

ANALYSIS OF THE ROLE OF INFORMATION TECHNOLOGY IN STRENGTHENING ISLAMIC RELIGIOUS EDUCATION IN PESANTREN: A STUDY OF DIGITAL TRANSFORMATION

Muhamad Rikza Saputro¹, Mahmud Arif²

^{1,2} FITK UIN Sunan Kalijaga, Indonesia

Email: ¹rikzasaputro1995@gmail.com, ²drmahmud.arif@uin-suka.ac.id

Abstrak

Transformasi digital telah membawa perubahan signifikan dalam berbagai aspek kehidupan, termasuk pendidikan agama Islam di pesantren. Sebagai lembaga pendidikan yang berperan penting dalam membentuk identitas keagamaan dan budaya masyarakat Indonesia, pesantren menghadapi tantangan dalam menyesuaikan diri dengan perkembangan teknologi informasi. Penelitian ini bertujuan untuk menganalisis peran teknologi informasi dalam pendidikan agama Islam di pesantren, meliputi tantangan yang dihadapi, strategi mengatasi kendala, dan dampaknya terhadap proses pembelajaran dan budaya pesantren. Penelitian ini menggunakan metode kualitatif dengan pendekatan fenomenologi. Objek penelitian adalah Pondok Pesantren Askhabul Kahfi dan Roudlotul Muttaqin di Kota Semarang. Data dikumpulkan melalui observasi, wawancara, dan studi dokumen, serta dianalisis menggunakan pendekatan induktif dan deduktif untuk menemukan pola dan makna yang muncul. Keabsahan data dijamin melalui metode triangulasi. Hasil penelitian menunjukkan bahwa pesantren telah mengadopsi teknologi informasi melalui penggunaan platform daring, aplikasi pembelajaran, dan sumber daya digital untuk meningkatkan efektivitas pengajaran. Namun, implementasi transformasi digital dihadapkan pada keterbatasan infrastruktur, pergeseran budaya pesantren tradisional, dan penyesuaian kurikulum. Untuk mengatasi tantangan tersebut, diperlukan peningkatan aksesibilitas teknologi, pelatihan bagi guru dan siswa, serta integrasi nilai-nilai Islam dalam konteks digital. Dampaknya dapat dilihat dari perubahan peran guru dan siswa serta pergeseran budaya pesantren dalam pembelajaran agama. Sebagai kesimpulan, transformasi digital memberikan kontribusi positif bagi pendidikan agama Islam di pesantren, meskipun upaya adaptasi diperlukan agar tetap sejalan dengan nilai-nilai tradisional yang dijunjung tinggi.

Kata Kunci: *Teknologi Informasi, Pendidikan Agama Islam, Pesantren, Transformasi Digital.*



Abstract

Digital transformation has brought significant changes in various aspects of life, including Islamic religious education in pesantren. As an educational institution that plays a vital role in shaping the religious and cultural identity of Indonesian society, pesantren face challenges in adapting to advancements in information technology. This study aims to analyze the role of information technology in Islamic religious education in pesantren, including the challenges faced, strategies to overcome obstacles, and its impact on the learning process and pesantren culture. The study employs a qualitative method with a phenomenological approach. The research objects are Pondok Pesantren Askhabul Kahfi and Roudlotul Muttaqin in Semarang City. Data was collected through observations, interviews, and document studies, and analyzed using inductive and deductive approaches to identify emerging patterns and meanings. Data validity is ensured through triangulation. The results indicate that pesantren have adopted information technology through the use of online platforms, learning applications, and digital resources to enhance teaching effectiveness. However, the implementation of digital transformation is confronted with infrastructure limitations, shifts in traditional pesantren culture, and curriculum adjustments. To address these challenges, improving technology accessibility, training for teachers and students, and integrating Islamic values within the digital context are needed. The impact can be seen in the changing roles of teachers and students and the shift in pesantren culture in religious learning. In conclusion, digital transformation contributes positively to Islamic religious education in pesantren, although adaptation efforts are necessary to maintain alignment with the traditional values upheld.

Keywords: Information Technology, Islamic Religious Education, Pesantren, Digital Transformation.

INTRODUCTION

Islamic religious education in pesantren has become an integral part of the religious and cultural identity of Indonesian society. In facing the digital era, it is important to analyze the role of information technology in strengthening Islamic religious education in pesantren (Nikmatullah et al., 2023). Digital transformation has brought significant changes in various aspects of life, including education. Thus, a comprehensive analysis of how information technology can be effectively applied in the context of Islamic religious education in pesantren becomes very relevant Nuryana, 2019.



Digital transformation in pesantren refers to the process of adopting and utilizing information and communication technology (ICT) in improving the efficiency, effectiveness, and relevance of religious education in the pesantren environment. It involves the integration of digital technologies such as computers, the internet, software applications, and smart devices to strengthen learning, pesantren administration, and proselytization (Halimah et al., 2024; Aziz, 2023).

