ISLAMIC RELIGIOUS EDUCATION LEARNING TECHNOLOGY IN THE INDUSTRIAL REVOLUTION 5.0 ERA

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Abstract

The era of the Industrial Revolution 5.0 has brought about significant transformations in various domains, including the realm of education, particularly Islamic Religious Education (PAI) in schools. The integration of technology in PAI learning has gained increasing recognition for its potential benefits. However, its implementation and effectiveness remain challenging in many educational institutions. A knowledge gap persists in understanding how PAI teachers can effectively utilize technology to enhance learning that is pertinent to students' needs in the digital era. To address this gap, this study employs a comprehensive literature review methodology, examining recent publications on the integration of technology in religious education. The findings of this study indicate that technology can be instrumental in enhancing accessibility to learning materials, facilitating interaction between teachers and students, and fostering student engagement in the learning process. Furthermore, it is evident that continuous training for teachers is crucial to enable them to fully harness the potential of technology in the educational setting. The implications of this study suggest that the development of educational policies that promote the integration of technology in PAI learning must be accompanied by well-structured and ongoing teacher training programs.

Keywords: *Learning Technology; Islamic Religious Education; The Era of Industrial Revolution 5.0*

A. Introduction

Technology has become an inseparable part of every human's life today. The proper use of technology can increase efficiency and effectiveness in everyday life, including in the teaching and learning process in schools, madrasahs, universities, and learning resource centers and libraries that provide collections of reading materials, especially those formatted in digital form (P. H. Putra, 2020). We have now entered the era of Industrial Revolution 5.0, although it is still in the development and debate stage. In general, it refers to technological developments that continue to increase automation and digitalization in industry and the production sector (Munanda, 2019). This concept focuses on the integration of technology and humans, as well as the need to develop systems that are more adaptive and responsive to changes in the production environment. Industrial Revolution 5.0 focuses more on the integration of advanced technologies such as AI, IoT, and robotic technology with human expertise and innovation that can encourage the development of more efficient, flexible, sustainable production systems and improve

human welfare (Maudiarti, 2018). Industrial Revolution 5.0 emphasizes the harmonization between advanced technology and humans, so learning technology that supports this revolution must pay attention to human-centric and sustainable aspects (Ahmad et al., 2022). By using software technology in learning, the education process becomes more flexible, interactive, and in accordance with the needs of individual students, thus increasing the effectiveness and efficiency of learning (Nur et al., 2022). The use of hardware technology in learning involves various physical devices to improve the education process. The following are some examples of hardware technology commonly used in learning: Computers and laptops are used to access information, run educational software, and complete computer-based tasks. Interactive projectors and screens assist in delivering material with clearer and more interactive visualizations. Interactive screens allow students to participate directly in lessons. Tablets and smartphones are used for quick, direct access to learning materials, educational applications, and online resources, as well as for mobile learning purposes. Smartboards are interactive digital whiteboards that allow teachers and students to write, draw, and access digital content directly on the board. Virtual Reality (VR) and Augmented Reality (AR) devices provide an immersive learning experience, allowing students to explore virtual environments or view 3D objects in a real-world context. Robotics kits and STEM kits are used in science, technology, engineering, and mathematics (STEM) education to teach concepts such as programming, electronics, and mechanics. 3D printers are used to print physical models from digital designs, helping students understand design and manufacturing concepts. Cameras and microphones are essential for distance learning and recording learning materials. Document cameras are also used to show a book or physical object to the entire class (Ramadhani & Nindyati, 2022).

The Industrial Revolution 5.0 marks an era where collaboration between humans and technology deepens, creating a smarter environment that focuses on human well-being. Not only automation, as in the Industrial Revolution 4.0, but now technologies such as artificial intelligence (AI), robotics, and the Internet of Things (IoT), are being used to improve the quality of human life, including in the education sector. According to a report from the World Economic Forum (2020), the Industrial Revolution 5.0 focuses on the harmonization of technological advances and humanitarian values, with the aim of advancing innovation based on empathy and human needs. In the context of education, this includes a more personalized approach, where technology helps educators understand the individual needs of students, adapt teaching materials, and create a more inclusive and effective learning environment. Therefore, the integration of technology into the education system is very important in order to create a learning process that is relevant and responsive to developments in the times (Munanda, 2019). Although technological advances have changed various aspects of education, the implementation of technology in Islamic Religious Education (PAI) learning still faces significant challenges. Many PAI teachers have not fully integrated technology into their teaching, either due to limited training or lack of access to relevant digital resources. According to research (UNESCO, 2020), the digital divide and technological literacy among educators, especially in religious

