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Realize digital transformation in higher education

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Abstract
This article examines the implementation of a technology-based PAI learning model at UNU Yogyakarta to meet the demands of the digital era. This study aims to describe the strategy for integrating technology into PAI learning and analyze its contribution to the effectiveness of the learning process. The research method used is descriptive qualitative, with data collection techniques including in-depth interviews, participant observation, and documentation. The results of the study show that UNU Yogyakarta has successfully implemented an integrated digital learning model in the Islamic Religious Education (PAI) course . This system integrates the LMS platform, 2D and 3D-based animated video media for delivering materials , as well as digital application-based interactive quizzes for weekly formative evaluations. The use of digital technology has been shown to increase student learning engagement by 78%, based on the results observation of learning activities in the LMS, as well as improving critical thinking skills through case study-based assignments analyzed in online groups , finally the PAI learning technology integration model at UNU Yogyakarta is not only oriented towards technical aspects and learning efficiency, but also optimizes the strengthening of Islamic character.

Keywords: Educational Technology, Digital Transformation, Islamic Universities, Religious Education

INTRODUCTION

Universities, as centers of science and innovation, are required to adapt to digital transformation in order to be able to answer the challenges of the times (Ramdhani, 2024). The urgency of this transformation is particularly evident in religious education, particularly Islamic Religious Education (PAI), which has traditionally relied on conventional and textual approaches. In the era of information disruption, PAI is expected not only to convey Islamic teachings normatively but also to adopt relevant, interactive, and contextual methods suited to the characteristics of the digital generation (Qomar, 2002).

Innovation plays a crucial role in transforming the spread of Islamic knowledge more widely and effectively , Students no longer rely solely on printed academic sources, but are increasingly accessing religious content through digital media such as Instagram and TikTok (Margono & Setiyarini, 2024). The gap between the learning models used by lecturers and students' learning habits poses a serious challenge. Therefore, technology integration in Islamic Religious Education (PAI) learning is an urgent need to effectively communicate Islamic values to a digitally savvy generation (Prastowo, 2021).

Despite its enormous potential, innovations in Islamic Religious Education (PAI) learning based on digital technology also face a number of challenges. One of the most prominent is the digital divide, particularly in areas with limited internet network infrastructure and device availability. Furthermore, not all teachers and lecturers possess sufficient digital literacy to integrate technology into learning. Another risk is the rampant misuse of technology, such as the circulation of biased, intolerant, and even radical religious content on social media. This can impact students' religious understanding if not balanced with critical filtering. Therefore, educators must possess both digital literacy and pedagogical skills to guide students in using technology wisely, in line with the Islamic values of *rahmatan lil 'alamin (blessing for all the universe)* (Perangin-Angin & Oktavia, 2025).

Based on these realities, this study focuses on understanding how technology-based Islamic Religious Education learning models are implemented in higher education, specifically at Nahdlatul Ulama University (UNU) Yogyakarta. The research's novelty lies in the integration of multimodal learning technology, Islamic values pedagogy, and character/spirituality formation within the context of Islamic Religious Education (PAI) at

UNU Yogyakarta, which has not been specifically discussed in other studies. Furthermore, this study also aims to examine the extent to which technology integration can contribute to increasing the effectiveness of the Islamic Religious Education learning process on campus.

Previous research has discussed the integration of technology in Islamic Religious Education (PAI) learning, such as the use of e-learning, Learning Management Systems (LMS), or digital-based interactive media. For example, a study by Febriana Wardiastuti (2023) found that students responded positively to the use of Quizizz because it provided fast evaluation results, was equipped with a question randomization feature, and statistical visualizations that made it easier for instructors to assess student understanding. However, this study still focused on the technical aspects of using digital media, without delving into holistic and transformative learning models.

This article presents a technology-based Islamic Religious Education (PAI) learning model approach that integrates digital media not only as a tool but also as a pedagogical framework underlying the overall learning design, strategy, and evaluation. The study also highlights UNU Yogyakarta as a case study of a modern Islamic campus with strategic potential in developing digital learning based on moderate Islamic values.

The main objective of this research is to describe and analyze in depth the implementation of a technology-based Islamic Religious Education (PAI) learning model at UNU Yogyakarta, as well as to identify its supporting and inhibiting factors. Furthermore, this research aims to provide conceptual and practical contributions to the development of an Islamic Religious Education (PAI) learning model that is adaptive to the digital ecosystem of higher education. The digital transformation of Islamic Religious Education (PAI) learning at this campus is expected to serve as a prototype and inspiration for other Islamic campuses, including Islamic boarding schools (pesantren), which are struggling to maintain their existence amidst the era of disruption.