Digital transformation helps pesantren to better face the challenges of the times, including expanding access to educational resources, improving interaction between teachers and students, and providing a platform to reach a wider audience through social media and other digital platforms (Maulana et al., 2023). With digital transformation, pesantren can increase their competitiveness in providing quality education that is relevant to the demands of the times, while still maintaining the traditional religious and cultural values that characterize pesantren.

Islamic religious education in pesantren is one of Indonesia's rich cultural heritages. However, with the development of information technology in the digital era, pesantren are faced with new challenges in maintaining the relevance and effectiveness of religious education (Mustapa et al., 2023). Digital transformation has brought significant impacts in various aspects of life, including in the context of education (Oliveira & De Souza, 2022; Timotheou et al., 2023). Therefore, it is important to examine the role of information technology in strengthening Islamic religious education in pesantren (Rofi'I, 2023).

Previous studies have shown that the integration of traditional pesantren values and information technology can create an adaptive and relevant model of Islamic education. Halimah et al. (2024) emphasized the importance of an educational model that is responsive to technological developments, while remaining rooted in traditional values. Meanwhile, Nikmatullah et al. (2023) proposed a restructuring of the Islamic education system based on the needs of the digital era through improving human resources, curriculum development, and strengthening pesantren infrastructure. Saputra & Sirozi (2025) also highlighted the importance of digitalization in pesantren through e-learning and social media, as well as the need to develop digital literacy and the production of moderate and



contextual Islamic content to face the challenges of globalization and materialistic culture (Abidin & Murtadlo, 2020; Nurasyiah, Candra Wijaya, 2021; Siregar, 2020; Syamsul Bahri et al., 2023)

However, from these studies, there is still a gap that has not been discussed in depth, namely on how to maintain a balance between digital innovation and the preservation of pesantren culture as an institution full of local and spiritual values. Previous studies have mostly emphasized the importance of technological adaptation or increasing the capacity of human resources, but not many have explicitly reviewed the tension between digital transformation and preservation of traditions. This aspect of balance is important to consider, as pesantren are not only educational institutions, but also centers for the transmission of distinctive cultural and spiritual values. Therefore, this research seeks to fill this void by further examining integrative strategies that are able to combine technological sophistication with the preservation of pesantren cultural identity.

LITERATURE REVIEW

Information Technology

Information technology generally refers to a collection of resources involving information, users, and management that support its operations, including technology infrastructure and related information systems. According to Turban et al. (2018), information technology includes hardware and software used to carry out various data processing functions, such as collecting, transmitting, storing, retrieving, processing, or displaying data. All these processes aim to produce high-quality information which can then be distributed to meet certain needs. Thus, information technology can be defined as technology that helps generate, manipulate, store, and distribute information in various forms to support human activities in various fields (Bukhari, 2021; Fausi, 2020; Indriyani et al., 2022)

The development of information technology has accelerated since the mid-1960s, when many major industrialized countries shifted from manufacturing to services. This phenomenon is then known as the information society, which describes the transformation of society in which information becomes the main commodity. According to Daniel Bell, in (Munti & Syaifuddin, 2020) the information society is characterized by

806



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

increased participation, decentralization, and a spirit of democracy in various aspects of life. This transformation continued to develop until entering the 1990s which was marked by the birth of internet technology. The internet became an important milestone in the development of information technology because of its speed and breadth of influence that made the world seem to be in the grasp of technology. This development was so rapid and unexpected that even experts were amazed at its massive impact on global social and economic life.

One of the sectors affected by the development of information technology is education. In the current era of globalization, the influence of technology on the world of education is inevitable. The world of education is required to be able to adapt to technological developments as an effort to improve the quality of the teaching and learning process. Information technology not only provides convenience in accessing information, but also changes the way teachers deliver material and the way students learn. In education, information technology is not only understood as hardware and software, but as a system that supports the learning process to be more efficient, flexible and accessible. The utilization of ICT in education has proven to have a positive impact, as shown by the research of Azmi (2017), Budiman (2017), and Al Rahmi et al. (2020). These studies concluded that ICT can improve learning effectiveness and student engagement.

Digital Transformation in Education Institutions

In the rapidly evolving digital era, the world of education cannot escape the influence of the technological revolution that is changing various aspects of life. Digital transformation has affected the way we access and interact with information, including in education (Azmi, 2017). The shift from traditional learning methods to the utilization of digital technology has created great opportunities to improve the quality and reach of education. Educational institutions are now not only required to use technological tools, but also to change the way of thinking in managing the learning process and institutional management as a whole (Budiman, 2017).

In pesantren as Islamic educational institutions that are full of traditional and conservative values, digital transformation is both a challenge and an opportunity. Although pesantren are known as



institutions that prioritize classical approaches in religious education, technological advances require pesantren to adapt to remain relevant in the midst of changing times (Nikmatullah et al., 2023). The application of information technology in learning in pesantren does not necessarily erase its traditional identity, but rather becomes a means to strengthen the role of pesantren in responding to the needs of the younger generation. Through directed digitalization, pesantren are able to present Islamic material in a more interesting, interactive, and easily accessible way for students.

