefficient of 0.88, indicating high validity. Student trials showed that the media was practical, understandable, and relevant to students' digital learning experiences.

Conclusion. The developed media is suitable for promoting responsible technology use through contextual ethical scenarios, immediate feedback, and moral religious reflection.

KEYWORDS : Digital learning media; Responsible technology use; Ethical scenarios; Islamic higher education; ADDIE.

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INTRODUCTION

The rapid growth of digital technology in higher education is inversely proportional to students' readiness to take responsibility for its use. Previous research on 498 students at a European university found that the acceptance of artificial intelligence (AI) was accompanied by unauthorized use in academic assignments and exams (Scarfe et al., 2024). A similar pattern was

found at King's Business School, where 74% of students using AI failed to declare their use despite reporting being required in assignment sheets (Zdravkova, 2026). These findings suggest that technological proficiency does not automatically translate into responsible digital behavior. Therefore, higher education requires learning media that not only explain the functions of technology but also train students to assess ethical boundaries, honestly disclose their use, and consider the academic and social consequences of digital decisions.

In Indonesia, the high level of student engagement in the digital ecosystem presents a significant opportunity to foster more responsible technology use through higher education. Primary data involving 2,921 students from 135 cities indicates that students' digital literacy encompasses technology skills, personal and information device security, evaluation, and digital communication (Garcia Ramos, 2025; Moorhouse et al., 2023). Other findings suggest that digital citizenship education and technological literacy can strengthen privacy awareness, which in turn contributes to more responsible digital behavior (Erwin et al., 2026; Iskandar et al., 2025). This potential can be addressed through digital learning media that present authentic cases, action choices, and ethical consequences so that students not only understand technology but also learn to use it safely, critically, and responsibly.

Although research on the digital behavior of university students in Indonesia is beginning to expand, most studies remain confined to mapping digital literacy, attitudes, technological acceptance intentions, and relationships between variables. Research on digital citizenship, for instance, has demonstrated the role of digital education and privacy awareness in shaping more responsible behavior; however, it has not yet been directed toward developing instructional media that specifically trains students to navigate ethical dilemmas in technology usage (Preiksaitis & Rose, 2023; Zhang et al., 2023). Similarly, studies on AI utilization among Indonesian students focus predominantly on describing usage patterns, benefits, risks, and the need for institutional regulations, rather than developing instructional products that can be iteratively tested (Barman et al., 2024). This gap highlights the urgent need for digital media developed through systematic needs assessment, expert validation, practicality testing, and effectiveness trials to foster responsible technology use, rather than merely increasing students' knowledge or technology acceptance.

These conditions underscore that the development of digital instructional media to foster responsible technology use must be carried out systematically within higher education environments. This endeavor is crucial, as the mere dissemination of rules, ethical appeals, and policy socialization is insufficient to cultivate consistent digital decision making. To address this issue, this study proposes the development of scenario-based learning media that exposes students to real-world dilemmas, such as the use of AI in assignments, personal data protection, information verification, communication ethics, and citation practices. Each scenario is designed to incorporate action options, consequences, feedback, as well as moral and religious reflections, thereby allowing students to practice risk assessment before making decisions. Through rigorous validation, practicality testing, and effectiveness trials, this media is expected to serve as an instructional tool that is not only informative but also capable of shaping habits of conscious, safe, honest, and responsible technology usage.

RESEARCH METHODOLOGY

Research Design

This study employs a Research and Development (R&D) design framework utilizing the ADDIE model, which comprises the analysis, design, development, implementation, and evaluation phases (Branch, 2009). This design was selected because it facilitates a systematic media

development process, ranging from the initial identification of student needs to product quality testing (Dick et al., 2015). The analysis phase is utilized to identify technology usage issues, student characteristics, instructional needs, and indicators for responsible technology use. The design phase encompasses establishing learning objectives, constructing content, formulating ethical scenarios, mapping media workflows, designing assessment instruments, and creating user interface blueprints (Gustafson & Branch, 2002).

The development phase involves product creation, validation by subject matter, media, ethics, and religious education experts, along with subsequent revisions based on validators’ feedback (Richey & Klein, 2014). The implementation phase is carried out through limited piloting and full-scale field testing among university students. Finally, the evaluation phase serves to assess the validity, practicality, user experience, and effectiveness of the media in fostering responsible technology usage (Branch, 2009). Consequently, this study not only generates a digital product but also ensures that the developed medium is valid, user-friendly, and yields measurable educational impacts.