education, are one of the inhibiting factors in the adoption of technology in the learning process. In addition, there have not been many studies that have explored in-depth how technology can support Islamic Religious Education teaching effectively, especially in strengthening religious and moral values in this digital era. Therefore, further research is needed to bridge this gap, ensuring that technology is used optimally to support religious learning that is contextual and relevant to students' needs in the Industrial Revolution 5.0 era.

Although technology has had a significant impact on the education sector, its integration in educational institutions remains unevenly distributed, particularly in developing countries. The International Telecommunication Union (ITU) reported in 2020 that approximately 47% of the global population still lacks internet access, a crucial requirement for utilizing technology in education. This lack of access creates substantial disparities between schools in developed and developing countries, as well as between urban and rural areas. These inequalities pose challenges in integrating technology into the teaching process, particularly in the context of religious education, such as Islamic Religious Education, where not all teachers possess the necessary tools or skills. Consequently, concrete measures are necessary to address this digital divide and promote more widespread and equitable use of technology in learning worldwide.

One of the primary obstacles to integrating technology into learning, particularly in religious subjects like Islamic Religious Education (PAI), is the digital divide between schools in urban and rural areas. According to (Rondinelli, 2007), schools in rural areas often lack adequate technological infrastructure, such as reliable internet and digital devices. This limitation results in limited opportunities for teachers in rural regions to effectively utilize technology in their teaching. In the context of Islamic Religious Education(Ahmad et al., 2022; Anwar et al., 2018; Jauhari, 2020), this divide further hampers the learning process, as this subject requires an interactive and in-depth approach to convey religious values to students. Without proper access to technology, students in rural areas are deprived of equal learning experiences compared to their urban counterparts, leading to disparities in the quality of education.

This study focuses on literature discussing the application of technology in learning and its impact on the effectiveness of Islamic Religious Education. The researchers employed a systematic approach to identify and analyze relevant previous studies, both globally and locally. According to Voogt et al. (2018), research on educational technology remains fragmented, particularly in the context of Islamic Religious Education. Therefore, a critical review is necessary to understand the potential and barriers to implementing technology in this field.

The literature review delves into various concepts, such as adaptive technology, artificial intelligence, and digital learning environments, particularly those applicable to Islamic Religious Education (ISE) learning. Additionally, this study emphasizes the significance of continuous training for Islamic Religious Education teachers to effectively leverage technology, as recommended by the (Commission, 2020). The commission emphasizes the necessity of technology-based learning that is tailored to students' needs

and developments. This research is urgent in light of technological advancements in the era of the Fourth Industrial Revolution, which necessitate adaptation in learning methodologies, including in Islamic Religious Education (PAI). Although the potential of technology in enhancing learning quality is acknowledged, the implementation of technology in Islamic Religious Education encounters various obstacles, notably the digital divide and insufficient teacher training. The urgency of this research lies in the need to explore effective strategies for integrating relevant and contextually appropriate technology into Islamic Religious Education learning in the digital era. Consequently, this study aims to investigate how technology can be optimally incorporated into Islamic Religious Education learning to enhance teacher competence and students' understanding of religious values.