UNU Yogyakarta is a campus that upholds the Islamic values of Ahlussunnah wal Jama'ah and is open to technological innovation, thus providing a relevant background for exploring the integration of technology-based Islamic Education learning (Yugo, 2025). As a university under the auspices of Nahdlatul Ulama, UNU has a vision to develop individuals who excel academically, spiritually, intellectually, and socially. Therefore, this research plays a

crucial role in strengthening the position of Islamic higher education as a pioneer in values- and technology based learning innovation. The findings of this study are expected to enrich the body of knowledge in the field of digital Islamic education and serve as a strategic reference for academics, policymakers, and education practitioners in universities and other Islamic educational institutions.

METHOD

This study uses a descriptive qualitative approach that aims to gain an in-depth understanding of how the technology-based Islamic Religious Education (PAI) learning model is implemented in higher education environments, especially in the context of digital transformation (Sugiyono, 2013). The study was conducted at the UNU Yogyakarta campus which is a technology-based learning. This study was conducted for approximately three months, from April 10 to June 20, 2025. During this period, the researcher was directly involved in observing the learning process, interacting with research subjects, and collecting data from various sources. The research subjects consisted of three main categories of key informants who played a significant role in the implementation of the learning model, such as lecturers who understood the direction of policy and curriculum development in the department, and several students who attended lectures.

Data collection in this study was conducted using three main techniques: in-depth interviews, participant observation, and documentation (Mappasere & Suyuti, 2019). The collected data were analyzed using the Miles and Huberman interactive model, which consists of three stages: data reduction, data presentation, and conclusion drawing. Data reduction was carried out by filtering important information from the results of interviews, observations, and documentation (Anggito & Setiawan, 2018). Next, the filtered data were presented in the form of descriptive narratives to make it easier for researchers to see patterns and relationships between findings. The final stage was drawing conclusions, which was carried out continuously throughout the research process to obtain a complete and accurate understanding. Data were collected, then triangulated, analyzed, and presented descriptively without changing the nature of the content being studied.

RESULT AND DISCUSSION

Integration of technology in Islamic Education learning

Technology is an activity that utilizes science for the purpose of simplify processes in industrial fields, including agriculture, medicine, trade, and so on. Technology can be defined as the process of handling technical problems based on scientific research, such as the use of electronic equipment, machines, and so on (Nuryana, 2022). Simon in Siahaan et al. (2020) clearly states that technology is a human effort to harmonize the natural and artificial environments. Therefore, humans need and require technology to utilize the environment in their lives, especially in the field of education.

Educational technology is a systematic method for planning, implementing and evaluating all teaching and learning activities by considering both technical and human resources and the interaction between the two, in order to achieve a more effective form of education (Big Indonesian Dictionary) (Lestari, 2018). Meanwhile, according to Yusuf (2012), educational technology is a systemic process that helps solve learning problems. Educational technology is an approach to education that utilizes technology and communication to support the teaching and learning process. Educational technology typically uses hardware such as computers, tablets, and smartphones, as well as software such as learning applications, e-learning platforms, and other digital resources to increase interaction, engagement, and learning effectiveness (Maylitha et al., 2022).

The following are some components and benefits of ICT-based learning models. There are several components of ICT based learning models. These components are hardware, software, and internet connection (Díaz Garcia et al., 2023). Hardware consists of Computers and Laptops used by teachers and students to access learning materials, conduct research, and complete assignments, Tablets and Smartphones to enable more flexible and mobile learning, and Projectors and Interactive Whiteboards to support visual and interactive presentation of materials in class. Software includes Learning Applications such as Quizizz, Kahoot!, and Duolingo that support interactive and game-based learning, E-Learning Platforms which are learning management systems (LMS) such as Moodle, Google Classroom, and Edmodo that enable online classroom management, and Digital Resources such as E-books, learning videos, online modules, and e-journals that enrich learning

materials. Internet Connectivity or Information Access is required, which allows students and teachers to search for online information quickly and widely. Equally important is Communication and Collaboration, which facilitates communication between teachers and students and collaboration between students through email, discussion forums, and educational social media (Yafi, 2020).

