
"DIGITAL-BASED PAI LEARNING INNOVATION TO INCREASE STUDENT ENGAGEMENT IN THE INDUSTRIAL REVOLUTION 4.0 ERA"

Sindy Sintiya

Insaniah University of North Sumatra, Indonesia

sindysintiya7@gmail.com

ABSTRACT

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The Industrial Revolution 4.0 era brings significant changes in various fields, especially in the education sector. Islamic Religious Education (PAI) as an important part of character and spiritual formation of students must transform to follow technological developments in order to remain relevant and effective. This study aims to examine innovations in digital-based PAI learning that can increase student involvement in the learning process. The approach used is a literature study with a descriptive analytical method to identify and evaluate various technologies and digital learning models applied in the context of PAI. The findings show that the use of e-learning platforms, mobile applications, interactive multimedia, and gamification significantly increases student motivation, active participation, and understanding of PAI materials. This innovation also provides learning flexibility that is in accordance with the characteristics of millennial and Z generation students who are very familiar with digital technology. Therefore, the integration of digital technology in PAI learning is not only a necessity, but also a crucial strategy to produce a faithful generation that is adaptive to changing times.

INTRODUCTION

The development of digital technology in the Industrial Revolution 4.0 era has presented challenges as well as great opportunities for the world of education. This revolution is marked by the integration of cyber technology, the Internet of Things (IoT), artificial intelligence (AI), and big data that penetrate almost all aspects of human life (Schwab, 2017). In the context of higher education, especially Islamic Religious Education (PAI) learning, this change requires teachers and educational institutions to innovate in learning methods in order to meet the needs of today's students who are called "digital natives" (Prensky, 2001).

Islamic Religious Education learning plays an important role in shaping the character, morals, and spirituality of students as the next generation of the nation. However, the reality in the field shows that student involvement in Islamic Religious Education learning is still often low due to monotonous and less interesting methods (Rahman, 2020). Traditional learning methods that only rely on lectures and memorization tend to make students passive and less motivated.

Along with the development of technology, digital-based learning innovations have emerged as a solution to increase student effectiveness and engagement. The use of e-learning, mobile applications, interactive multimedia, and gamification in Islamic Religious Education learning can create a more dynamic, interesting, and adaptive learning experience to students' learning styles (Siemens, 2005; Johnson et al., 2016).

In addition, the COVID-19 pandemic that has hit the world for the past few years has accelerated the digital transformation in education, forcing universities to adopt online learning technology massively (UNESCO, 2020). This shows that digital-based learning is not just an option, but a necessity to maintain the continuity and quality of education.

This study aims to examine digital-based Islamic Religious Education learning innovations that effectively increase student engagement in the Industrial Revolution

4.0 era. This study integrates theoretical reviews, practices, and case studies related to the application of digital technology in Islamic Religious Education learning to provide a comprehensive overview and practical recommendations for the development of religious education in higher education.

RESEARCH METHODS

Data Source Method

It is the extent to which students are involved in the learning activities carried out. Observations were conducted in several meetings to obtain a more comprehensive picture of the interactions between teachers and students, as well as students' responses to the methods used. Secondary Data Sources: Secondary data sources include interviews with Islamic Religious Education teachers who teach in the class, as well as several students involved in the learning. These interviews aim to deepen the teacher's understanding of the challenges faced in teaching the five daily prayers, as well as students' perceptions of the learning they receive. The interviews were conducted in a semi-structured manner to allow for flexibility in exploring more in-depth information. Documentation: The documentation used in this study included materials, lesson plans, and observation notes collected during the research process. These documents provide additional context regarding the curriculum and methods used in learning prayer.

Data Analysis Methods

Data analysis in this study used qualitative descriptive analysis techniques. The steps of data analysis carried out include: Data Reduction: The first step is to organize data obtained from observation, interviews, and documentation. Relevant data is then filtered and arranged systematically. This is done to reduce information that is not directly related to the research objectives, so that only relevant data is used in the analysis. Data Categorization: The reduced data is then grouped into categories based on themes that emerge during data collection. For example, data on the learning methods used, obstacles faced in teaching prayer, and student reactions to the learning methods applied. Data Interpretation: After the data is grouped, the next step is to analyze and interpret the collected data. This process involves finding patterns and relationships between existing data, and connecting them to relevant learning theories.