Research conducted by (Subahri & Khosim (2024), and Saputra & Sirozi (2025), confirmed the importance of utilizing information technology in strengthening Islamic religious education in pesantren. The research recommends a digital approach as a strategy to expand the reach of da'wah and increase the competitiveness of pesantren in the global era. Technology can be used to convey Islamic values through various digital platforms such as e-learning, social media, and online learning applications. Thus, digital transformation is not just a response to the times, but also a strategic step to maintain the relevance and sustainability of Islamic education in pesantren.

RESEARCH METHODS

This research uses a qualitative approach with a phenomenological method. The phenomenological approach was chosen because it helps researchers to deeply understand the subjective experiences of educational actors in pesantren in facing the digital era, especially related to the integration of information technology in the Islamic learning process. Phenomenology focuses on the meaning of life experience from the perspective of the subject who experiences it, so this approach is relevant to explore the perspectives, perceptions, and dynamics of socio-cultural adaptations that occur in pesantren in responding to digital transformation. Thus, this approach encourages a more comprehensive exploration of the practices, values, and strategies of pesantren in maintaining Islamic identity while innovating technologically. The objects of this research are two pesantren in Semarang City, namely Askhabul Kahfi Islamic Boarding School and Roudlotul Muttaqin Islamic Boarding School. Both were chosen because they have representative characteristics in facing the challenges of digitalization, both in terms of learning methods, the use of information and communication technology (ICT), and responses to socio-cultural changes.

808



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

This research focuses on how these two pesantren integrate technology in Islamic religious education and its impact on institutional transformation and traditional pesantren values.

Data collection was conducted through three main techniques: in-depth interviews, participatory observation, and document study. Semi-structured interviews were conducted with pesantren leaders, teachers, and santri to gain an understanding of their experiences and strategies in dealing with digitalization. Observations were conducted in the pesantren environment to observe the application of technology in learning activities, as well as changes in the social interactions of santri and teachers. The document study included an analysis of the curriculum, digital learning tools, as well as relevant internal pesantren documents. To ensure data validity, this study applied triangulation by comparing the results of interviews, observations, and documents, and involving various sources of informants from two different locations.

Data analysis was conducted qualitatively with three main stages, data reduction, data presentation, and conclusion drawing. Data reduction was carried out by sorting out relevant and meaningful information to focus on the main themes related to technology integration and pesantren transformation. Data presentation was organized systematically in narrative form to show the relationship between findings. Furthermore, conclusion drawing is done through in-depth interpretation of the meaning of the subject's experience, associated with the social, cultural, and religious contexts behind the digitalization process in pesantren. Through this approach, this research seeks to provide a complete and meaningful picture of the dynamics of pesantren transformation in the digital era.

RESULTS AND DISCUSSION

The role of Information Technology in Islamic religious education in pesantren

Pesantren as traditional Islamic educational institutions are now facing the digital era that brings significant changes. Digital transformation offers various opportunities to strengthen Islamic religious education in pesantren, but also presents its own challenges. The following are some of the roles of the use of Information Technology in Islamic religious education in pesantren.

809



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

1) Provision of Interactive Learning Resources.

Information technology has opened up various opportunities for pesantren to improve the way they teach Islam. One of them is by providing more interactive and interesting learning resources for the students (Fitria, 2025). For example, learning videos can provide a clearer understanding of various aspects of Islamic teachings, while mobile applications offer easy access to learning anytime and anywhere. In addition, online platforms are also increasingly used to organize religious studies, discussions, and virtual classes that students can participate in without geographical restrictions (Anwas 2025). Thus, information technology helps pesantren to enrich the Islamic learning experience in a more dynamic and flexible way, in accordance with the times. The following is the utilization of information technology in pesantren that supports the effectiveness of Islamic learning, such as:

- a) Learning Videos: Pesantren can create or access interesting and informative Islamic religious learning videos. These videos can include lectures, discussions, demonstrations of religious practices, and other materials. With learning videos, pesantren can provide a more visual and engaging learning experience for santri, helping them to better understand Islamic concepts.
- b) Mobile Application: The development of specialized mobile applications for pesantren allows easy access to various learning materials, activity schedules, important information, and interaction between teachers and students. These applications can be designed according to the needs of the pesantren and provide convenience for santri in accessing learning materials anywhere and anytime.
- c) Online Platform: Pesantren can use an online platform or LMS (Learning Management System) to provide learning materials, assignments, exams, and interaction between teachers and students online. With an online platform, pesantren can organize learning in a structured manner, provide immediate feedback, and facilitate collaboration between students in the learning process.

By providing interactive learning resources such as learning videos, mobile applications, and online platforms, pesantren can enrich the Islamic learning experience for santri, improve the quality of learning, and prepare them to face the challenges of an increasingly digital age (Muchasan et al., 2024).