In this context, the integration of information and communication technology (ICT) with Islamic Religious Education is crucial, as it enables the delivery of religious values to be more engaging, interactive, and relevant to the needs of the times. Islamic Religious Education is a spiritual, moral, intellectual, and social process aimed at guiding individuals and groups. Furthermore, Islamic Religious Education can guide individuals, instill values and principles, exemplify an ideal way of life, and prepare the younger generation to face the challenges of life in this world and the hereafter. Islamic Religious Education is an effort to foster and guide students to become ideal citizens in the future. One way to achieve this is by providing comprehensive and contextual religious education (Hanifah Salsabila et al., 2023).

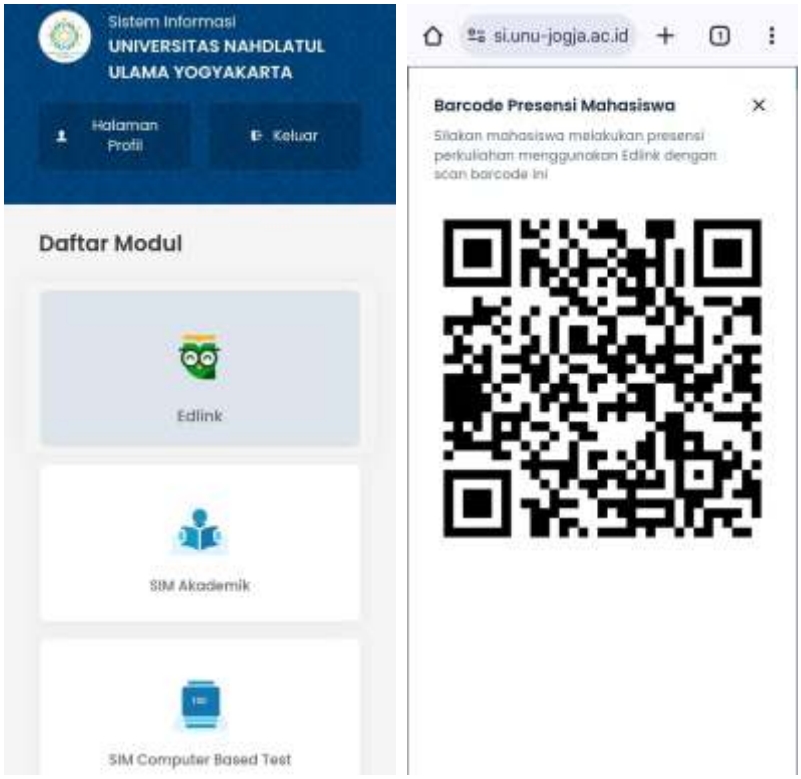
Thus, in the process of Islamic Religious Education, technology is not merely a tool, but has become an integral part integrated with the learning objectives themselves. Simply put, integration in this context can be understood as the continuity, harmony, and connection between media and technology with the material and objectives of Islamic Religious Education. This means that learning media, whether in the form of tools or teaching materials, are harmoniously integrated with technology, such as hardware and software, to facilitate students' acquisition. knowledge, mastering skills, and developing Islamic attitudes and character. Technology is used not only to convey information but also as a pedagogical approach that addresses various learning challenges through methods based on scientific research. This supports the development of students who excel not only cognitively but also possess spiritual leadership and character aligned with the values of the Quran and Hadith.

Implementation of Technology-Based Islamic Education Learning Model at UNU Yogyakarta Campus

The implementation of a technology-based Islamic Religious Education (PAI) learning model at Nahdlatul Ulama University (UNU) demonstrates a digital transformation

That not only touches on the technical aspects of learning but also leads to the formation of Islamic character and values. According to Mr. Murdianto, a UNU lecturer, technology in education is not an end in itself but rather a tool that must be intelligently controlled by educators and students. This perspective aligns with Simon's definition of technology, as cited in Siahaan et al. (2020), which states that technology is a human effort to harmonize the natural and artificial environments to simplify life, including in the context of education. In this case, technology is not used to replace the humanistic learning process but rather to support it, making it more effective and contextual.

Picture 1. Display of the Learning Management System (LMS) SIUNU.