In this case, the researcher will assess how effective the method used is in improving students' understanding of the five daily prayers Sugiono (2019: 78)

Verification of Findings: The final step is to verify the findings obtained to ensure the validity of the data. Verification is done by comparing the findings obtained through observation, interviews, and documentation. In addition, researchers will also look for additional sources or literature that can strengthen or challenge the existing findings.

RESULTS AND DISCUSSION

Increasing Interest in Learning through Online Learning

Research conducted at IAIN Samarinda (Rahman, 2020) shows that online learning significantly increases students' interest in learning. The correlation coefficient of 0.975 shows a very strong relationship between the use of online learning and increased interest in learning.

Table 1. Correlation of Online Learning with Islamic Religious Education Students' Learning Interests

Variables	Correlation Coefficient (r)	R-Square (%)
Online Learning vs Learning Interest	0.975	95.06

The Impact of Digital Courses on Student Skills

shows that the Digital-Based PAI Learning Design course significantly improves students' digital competence.

Student Perceptions of VR Technology in Learning

Table 3. Student Perceptions of VR Technology

Category	Percentage (%)
Ready to Use VR	68%
Trust VR to Improve Results	72%

From the data above, it can be concluded that the integration of digital technology significantly increases student engagement and motivation in Islamic Religious Education learning. Web-based media, VR, e-learning, and gamification not only improve understanding of the material, but also provide flexibility and appeal that are more in line with the characteristics of generation Z students.

However, the implementation of this innovation also faces challenges such as limited infrastructure and digital literacy of lecturers. Long-term solutions include intensive training for teachers, technological support by campuses, and the provision of equal internet access for students.

Islamic Religious Education (PAI) learning in the Industrial Revolution 4.0 era has experienced a significant paradigm shift. The presence of digital technology demands innovation in the learning process to remain relevant and able to attract the interest of the millennial generation and generation Z. According to the Connectivism theory put forward by George Siemens (2005), learning in the digital era is no longer centered on teachers as the only source of information, but rather occurs through connections between various digital learning sources, social networks, and technology platforms. In this context, innovation in PAI learning needs to be designed to be able to create a collaborative, flexible, and digital-oriented learning environment for students.

PAI Learning Innovation Design

Component	Platform/Media	Function
LMS (Learning Management System)	Moodle, Google Classroom	Learning control center
Interactive Video	YouTube, Canva Video, Edpuzzle	Visual and audio materials
Interactive Quiz	Quizizz, Kahoot!, Mentimeter	Concept reinforcement and formative assessment
AI Chatbot	ChatGPT/WA Bot Islamic	Personal religious Q&A
Social media	Instagram/TikTok Education	PAI in the form of microlearning

One form of effective innovation is the use of Learning Management Systems (LMS) such as Moodle and Google Classroom. Through LMS, students can access teaching materials online, work on assignments, and interact with lecturers and fellow students asynchronously. This is in line with the concept of Blended Learning which combines the advantages of face-to-face learning and online learning. According to Heinich et al. (2002), the use of technology in learning can increase learning motivation and significantly expand the reach of learning. In practice, Islamic Religious Education learning can be packaged in the form of interactive videos, online discussions, and gamification through applications such as Kahoot and Quizizz, so that the learning process becomes more fun and competitive.

Furthermore, digital learning also allows the implementation of the Flipped Classroom model, a model in which students first study the material through digital media before discussing it in class. This model supports the Constructivism theory of Piaget and Vygotsky, which emphasizes that learning occurs actively when students construct their own understanding through social interaction and experience. In the context of Islamic Religious Education, students can more actively discuss Islamic values, the relevance of Islamic teachings to contemporary phenomena, and strengthening Islamic character reflectively.