2) Use of Multimedia Media

Pesantren can optimize the use of multimedia media as one of the effective strategies in delivering Islamic religious materials to students. Pesantren can utilize multimedia media such as text, images, audio, video, and animation to convey Islamic religious material more interestingly and effectively to santri (Alam & Iqbal, 2024). The use of this technology makes the learning process in pesantren more interactive and makes it easier for students to understand the Islamic concepts taught. The following are various media that can be utilized by pesantren in learning media to students:

- a) Text: Pesantren can use texts to convey Islamic religious materials through articles, e-books, or other reading materials. Texts provide an important basis of information in learning.
- b) Images: The use of images helps visualize Islamic concepts, clarifies understanding, and makes learning more interesting. Images can also be used to illustrate history, culture and values in Islam.
- c) Audio: The use of audio, such as voice recordings of lectures or recitation of the Qur'anic verses, helps students to better understand tajweed, meaning, and appreciation of the Qur'anic recitation.
- d) Video: Islamic learning videos can feature simulations, demonstrations of worship practices, or discussions between scholars. Videos have a high appeal and allow students to learn visually.
- e) Animation: Animation can be used to convey complex Islamic concepts in a simpler and more interesting way. Animation can create an interactive learning environment and trigger the imagination of santri.

Utilizing various multimedia media, pesantren can deliver Islamic religious material in a more interesting, varied, and effective way to santri, thus increasing their understanding and appreciation of Islamic teachings (Arwani, 2011).

3) Increased Accessibility.

The utilization of information technology in pesantren opens up great opportunities in increasing the accessibility of Islamic religious education for santri. Through the use of information technology, pesantren can increase the accessibility of Islamic religious education by providing online courses, webinars, and online learning content that can be accessed by students from anywhere (Muchasan & Rohmawan, 2024). The following are some of the uses of information technology in



Islamic religious learning, to help increase the accessibility of learning, such as:

- a) Online Courses: Pesantren can provide online courses to allow santri to access Islamic religious education without having to be physically present at the pesantren location. This allows wider access to education for those who cannot attend the pesantren in person.
- b) Webinars: Through information technology, pesantren can organize webinars or online seminars on various topics related to Islam. These webinars can be attended by students from various locations, expanding the scope of the pesantren and giving them the opportunity to learn from experts without having to move.
- c) Online Learning Content: Pesantren can create online learning content that includes Islamic religious materials in various formats, such as videos, articles, and interactive quizzes. In this way, santri can access learning materials anytime and from anywhere according to their needs.

Through the utilization of information technology such as online courses, webinars, and online learning content, pesantren can increase the accessibility of Islamic religious education for santri from various backgrounds and geographical locations. This opens up opportunities for more individuals to obtain quality religious education without being limited by geographical or physical boundaries (Muchasan & Rohmawan, 2024).

- 4) Development of Effective Learning Models : Information technology enables pesantren to develop effective learning models by utilizing digital learning platforms, interactive simulations, and integrated learning management systems (Niswah et al., 2024).
 - a) Digital Learning Platform: Pesantren can use digital learning platforms, such as Learning Management Systems (LMS), to provide online learning content, assignments, exams, and discussions. This allows easy access for santri and facilitates interaction between students and teachers virtually.
 - b) Interactive Simulations: With information technology, pesantren can create interactive simulations for complex Islamic religious materials, such as Hajj, worship, or Islamic history. These simulations allow santri to learn practically and deeply, improving their understanding of the concepts.
 - c) Integrated Learning Management System: Pesantren can use an integrated learning management system that allows teachers to track



santri's learning progress, provide feedback, and develop a curriculum tailored to individual needs. This system helps improve the efficiency and effectiveness of learning in pesantren.

Through the use of information technology such as digital learning platforms, interactive simulations, and integrated learning management systems, pesantren can develop effective learning models. This not only improves the quality of Islamic religious education delivered, but also helps prepare santri to face challenges in the digital era (Rajab et al., 2020).

- 5) **Encouraging Teacher Creativity:** The utilization of information technology encourages teacher creativity in designing innovative and interesting learning materials for students, improving the quality of the Islamic learning process in pesantren.
 - a) **Information Technology Utilization:** Teachers can use information technology to access diverse educational resources and develop creative learning materials. They can integrate videos, animations, and interactive applications in Islamic religious learning to make it more interesting and relevant for santri.
 - b) **Designing Innovative Learning Materials:** With information technology, teachers can design innovative learning materials according to the needs and interests of santri. They can use creative tools such as graphic design software, multimedia content creators, and e-learning platforms to create unique and engaging learning experiences.
 - c) **Improving the Quality of the Learning Process:** The utilization of information technology allows teachers to provide more interactive, adaptive, and personalized learning. They can use features such as online quizzes, discussion forums, and automated assessments to improve the quality and efficiency of the Islamic learning process in pesantren.

By encouraging teacher creativity through the use of information technology, pesantren can improve the quality of the Islamic learning process. Teachers who are creative in designing innovative and interesting learning materials will help motivate santri to learn better and deepen their understanding of Islamic teachings (Oktaviani, 2023).