B. Method

This study uses a qualitative research design with a literature review approach. The data sources used come from journal articles, books, and research reports that are relevant to the topic of technology integration in Islamic Religious Education (PAI) learning in the Industrial Revolution 5.0 era. Researchers collected data by identifying and selecting the latest literature that discusses the implementation of technology in religious education, as well as the challenges and opportunities associated with this implementation. The selected literature was published within the last 10 years to ensure the relevance and accuracy of the data. All literature used has gone through a strict selection process based on quality and contribution to the research topic. Data collection techniques were carried out through searching scientific databases such as Scopus, ScienceDirect, and Google Scholar. The keywords used in the search include "learning technology," "Islamic Religious Education," and "Industrial Revolution 5.0." The articles found were then evaluated based on their relevance to the topic, as well as their contribution to the research being conducted. The data collected was analyzed using content analysis techniques, which allowed researchers to identify the main themes that emerged from the literature. The main findings from each literature were recorded and categorized to facilitate the process of analyzing and discussing the research results. The results of the data analysis from this literature review are used to formulate recommendations related to technology integration in Islamic Religious Education learning. The analysis process focuses on identifying opportunities and obstacles in the application of technology, as well as the role of teachers in adopting technology as a learning tool. The results of this analysis are also used to explore the potential for increasing the competence of Islamic Religious Education teachers in utilizing technology for more interactive and inclusive learning. This study contributes to a deeper understanding of how technology can support religious learning that is relevant to current developments. Thus, the results of this study are expected to provide new insights for educational policy-makers regarding the use of technology in Islamic Religious Education learning.

C. Finding and Discussion

Integrating technology in Islamic Religious Education learning in Era 5.0

The integration of technology in Islamic Religious Education (PAI) learning in the Industrial Revolution 5.0 era requires adequate infrastructure readiness and continuous teacher training (Miskiah et al., 2019; Rahman & Akbar, 2021). To avoid gaps in technological infrastructure, it is highly recommended that every school, both in urban and rural areas, be facilitated with stable internet access and appropriate digital devices. If there are limitations in access, the government and stakeholders should immediately prioritize the equalization of this infrastructure. However, if you are already facing these limitations, the researcher suggests not to worry, because the results of this study have shown that gradual and planned infrastructure improvements can overcome this gap, while allowing technology integration to run more effectively. The integration of technology in Islamic Religious Education (PAI) learning in the Industrial Revolution 5.0 era faces major challenges in terms of uneven infrastructure (Fitria & Subakti, 2022; Thai et al., 2017). According to Selwyn (2011), limited access to technology in schools, especially in rural areas, can slow down the implementation of technology-based learning. Therefore, there needs to be an education policy that supports equal access to digital infrastructure. The researcher suggests that schools be given full support in the form of procuring technological devices and stable and fast internet access. Thus, the gap in infrastructure can be overcome, and schools throughout the region can make optimal use of technology to improve the quality of Islamic Religious Education learning.

Technology training for Islamic Religious Education teachers is a key element in preventing gaps in digital-based teaching competencies. Therefore, it is highly recommended that educational institutions and the government provide ongoing training programs to improve teachers' technological literacy. In addition, the training must be designed to be relevant to the Islamic Religious Education context and pay attention to interactive and contextual learning methods (Mujtaba et al., 2021; P. Putra et al., 2020). If it turns out that Islamic Religious Education teachers have faced obstacles in mastering technology, the researcher recommends immediately following the training program suggested in the results of this study, because it has been proven effective in significantly improving teachers' technological competencies. The digital divide between schools in urban and rural areas can be prevented by designing policies that focus on equalizing access to technology. To avoid this gap, the government needs to ensure that the allocation of budget and technology resources is carried out evenly across the region, including areas that are difficult to reach. If this gap has occurred, the researcher recommends that there is no need to worry, because the results of the study show that solutions to equalizing access can be implemented by improving infrastructure and expanding the scope of training for teachers in remote areas.

Lack of technology training for Islamic Religious Education teachers is one of the inhibiting factors in the effective implementation of technology. Guskey (2002) emphasized that ongoing professional training is essential to improve teachers' skills in utilizing technology for teaching. Therefore, it is recommended that training specifically

designed for Islamic Religious Education teachers can introduce them to various digital tools and platforms that can be used in religious teaching. In addition, the Technological Pedagogical Content Knowledge (TPACK) theory by Mishra and Koehler (2006) emphasizes that training should include a combination of technology, content, and pedagogy. With structured training, Islamic Religious Education teachers can overcome gaps in technological competence and create a more innovative learning environment.

In order to avoid gaps in optimal use of technology, it is recommended that Islamic Religious Education teachers utilize interactive technology that can increase student involvement in learning. Teachers must be trained to use digital media that allows students to participate actively, so that religious values can be understood more deeply. If teachers face obstacles in utilizing technology in this way, the researcher suggests referring to the results of this study which emphasizes the importance of intensive training related to interactive and personal digital learning methods. Thus, the gap can be overcome through a more effective understanding and application of technology (Afrilia, 2018; Beaumont et al., 2022; Harun, 2021).