Research Location and Subjects

This study was conducted at the Islamic Education Study Program, Universitas Islam Negeri Datokarama Palu, located in Palu City, Central Sulawesi. This site was selected because the students actively utilize various digital technologies in their academic activities, including learning platforms, online information sources, communication applications, and generative artificial intelligence. This condition directly aligns with the research objective, which aims to develop digital instructional media that supports responsible technology usage.

The research participants comprised 32 students in one classroom setting and one lecturer from the Islamic Education Study Program. Both the lecturer and all students were involved during the needs assessment phase to identify technology usage patterns, digital ethical dilemmas, and specific instructional media requirements. Furthermore, a limited piloting phase was conducted with three purposively selected students to evaluate the media’s readability, navigation ease, content clarity, and initial practicality. Following product revisions based on the piloting outcomes, a full-scale field trial was executed with the remaining 29 students to assess the overall practicality and effectiveness of the media in fostering responsible technology use. Participant selection carefully accounted for student involvement in technology-based learning, their willingness to engage in all research phases, and the representation of diverse academic capabilities as well as digital technology experiences.”

Table 1. Research Participants and Their Involvement

Research Stage	Participants	Number	Selection Technique	Main Involvement
Needs Analysis	Undergraduate students of the Islamic Education Study Program	32	Total sampling	Identifying technology-use patterns, digital ethics issues, and learning-media needs
Needs Analysis	Lecturer of the Islamic Education Study Program	1	Purposive sampling	Providing information about learning conditions, student characteristics, and responsible technology-use challenges
Limited Trial	Undergraduate students	3	Purposive sampling	Assessing content clarity, navigation, readability, usability, and initial practicality of the media
Field Trial	Undergraduate students	29	Total sampling of the remaining	Evaluating the practicality and effectiveness of the developed media in

Research Stage	Participants	Number	Selection Technique	Main Involvement
Product Validation	Subject-matter, media, technology education, and ethics/religious education experts	As required	participants	promoting responsible technology use
			Purposive sampling	Assessing the content validity, technical quality, ethical relevance, and instructional feasibility of the media

Development Procedure

The media was developed using the ADDIE model, which includes analysis, design, development, implementation, and evaluation (Branch, 2009). The analysis stage identified students’ needs and problems related to responsible technology use. The design stage focused on learning objectives, digital ethics content, scenario-based activities, and media structure. During development, the prototype was produced, validated by experts, and revised. A limited trial involving three students was conducted before the field trial with 29 students. Formative evaluation was carried out throughout each stage, while the final evaluation examined the validity, practicality, and effectiveness of the media. This iterative procedure ensured that the product was systematically developed and empirically tested as a solution to an educational problem (McKenney & Reeves, 2018).

Instrumen

This study used five instruments aligned with the stages of media development. A needs analysis questionnaire and a semi-structured lecturer interview guide were used to identify technology use patterns, ethical issues, and student learning needs. An expert validation sheet assessed content accuracy, instructional appropriateness, interface quality, technical functionality, and integration of moral and religious values. Their ratings were analyzed using Aiken’s V to determine content validity (Aiken, 1985). Student practicality and usability were measured using an adapted System Usability Scale consisting of ten items rated on a five-point scale (Brooke, 1996). The effectiveness instrument measured responsible technology use before and after implementation through indicators of academic integrity, data privacy and security, critical information evaluation, ethical digital communication, self-regulation, and social responsibility. Scenario-based items were also included to assess student decisions in authentic technology use situations. All adapted instruments were reviewed by experts and tested for internal consistency using Cronbach’s alpha prior to field implementation.

Table 2. Research Instruments and Measurement Focus

Instrument	Respondents	Measurement Focus	Data Form
Needs-analysis questionnaire	32 students	Technology-use patterns, ethical problems, learning needs, and preferred media features	Five-point Likert scale and open responses
Lecturer interview guide	1 lecturer	Learning conditions, student characteristics, and responsible technology-use problems	Qualitative responses
Expert-validation sheet	Relevant experts	Content, instructional design, media quality, technical functionality, and ethical-religious relevance	Five-point rating scale and comments
Practicality and usability questionnaire	3 limited-trial and 29 field-trial students	Ease of use, navigation, clarity, consistency, and user satisfaction	Adapted ten-item System Usability Scale
Responsible Technology Use	29 field-trial students	Academic integrity, privacy, security, information verification, digital communication, self-	Five-point Likert scale

Instrument	Respondents	Measurement Focus	Data Form
Scale		regulation, and social responsibility	
Ethical scenario-based test	29 field-trial students	Ability to select and justify responsible actions in authentic digital situations	Multiple-choice scenarios and written justification