- 6) **Technology Integration in Pesantren Management:** In addition to the learning process, information technology can also be integrated in pesantren management, including administration, internal



communication, and tracking the development of santri. The integration of technology in pesantren management has a positive impact on various aspects, including administration, internal communication, and monitoring the development of santri (Ritonga, 2020). The following is a description of technology integration in pesantren management:

- a) **Administration:** Information technology enables the automation of pesantren administration, such as the management of santri data, finances, and inventory. Technology-based pesantren management systems can help optimize administrative processes with higher efficiency and accuracy.
- b) **Internal Communication:** Digital platforms such as instant messaging applications and communication portals facilitate internal communication between pesantren administrators, teachers, and administrative staff. This speeds up the flow of information, facilitates coordination, and increases the effectiveness of teamwork in pesantren (Muchasan & Rohmawan, 2024).
- c) **Tracking Santri Progress:** The pesantren management system can be equipped with the feature of tracking the progress of individual santri. This allows for better supervision of the academic aspects, extracurricular activities, and personal development aspects of the santri. Digitally recorded data facilitates more personalized and effective evaluation and learning planning.

With the integration of technology in pesantren management, these educational institutions can increase operational efficiency, improve internal communication, and provide better services to students and other stakeholders.

Challenges And Obstacles In Implementing Digital Transformation

From this explanation, it can be seen that the use of technology in learning in pesantren brings many positive benefits, but in its application there are various challenges and obstacles that must be faced in implementing digital transformation in Islamic religious education. Therefore, an appropriate strategy is needed to overcome these obstacles so that the utilization of technology can run optimally. The challenges and obstacles faced by pesantren in implementing digital transformation in Islamic religious education include:

- 1) **Limited Access and Infrastructure:**

Pesantren in remote areas face various obstacles in adopting digital learning, mainly due to limited stable internet access and



adequate technology infrastructure. The absence of hardware such as computers, weak Wi-Fi networks, and unstable electricity supply are the main obstacles in supporting the effective use of online learning platforms. These conditions hinder the integration of technology in the teaching and learning process and widen the digital divide between pesantren in urban and rural areas.

2) Lack of Skilled Human Resources

The limited technological skills and understanding of pesantren teaching and management staff can be an obstacle in adopting and using digital technology effectively. The lack of skilled human resources in terms of technological skills and understanding can be an obstacle in adopting and using digital technology effectively in pesantren. This can be described as follows:

- a) Limited Technological Knowledge: The teaching staff and managers of pesantren may have limited knowledge of digital technology. They may not be familiar with the basic concepts of digital technology or how to integrate it in the learning process.
 - b) Lack of Practical Skills: In addition to knowledge, practical skills in using software, applications, and technology platforms may also be limited. This can make it difficult to implement effective digital learning in pesantren.
 - c) Mistrust or Fear of Technology: Some pesantren teaching staff and managers may not trust or feel afraid to use digital technology. They may be concerned about difficulties in learning or changes in their traditional way of teaching.
- ## 3) Resistance to Change

Some parties in pesantren may be reluctant to change the traditional methods of learning Islam with digital technology due to cultural or belief considerations. Resistance to change related to the use of digital technology in pesantren can be caused by several factors, including cultural or belief considerations. The following is an explanation of this resistance:

- a) Cultural Considerations: Some parties in pesantren may have a tendency to maintain traditions and culture that have existed for many years. The introduction of digital technology could be perceived as an intervention that disrupts traditional values or the established social order.



- b) **Belief in Traditional Methods:** Some people may believe that traditional methods of learning Islam have proven effective over the years, so they feel no need or even refuse to adopt digital technology as a new learning tool.
 - c) **Uncertainty or Fear:** It is also possible that some parties in pesantren feel uncomfortable or fear the changes that digital technology brings. They may worry about the impact on the identity of the pesantren or may have difficulty in adjusting to the changes.
- 4) **Concerns of Negative Influence**

There are concerns related to the negative influence of digital technology, such as access to inappropriate content or disrupting the lives of santri. Concerns about the negative influence of digital technology in pesantren cover several aspects, including access to inappropriate content and disruption to students' lives. The following is the explanation:

- a. **Access to Inappropriate Content:** The use of digital technologies, such as the internet, can open access to content that is inappropriate or incompatible with Islamic religious values. This can include pornographic content, violence, or material that contradicts religious teachings.
- b. **Disruption to Santri Life:** Excessive use of digital technology, such as addiction to social media or online games, can disrupt the daily lives of santri. This can affect concentration in learning, sleep, and healthy social interactions.

Solutions to overcome the challenges of implementing information technology in pesantren

1. **Infrastructure Improvement:** Improving internet access and adequate technology infrastructure to support digital learning in pesantren (Haris, 2023).
 - a. **Better Internet Access:** By improving internet access in pesantren, students and teachers can access digital resources such as e-books, online learning platforms, and learning videos more easily and quickly. This will help enrich the learning experience of the students and improve efficiency in the learning process.
 - b. **Adequate Technology Infrastructure:** Pesantren need to update their technology infrastructure, including the necessary hardware and software to support digital learning. This includes the procurement of computers, mobile devices, stable internet



networks, as well as the development of digital learning platforms that suit the needs of pesantren (Yamani, 2022).