This integration is the use of the SiUNU system, which serves as UNU's local Learning Management System (LMS). Interviews with Mr. Murdianto, a lecturer at Nahdlatul Ulama University (UNU), and two female students revealed that the implementation of technology-based learning at UNU has been systematic and comprehensive, including in the context of Islamic Religious Education (PAI) (Marlini et al., 2024). Technology is not merely seen as an

accessory or symbol of progress, but rather as a tool that must be controlled wisely by lecturers and students. In practice, UNU has developed an integrated application system called SiUNU, which includes various important features such as Edlink, SIM Akademik, and counseling services and academic proposals. These features allow lecturers to upload materials, check attendance, provide assessments, and interact with students online in one integrated ecosystem. This represents the components of educational technology outlined in Yusuf's theory (2012), namely the integrated use of hardware, software, and internet connectivity to improve learning effectiveness. Mr. Murdianto stated that through SiUNU, the entire learning process becomes more systematic, from planning course registration, attendance, material delivery, to learning evaluation.

However, its implementation is not rigid. Mr. Murdianto still prioritizes direct interaction to maintain the psychological bond between lecturers and students. According to him, emotional closeness and intimacy in the learning process are an important part of education, especially Islamic Religious Education, which aims to shape the Islamic character of students. Excessive use of technology without a personal touch is feared to lead to "shallow learning" and a decline in students' critical thinking skills. This aligns with the basic principles of educational technology as stated in the Great Indonesian Dictionary, which states that technology should be used systematically, taking into account the interaction between humans and their devices.

This lecturer's view is reinforced by the experiences of two students, Zulfa and Sabrina, who have directly experienced the benefits of technology-based learning. They stated that the use of animated videos, digital quizzes like Kahoot, and interactive media applications can deliver Islamic Religious Education (PAI) material in a more engaging and understandable way. Furthermore, this technology provides opportunities for them to learn Islamic values indirectly through visualizations and real-life examples.

In line with this, Idris & Mokodenseho's (2021) theory reinforces the argument that Islamic religious education is not only about transferring knowledge but also about developing spirituality, morals, and social awareness. Therefore, integrating technology into Islamic education is a crucial strategy for conveying Islamic values in a format that aligns with current developments and the preferences of the digital generation. Here, the role of

technology shifts from being a mere technical tool to a pedagogical approach that creates a deep and meaningful learning experience.

However, students also recognize the limitations of digital learning, such as reduced face-to-face discussions, decreased critical thinking skills, and disparities in digital skills among lecturers. They believe that technology must be used in a balanced and selective manner (Dylko, 2016). In this case, the ideal integration is not only in terms of technology, but also in terms of the values to be conveyed. Islamic Religious Education materials delivered through digital media must remain contextual and touch the spiritual aspects of students, such as laughing at one's shortcomings as a form of in-depth psychological group counseling, as mentioned by Mr. Murdianto.

Thus, the process of integrating technology into Islamic Religious Education (PAI) learning at UNU is not merely aimed at technical efficiency but is part of a holistic educational transformation process. This encompasses cognitive, affective, and spiritual dimensions, as outlined by Yusuf (2012) and Idris & Mokodenseho (2021). In this case, technology is not merely a passive instrument, but rather a reflective medium that guides students not only to understand Islam theoretically but also to internalize its values in their daily lives. This is a concrete manifestation of digital transformation in higher education, particularly in the field of Islamic Religious Education.

Analysis of Paulo Freire's Critical Consumer Concept on the Use of Technology in Islamic Education Learning

In the context of higher education, Henry Giroux warned that higher education has largely been drawn into a technocratic and pragmatic logic that emphasizes efficiency and technical skills alone, neglecting ethical values and idealism (Giroux, 1992). This is reflected in student responses in interviews, which expressed satisfaction with various technological conveniences such as educational videos, interactive quiz applications, and animations. While these tools facilitate understanding, some admitted that digital learning tends to make them more passive, lose motivation for critical thinking, and reduce the quality of live discussions in class. This phenomenon highlights Giroux's concern about the emergence of students who are consumers of technology rather than producers of knowledge and agents of social change (Giroux, 2015).

This aligns with the views of Mr. Murdianto, a UNU lecturer, as gleaned from interviews. He firmly stated that technology is a tool, not an end in itself. He rejects the use of technology as a complete substitute for learning processes that focus on psychological connections and critical thinking. He prefers direct, in-person interaction to barcodes, as human interaction is a crucial element in shaping students' Islamic character. This aligns with Nuryatno's critique that education must not lose the "language of criticism" and the "language of possibility," namely the ability to uncover hidden values and imagine a more ethical and democratic world through education (Rengkaningtias, 2025).