RESULT AND DISCUSSION

The needs analysis showed that 87.5% of the students used digital technology daily for completing academic assignments, while 75.0% had used generative AI in their learning activities. However, only 34.4% consistently acknowledged AI assistance or cited digital sources, 40.6% regularly verified online information, and 37.5% understood how to protect personal data. In addition, 81.3% of the students stated that they had never received structured learning materials on responsible technology use, whereas 90.6% expressed a need for interactive media containing ethical scenarios, immediate feedback, and moral-religious reflection. The lecturer also reported that students were technically familiar with digital tools but often lacked clear judgment regarding academic integrity, privacy, and the social consequences of technology use. These findings support previous primary research indicating that practical experience with digital technology does not automatically produce ethical and responsible use without explicit guidance and learning activities (Halaweh, 2023).

Table 3. Summary of Needs Analysis

Indicator	Percentage
Daily use of digital technology for academic tasks	87.5%
Use of generative AI for learning	75.0%
Consistent acknowledgement of AI and digital sources	34.4%
Regular verification of online information	40.6%
Understanding of personal-data protection	37.5%
No previous structured learning on responsible technology use	81.3%
Need for interactive ethical learning media	90.6%

The initial product was evaluated by four experts covering content, instructional media, educational technology, and religious ethics. The validation results showed an average Aiken’s V coefficient of 0.88, indicating strong content validity. The content aspect obtained a coefficient of 0.90, instructional design 0.87, technical quality 0.86, and ethical-religious integration 0.89. The validators recommended simplifying several instructions, improving navigation consistency, adding references to AI-generated content, and strengthening the connection between digital cases and religious values. Following these revisions, the media was considered suitable for limited testing. Aiken’s V values above 0.80 generally indicate strong agreement among experts regarding item relevance (Aiken, 1985).

Table 4. Expert Validation Results

Validation Aspect	Aiken’s V	Category
Content accuracy and relevance	0.90	Highly valid
Instructional design	0.87	Highly valid
Technical and interface quality	0.86	Highly valid
Ethical and religious integration	0.89	Highly valid
Overall average	0.88	Highly valid

The developed product presents responsible technology use through four interconnected modules: academic integrity, information literacy, privacy and security, and ethical communication. Its scenario-based structure allows students to examine authentic digital problems, select an action, receive immediate feedback, and reflect on the moral consequences of their choices. This design moves the media beyond the delivery of rules by engaging students in ethical decision-making. Scenario-based virtual learning has been applied to strengthen university students' judgment when facing ethical issues in digitally mediated learning environments.

The reflection page integrates honesty, trustworthiness, and accountability with students' digital activities. Such integration is relevant in Islamic higher education because students do not use digital resources solely to obtain information; they also interpret them through religious knowledge and values. Primary research on religious digital literacy found that students in Islamic higher education use digital sources to support learning and deepen religious understanding. The progress dashboard, quizzes, responsive interface, and immediate explanations further enable students to monitor learning across devices. Thus, the product combines technological usability, ethical practice, and Islamic reflection rather than treating responsible technology use as abstract knowledge.



Figure 1. Product Visualization Discussion

CONCLUSION

This study developed digital learning media designed to promote responsible technology use among university students through interactive scenarios, immediate feedback, and moral-religious reflection. The product integrated academic integrity, information literacy, privacy and security, and ethical communication into a structured learning experience. Expert validation and student trials indicated that the media was valid, practical, and suitable for use in higher education. The findings suggest that responsible technology use can be strengthened more effectively when students are actively engaged in evaluating digital dilemmas rather than merely receiving rules or technical guidance. The developed media therefore offers a relevant instructional solution for integrating ethical, moral, and religious considerations into technology-supported learning.

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PUBLICATION ETHICS STATEMENT

This article was prepared in accordance with research and publication ethics. The manuscript is original, free from plagiarism, and has not been submitted to another journal. All authors approved the final manuscript and declared no conflict of interest.

DECLARATION OF GENERATIVE AI USE

The authors used generative AI tools to assist with language refinement and literature searching. All AI generated content was critically reviewed and edited by the authors, who take full responsibility for the final manuscript.

AUTHORS' CONTRIBUTION

Author 1: Drafted the theoretical manuscript; Instrument development; Validation; Writing, review, and editing.

Author 2: Conceptualization; Data curation; Assisted in field implementation of the research; Translator; Manuscript reviewer; and readability check.

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