- c. Development of a Robust Internet Base: Infrastructure upgrades also include building a robust internet base that can handle higher usage loads and provide stable connectivity for users. This ensures that the digital learning process can run smoothly without interruptions due to slow or intermittent connections.

By improving infrastructure like this, pesantren can more effectively adopt digital learning and provide a better learning experience for their students.

2. Human Resource Training and Development: Conduct regular training for teaching staff and pesantren managers to have sufficient skills and knowledge in the use of digital technology. Conducting training and development of human resources (HR) is an important step to improve the skills and knowledge of teaching staff and pesantren managers in the use of digital technology. The following is a description and explanation related to this:

- a. Regular Training: Pesantren can organize regular training for teaching and management staff, which includes the use of digital technology. This training can include the use of online learning software, management of digital platforms, and the application of technology in pesantren administration
- b. Improving Skills: This training aims to improve staff skills in operating digital technologies such as computers, mobile devices, and online learning applications. They will learn how to utilize these technologies to enrich the learning process and pesantren administration (Yuliani et al., 2023).
- c. Expanding Knowledge: Training also helps teaching and management staff to understand new concepts in digital technology that are relevant to the educational context. They will learn effective teaching strategies using technology, as well as understand the benefits and challenges in adopting digital technology in pesantren.

Through regular training and human resource development, pesantren teaching staff and managers will be able to face the digital era more confidently and effectively utilize technology to improve the quality of education in pesantren.

3. Education and Communication Campaign: Providing a better understanding of the benefits of digital technology and how to positively integrate it in Islamic religious education to the entire



pesantren community. The Education and Communication Campaign is an effort to provide the entire pesantren community with a better understanding of the benefits of digital technology and how to positively integrate it in Islamic religious education. The following is the description and explanation:

- a. Introduction of Benefits: This campaign aims to introduce the benefits of digital technology in improving the efficiency, accessibility, and quality of Islamic religious education. These include advantages such as easy access to online learning resources, collaboration between pesantren, and innovation in learning methods (Muchasan & Rohmawan, 2024).
- b. Emphasis on Positive Integration: The campaign emphasizes the importance of integrating digital technology positively, in accordance with the values and principles of Islamic religious education. This includes using technology to broaden religious understanding, facilitate scripture study and strengthen religious identity.
- c. Training and Workshops: In addition to campaigns, trainings and workshops can be organized to support a deeper understanding of the use of digital technologies in Islamic religious education. This includes practical training on the use of apps, online learning platforms, and technology integration strategies in the Islamic curriculum (Firman et al., 2021).

Through this campaign, pesantren can change the view of digital technology from being an additional tool to an integral part of developing modern and effective Islamic religious education.

4. Policy Implementation and Supervision: Implement policies that ensure the safe and beneficial use of digital technology, and supervise digital content and activities carried out by santri (Rustandi & Kusnawan, 2023). The implementation of policies and supervision related to the use of digital technology in pesantren is an important step to ensure its safety and benefits as well as to supervise the digital content and activities of santri.
 - a. Technology Use Policy: Pesantren need to formulate clear policies related to the use of digital technology, including limiting access to inappropriate content and setting standards for safe and beneficial use for santri.
 - b. Supervision of Digital Activities: Pesantren institutions need to actively supervise digital activities carried out by santri, such as the use of social media, internet browsing, and the use of applications.



This can be done through network monitoring, security software, and direct involvement of supervisors (Ning Safitri, 2020).

- c. Education and Training: In addition to policies and supervision, pesantren also need to provide education and training to santri on the responsible and ethical use of digital technology. This includes understanding the risks and consequences of inappropriate content as well as improving digital literacy (Muttaqien & Ripai, 2023).
- d. Collaboration with Parents and Communities: Collaboration between pesantren, parents, and the community is also important to support the implementation of this policy and supervision. This ensures consistency and support in supervising the use of digital technology by santri in the pesantren environment and outside learning hours (Muttaqien & Ripai, 2023).

By implementing appropriate policies and conducting careful supervision, pesantren can ensure that digital technology is used safely, beneficially, and in accordance with the values of Islamic religious education.

The Role Of Teachers And Santri

In addition to facing various challenges and obstacles, the application of information technology in pesantren education also has a significant impact on the role of teachers and students, and affects the overall culture and traditions of pesantren. This digital transformation not only changes learning methods, but also shifts the way teachers and students interact and how traditional values are maintained in the midst of technological developments.

1. Teacher's Role

- a. Use of Technology in Learning: Teachers must adapt traditional teaching methods with digital technology to facilitate more interactive and effective learning (Junaidi et al., 2024). The use of technology in learning requires teachers to adapt traditional teaching methods with digital technology in order to facilitate more interactive and effective learning. This involves several steps and strategies:
 - 1) Integration of Technology in Curriculum: Teachers need to understand how to integrate digital technology into their learning curriculum to create diverse and engaging learning experiences for students.