Furthermore, Mr. Murdianto also integrates learning that fosters critical awareness, such as asking students to be honest in using AI or digital devices, as Nuryatno mentioned, namely the formation of ethics and integrity beyond formal materials. This is where education functions as an emancipatory practice that not only transmits knowledge but also forms moral awareness and social responsibility. The behavior demonstrated by Mr. Murdianto aligns with Paulo Freire's educational philosophy in "Pedagogy of the Oppressed," which emphasizes the importance of freeing education from the practice of "Banking Education" that treats students as empty vessels to be filled with information. Freire advocates dialogical education, where learners become active and critical subjects engaged with social reality (Afida et al., 2021). Mr. Murdianto consciously chooses to call students individually during attendance rather than simply using barcodes to create a stronger psychological connection. This practice supports Freire's idea that education should be humane, build meaningful relationships, and foster critical awareness among students.

M. Agus Nuryatno (2017) criticized the tendency of many educational institutions to make students passive consumers of science and technology. Students simply accept and use technology instantly without critically examining the underlying values, ideologies, or power structures. Within this framework, technology-based learning in higher education must be able to encourage students to become critical consumers, not simply users of technology subject to market logic and technocratic pragmatism (Nuryatno, 2017).

From the student perspective, the findings obtained from Zulfa and Sabrina show that the use of technology in learning is still at the consumer stage and does not fully reflect the use of technology. critical-productive. Students experienced the benefits of easy access to

Materials through online learning, videos, and digital quizzes, but at the same time, they also identified potential negative impacts such as reduced opportunities for critical thinking and weakened face-to-face interactions. Furthermore, Zulfa's statement regarding the challenges experienced by lecturers who are not yet fully familiar with technology indicates a gap in the readiness of digital implementation in the learning environment. These findings underscore that the process of integrating technology into learning still requires strengthening pedagogical and reflective aspects to develop into more critical and productive practices, as expected within the framework of critical education.

According to Nuryatno's theory, higher education should not be trapped in technocratic rationality, a uniform and adaptive mindset that only emphasizes technical aspects and efficiency. Unfortunately, the students interviewed tended to feel comfortable with visual and instant learning models (video, animation, applications), but had not demonstrated critical reflection on the origins, ideology, or long-term impacts of using these technologies (Fachrozie et al., 2021). Thus, although technology has increased the ease and accessibility of learning, not all students have succeeded in transforming it into a reflective and critical learning process (Bush & Mott, 2009).

Therefore, the implementation of technology-based Islamic Religious Education (PAI) learning at UNU can be considered ideal if it aligns with the principles of critical education: avoiding dehumanization, encouraging psychological interaction, and aligning technology with ethical-religious values (Zakiyyah, 2024). This approach should produce students who not only access and use technology, but also critique, contextualize, and internalize Islamic values in the digital world. This process must position technology as a medium for forming independent, integrated, and socially conscious individuals, not merely future workers who are technically skilled but lack ethical values. In line with Nuryatno (2017), higher education must position itself as a space for developing thinking subjects, not merely objects of a pragmatic and instant system. However, challenges remain: some students still view technology as an instant convenience rather than a tool for reflection (Setyaningsih & Putri, 2025). It is an important responsibility for educators to continue to guide students so that they are not just consumers of technology, but become active subjects who think critically, have integrity, and are able to integrate Islamic values meaningfully into the digital world.

CONCLUSION

The implementation of a technology-based Islamic Religious Education (PAI) learning model at Nahdlatul Ulama University (UNU) Yogyakarta demonstrates a significant contribution to digital transformation that goes beyond technical aspects to include pedagogical, spiritual, and ethical dimensions, positioning technology as a reflective and transformative medium for holistic and contextual learning. Through the SiUNU platform, UNU has successfully integrated an interactive digital learning system such as animated videos and digital quizzes that enhances the effectiveness of content delivery and encourages active student participation, while maintaining a humanistic and spiritual approach that emphasizes psychological connection, personal communication, and lecturer integrity. This implementation is grounded in critical education theories proposed by Paulo Freire, Henry Giroux, and M. Agus Nuryatno, which promote students as active and critical subjects in interpreting technology, although some still remain passive consumers. Overall, the technology-based PAI model at UNU is relevant to the demands of the digital era and aligned with the mission of Islamic education to develop the whole person, offering inspiration for other Islamic educational institutions, provided that continuous training and mentoring are ensured to achieve equal readiness and competence among educators in digital learning practices.

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