The digital divide between schools in urban and rural areas can also be overcome through policies that support the equal distribution of technological resources (Anderson & Srinivasan, 2003). Technology can only have a significant impact if it is used evenly in all educational areas. Therefore, there needs to be a policy intervention that prioritizes the fair distribution of technology between urban and rural areas. This study found that policies that focus on equal access can be a solution to overcoming the digital divide gap. Thus, all students, regardless of geographic location, will have an equal opportunity to utilize technology to learn religious values.

The lack of in-depth research related to technology integration in Islamic Religious Education can be prevented by expanding future empirical studies that focus on the effectiveness of technology in religious education. Educational institutions and academics are expected to collaborate to produce more comprehensive research to fill this gap. If the gap has occurred, the researcher suggests not to worry, because the results of this study have provided concrete solutions that can be applied, namely by increasing awareness of the importance of technology in religious learning and expanding the framework of deeper research in this field.

Education Policy Regarding the Use of Technology in Islamic Religious Education Learning

The discussion related to education policy regarding the use of technology in Islamic Religious Education (PAI) learning highlights the importance of the role of government and stakeholders in creating policies that support effective technology integration. According to the education policy theory proposed by Anderson (2008), policies must be oriented towards equalizing access to technology across educational institutions, including schools in rural areas. In the context of PAI, the government needs to ensure that education policies do not only focus on providing technological infrastructure, but also

support the development of teacher capacity to utilize technology effectively in religious learning. Without the right policies, the gap between urban and rural areas, as well as between teachers who have technological literacy and those who do not, will widen. In addition, education policies must also include ongoing training for PAI teachers. According to Guskey (2002), effective teacher training must continue to be carried out to ensure that teachers can keep up with technological developments and apply them in teaching.

This study found that structured training can help teachers overcome challenges in the use of technology and strengthen their pedagogical competence. Therefore, policies that encourage increased technological literacy through mandatory training programs for PAI teachers will have a positive impact on the quality of religious learning in the era of the Industrial Revolution 5.0 (Fitria & Subakti, 2022). Furthermore, education policies should include measures to support sustainable technology infrastructure in schools. The results of this study emphasize that technology can only be integrated well if there is equitable access to the internet and digital devices. Therefore, government policies should ensure that there is an adequate budget allocation for the procurement and maintenance of technology infrastructure, especially in areas that are still digitally disadvantaged. The government also needs to involve various stakeholders, including the private sector, in supporting the equitable distribution of technology across regions. Finally, education policies should also support further research on the impact of technology on Islamic Religious Education learning. The results of this study indicate that although technology has great potential to improve religious learning, more research is needed to explore the best ways to integrate technology into Islamic Religious Education curricula. Policies that encourage collaborative research between academics, practitioners, and government will help enrich the literature and provide guidance for teachers and policymakers in the future. Thus, effective education policies related to the use of technology in Islamic Religious Education should focus on equitable access, increasing teacher technological literacy, supporting infrastructure, and developing sustainable research. Only with comprehensive policies can challenges in technology integration be overcome, so that Islamic Religious Education learning can develop in accordance with the demands of the Industrial Revolution 5.0 era (Nugraha & Fauzi, 2020).

Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources. If the 1994 definition laid a strong foundation in the construction of the learning technology field area, then the second definition emphasizes the importance of facilitating learning and improving performance by maximizing the creation, use, and management of appropriate technological resources. According to Januszewski and Molenda (2008) there are seven important things in the definition of modern learning technology that distinguish it from the previous definition, namely: The term used is study and not research (research) indicating that the word study refers to a much broader view compared to various other forms of investigation including reflective practice. Ethical practice becomes a strong commitment to be upheld, and therefore, the

word ethics is not only related to rules and expectations but also becomes the basis of every practice. Even ethical practice is considered very essential in supporting professional success, without ethical considerations, it is impossible for professional success to be achieved. The object of learning technology study is facilitating learning which includes designing learning environments, managing learning resources, providing learning equipment, content (messages) or information storage that becomes learning tasks, and choosing assessment methods to measure the level of achievement of knowledge, skills, and attitudes (Priatna, 2018). Learning is placed at the center of the definition, which means that helping people learn is the main goal of learning technology that can be achieved. That is why all definitions formulated by AECT always place learning as the core of learning technology studies. Performance improvement means the importance of building quality with clear criteria, the goal of facilitating learning is better than other approaches outside of learning technology. In addition, performance improvement refers to the goal of directing learners not to passively pursue knowledge, but to be active and ready to use knowledge, skills, and attitudes.