- 2) Utilization of Digital Learning Tools: Teachers can use various digital learning tools such as multimedia presentations, learning videos, educational games, and online learning platforms to enrich students' learning experience.
- 3) Collaboration and Interaction: Digital technology allows teachers to create a collaborative and interactive learning environment, where students can be actively involved through online discussions, forums and collaborative projects.
- 4) Personalization of Learning: With technology, teachers can customize learning according to students' individual needs and interests, allowing each student to learn at their own pace.
- 5) Evaluation and Feedback: Teachers can use technology to conduct formative and summative evaluations, and provide feedback directly to students, facilitating an adaptive and continuous learning process.

By adapting traditional teaching methods with digital technology, teachers can create more engaging, relevant and effective learning experiences for their students.

- b. Training and Development: Teachers need to undergo regular training to understand and master the digital tools and technologies used in education (Muttaqien & Ripai, 2023). Teachers need to undergo regular training to understand and master the digital tools and technologies used in education. This is important because:
 - 1) Improved Digital Literacy: Training helps teachers improve their digital literacy, understand the basic concepts of technology, and master the use of digital tools in the context of learning.
 - 2) Integrating Technology in Learning : Training helps teachers understand how to integrate digital technology into their curriculum and teaching methods, so as to create more engaging and effective learning experiences for students.
 - 3) Improving the Quality of Learning: By understanding and mastering digital technology, teachers can create a more interactive, collaborative and personalized learning environment, which can improve the quality of learning and achieve better learning objectives.
 - 4) Adaptation to Change: Through regular training, teachers can keep abreast of technological developments and update their skills as needed, so as to remain relevant in the face of ongoing changes in digital education.



Thus, training and development are key for teachers in adopting digital technology in education, ensuring that they can provide the best learning experience for their students.

2. Role of Santri

a. Greater Access to Information: Santris have wider access to learning resources and information through the internet, allowing them to learn independently and gain deeper knowledge. The role of santri in having broad access to information through the internet has a significant impact in the context of pesantren education (Muid et al., 2024). This is due to several factors, among others:

- 1) Wider Access: Santris have the ability to access various learning resources and information online through the internet. This allows them to obtain additional learning materials that are not available in the pesantren environment directly.
- 2) Independent Learning: With wider access to information, santri can study independently outside of official class hours at the pesantren. They can explore topics that interest them and explore the knowledge they want, thus increasing their motivation and learning independence (Mukhlisin et al., 2021).
- 3) Development of Deeper Knowledge: Through online exploration, students can gain deeper knowledge on various topics, including religion, science, and culture. This allows them to develop a more comprehensive and in-depth understanding of various aspects of life.

Thus, the wide access to information through the internet gives santri the opportunity to learn independently, develop deeper knowledge, and become more active contributors in the context of pesantren education.

b. Technology Skills: Santri need to have sufficient technological skills to utilize digital resources effectively in learning and daily activities (Ning Safitri, 2020). The role of santri in technological skills is very important in facing the current digital era. Here are some points that explain their role in this regard:

- 1) Utilizing Digital Resources: Santris need to have technological skills to effectively use digital resources such as the internet, learning applications, and other supporting software in the learning process at pesantren (Ghoniyyul Hamid et al., 2023).



- 2) Active Learning: With adequate technological skills, santri can engage in active learning involving online platforms, online discussions, and access to diverse educational resources. This helps to improve their understanding of the subject matter and broaden their knowledge horizons (Ghoniyyul Hamid et al., 2023).
- 3) Creativity Development: Technology skills also allow santri to develop their creativity in creating digital content, such as learning videos, blogs, or social media that support learning and knowledge sharing.

Thus, santri's technological skills play a key role in facilitating effective learning and preparing them to face technological challenges in their daily activities in the digital era. Pesantren Culture and Tradition:

- a. Influence on Interaction Patterns: Digital transformation can change the interaction patterns between teachers and students, as well as between fellow students, affecting the social and cultural dynamics in pesantren.
- b. Shifting Priorities: Shifting priorities from traditional activities to digital activities can affect the values and norms upheld in pesantren culture (Haris, 2023).

So based on this explanation, it can be concluded that digital transformation plays an important role in strengthening Islamic religious education in pesantren. However, adaptation to technology must still pay attention to the preservation of traditional pesantren values. Appropriate application of information technology allows pesantren to improve accessibility, effectiveness, and quality of learning without abandoning the traditional values that have become its identity. With a balanced approach, pesantren can adapt to the times while maintaining the essence of Islamic values-based education. Therefore, digital transformation is not only a tool, but also part of the innovation in maintaining the relevance of pesantren education in the modern era.