The results of implementing various digital innovations in Islamic Religious Education learning show that student engagement has increased significantly. Students become more enthusiastic about attending lectures, more active in discussions, and find it easier to understand the material through visualization and interactive media. This is also reinforced by Keller's Learning Motivation theory (ARCS Model), which states that attention, relevance, confidence, and satisfaction are key factors in increasing learning motivation.

Digital innovation enables the provision of materials that are interesting, relevant to students' lives, and provide a satisfying learning experience. Innovation in Islamic Religious Education learning in the Industrial Revolution 4.0 era cannot be separated from the digital transformation that changes the way students access, process, and share information. Today's students are part of the digital native generation who are familiar with technology and social media, so traditional learning tends to be considered less interesting and less effective. In this context, the Connectivism theory developed by George Siemens (2005) is very relevant, because it emphasizes that learning in the digital era takes place through connections between various sources of digital information, social networks, and technology platforms. Therefore, Islamic Religious Education learning needs to be designed to enable students to build Islamic knowledge through digital interactions, such as online discussion forums, interactive videos, and the use of social media as a medium for reflecting religious values. Furthermore, the constructivist approach of Jean Piaget and Lev Vygotsky supports the application of active and collaborative learning models, such as flipped classrooms and project-based learning in religious education. Students do not only receive material passively, but also help build their own understanding of Islamic values through discussions, independent source searches, and digital presentations. Vygotsky (1978) stated that social interaction plays an important role in the process of internalizing knowledge, which in the context of digital learning can be facilitated through platforms such as Google Classroom and Moodle.

In addition, students' learning motivation also increases with the implementation of a technology-based approach. The ARCS theory developed by John Keller (1987) shows that learning motivation can be increased through four aspects: attention, relevance, confidence, and satisfaction. The use of learning videos, online quizzes such as Quizizz or Kahoot, and digital badges for certain achievements, can attract students' attention and provide a fun and meaningful learning experience.

The Blended Learning model as explained by Graham (2006) is also an innovative solution in Islamic Religious Education learning. By combining face-to-face meetings and online activities,

students can gain flexibility in learning, strengthen their understanding of the material through various media, and still build closeness with lecturers and classmates. This is in line with Mayer's Multimedia Learning theory (2009), which emphasizes that the use of visual and verbal elements simultaneously can improve students' retention and understanding of the teaching material.

By combining various theoretical approaches, digital-based Islamic Religious Education learning innovations have been proven to not only increase student engagement but also strengthen the effectiveness of the process of internalizing Islamic values in their academic and social lives. Therefore, the integration of theory, technology, and Islamic values is an important foundation in designing adaptive, contextual, and transformative Islamic Religious Education learning strategies in the digital era.

However, the implementation of digital innovation is not without challenges. Some of the obstacles faced include limited digital literacy among lecturers, the quality of technological infrastructure in universities, and limited digital PAI content that is contextual and contains local values. Therefore, lecturer training in digital pedagogy is needed as well as institutional support in providing adequate facilities and infrastructure. In addition, the development of learning content that is in accordance with cultural characteristics and local needs is very important to maintain the authenticity of religious education.

Thus, innovation in digital-based Islamic Religious Education learning is a necessity in the era of the Industrial Revolution 4.0. This innovation is not only a modernization of methods, but also a strategy to increase the relevance, effectiveness, and involvement of students in understanding and internalizing Islamic values contextually and applicatively. Therefore, sustainable development of the digital Islamic Religious Education learning model needs to be carried out continuously through an integrative approach between theory, practice, and the needs of the times.

CONCLUSION

Digital-based Islamic Religious Education learning innovation is an absolute necessity in the era of the Industrial Revolution 4.0 to improve student engagement and learning outcomes. The use of e-learning, mobile applications, interactive multimedia, and gamification has proven effective in creating an interesting, flexible, and adaptive learning process to the characteristics of digital generation students. The implementation

of digital technology in Islamic Religious Education learning not only increases student motivation and participation, but also prepares them to become a generation of believers who are intelligent and adaptive to the development of the times. Therefore, universities need to seriously integrate digital innovation into the Islamic Religious Education curriculum and learning strategies.

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