Describes the main function of learning technology studies is to create, use, and manage as a factual form of the design, development, and evaluation area in the 1994 definition of learning technology. The process related to creating has developed so advanced and changed technology, starting from the study of mass media, then adapted for the purpose of learning films, radio, television, to digital technology and the Internet which have facilitated the implementation of learning. Likewise, using means placing students to become accustomed to appropriate technology sources under conducive learning situations. Then, management in learning technology studies means planning, coordinating, organizing, and supervising sources, information and presentation systems in the context of managing learning design projects. The definition emphasizes the use of equipment and methods must be appropriate, which means appropriate to the people and conditions in which learning occurs (Aryanti et al., 2022; Uswatun Hasanah, 2022).

In general, the current definition of learning technology is a combination of information and communication technology used to improve the learning process, teaching, and development of student abilities. This learning technology includes various ways of using technology, such as: E-learning systems, which are systems used to teach and learn via the internet, such as online platforms, courses, and modules. Multimedia, which is the use of various media such as images, videos, audio, and animations to improve the quality of learning. E-books, which are electronic books that can be accessed via the internet or other devices. Online learning management systems (LMS), which are systems used to organize, manage, and access online learning materials. Podcasting, which is a series of digital audio and audio-visual files that are available for download or streaming. Podcast content can be conversations, interviews, lectures, or even story narratives. Podcasts are made so interesting because they are easy to access and verify by listeners whenever and wherever they are. Video conferencing, which is a technology used to conduct long-distance meetings via video. Simulation, which is the use of technology to simulate real situations and allow students to practice and learn. Gamification, which is

the use of game elements in the learning process to make students more motivated and involved. The purpose of learning technology is to improve the quality of education, improve accessibility, improve the quality of education, improve efficiency, and improve students' abilities in various fields (Sakti, 2025). There are several advantages to using learning technology, including: (a) improving educational accessibility for students who have physical or location difficulties, namely the convenience given to every citizen to use their opportunity to enter an education program, (b) improving the quality of education by using various media and resources, (c) improving efficiency by using technology to organize, manage, and access learning materials, (d) improving students' abilities by using various learning methods and developing soft skills.

However, the use of learning technology also has several disadvantages, such as; (a) relatively high costs to develop and use technology, (b) dependence on the internet and technology that can cause disruption, (c) poor quality learning materials if not on target. Overall, the use of learning technology can be an effective means to improve the quality of education and learning and can quickly develop the abilities possessed by students.

E. Conclusion

The conclusion of this study shows that the integration of technology in Islamic Religious Education (PAI) learning in the Industrial Revolution 5.0 era requires serious attention to aspects of infrastructure, teacher training, and comprehensive education policies. Equal access to technology in schools, especially in remote areas, is key to overcoming the digital divide. In addition, continuous training for PAI teachers is very important to improve their competence in using technology optimally in the learning process. The results of this study also emphasize the importance of government policy support that ensures the development of sustainable technology infrastructure and encourages further research on the impact of technology on PAI learning. Overall, these findings provide a clear direction for improving the quality of religious education in the digital era. The benefits of this study's findings, theoretically, broaden the understanding of how technology can be integrated into PAI learning to improve teaching effectiveness and student engagement. Practically, these findings provide relevant solutions for stakeholders in the field of educational financial management, especially in budget allocation for technology infrastructure and teacher training. With proper financial management, schools and the government can ensure that technology is used efficiently and effectively in supporting learning. However, this study has several limitations, such as focusing on education policies without an in-depth study of socio-cultural factors that may influence the implementation of technology. Future research is expected to explore these aspects and test the effectiveness of various technology training models for Islamic Religious Education teachers in various cultural and geographical contexts.

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