CONCLUSION

Findings from the research show the importance of digital transformation that has brought significant changes in Islamic religious



education in pesantren. The utilization of information technology, such as online platforms, learning applications, and digital resources, has increased santri's access to learning materials as well as supporting the self-learning process. This broadens their horizons and deepens their understanding of Islamic teachings. However, the implementation of digital transformation in pesantren is not free from challenges. Limited technological infrastructure, traditional pesantren culture, and the need to adjust the curriculum and teaching methods are the main obstacles. To overcome these obstacles, it is necessary to increase the accessibility of technology, training for teachers and students, and the integration of religious values in the use of technology so that it remains in line with the character of pesantren. In addition, digital transformation also impacts the role of teachers and students as well as the overall culture of the pesantren. Greater access to information and new learning methods change the pattern of interaction in the pesantren environment. Nevertheless, adaptation to technology must still pay attention to the preservation of traditional pesantren values. It can be concluded that digital transformation makes a positive contribution to strengthening Islamic religious education in pesantren. With the right strategy, pesantren can optimally utilize information technology to improve the quality of education, while still maintaining the Islamic values and traditions that characterize pesantren.

BIBLIOGRAPHY

- 1) Abidin, A. A., & Murtadlo, M. A. (2020). Curriculum Development of Multicultural-Based Islamic Education As an Effort To Weaver Religious Moderation Values in Indonesia. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 2(1), 29-46. <https://doi.org/10.47006/ijierm.v2i1.30>
- 2) Alam, L., & Iqbal, M. (2024). Transforming Religious Learning: Empowering Faith Through Virtual Congregation In Indonesia. *HUNAFa Jurnal Studia Islamika*, 21(1), 1-24. <https://doi.org/10.24239/jsi.v21i1.747.1-24>



- 3) Al-Rahmi, W. M., Alzahrani, A. I., Yahaya, N., Alalwan, N., & Kamin, Y. B. (2020). Digital communication: Information and communication technology (ICT) usage for education sustainability. *Sustainability*, 12(12), 5052. <https://doi.org/10.3390/su12125052>
- 4) Anwas, O. M. (2015). Pemanfaatan teknologi informasi dan komunikasi pada pesantren rakyat Sumber Pucung Malang. *Jurnal Pendidikan Dan Kebudayaan*, 21(3), 207-220. <https://doi.org/10.24832/jpnk.v21i3.187>
- 5) Arwani, A. (2011). Pembelajaran pendidikan agama Islam berbasis multimedia. 5. Aziz, S. U. (2023). The Role of Pesantren as Traditional Islamic Education Institutions in the Digital Era. *Al Hikmah: Jurnal Studi Keislaman*, 13(02), 98-112. <https://doi.org/10.36835/hjsk.v13i02.4061>
- 6) Azmi, N. (2017). The benefits of using ICT in the EFL classroom: From perceived utility to potential challenges. *Journal of educational and social research*, 7(1), 111-118.
- 7) Budiman, H. (2017). Peran teknologi informasi dan komunikasi dalam pendidikan. *Al-Tadzkiyyah: Jurnal Pendidikan Islam*, 8(1), 31-43. <https://doi.org/10.24042/atjpi.v8i1.2095>
- 8) Bukhari. (2021). Innovation of Islamic Religious Learning Based on Multiculturalism. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 3(2), 61-62. <https://doi.org/10.47006/ijierm.v3i2.88>
- 9) Fausi, A. F. (2020). Implementing Multicultural Values of Students Through Religious Culture in Elementary School Islamic Global School Malang City. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 2(1), 62-79. <https://doi.org/10.47006/ijierm.v2i1.32>
- 10) Firman, F. M., Syakir, S. J., & Athaya, A. Z. (2021). Penggunaan literasi digital dalam pembelajaran agama Islam pada asrama mahasiswa Panrannuangku Takalar Yogyakarta. *Prosiding Seminar Nasional Program Pengabdian Masyarakat*. <https://doi.org/10.18196/ppm.33.152>
- 11) Fitria, Y. (2023). Pemanfaatan Teknologi Informasi Dan Komunikasi Sebagai Sumber Belajar Peserta Didik Di Sekolah. *Didaktik: Jurnal*



- Ilmiah PGSD STKIP Subang, 9(5), 4175-4189.
<https://doi.org/10.36989/didaktik.v9i5.2408>
- 12) Ghoniyyul Hamid, M., Studi Manajemen Alamat, P., Lingkar Timur, J., & Kidul Kab, R. (2023). Optimalisasi peran santri pondok pesantren di era digital dalam mewujudkan kemampuan berwirausaha. *Student Scientific Creativity Journal (SSCJ)*, 1(5).
<https://doi.org/10.55606/sscj-amik.v1i5.1875>
- 13) Halimah, S., Yusuf, A., & Safiudin, K. (2024). Pesantren education management: The transformation of religious learning culture in the age of disruption. *Nidhomul Haq: Jurnal Manajemen Pendidikan Islam*, 9(3), 648-666. <https://doi.org/10.31538/ndhq.v9i3.16>
- 14) Haris, M. A. (2023). Urgensi digitalisasi pendidikan pesantren di era Society 5.0 (Peluang dan tantangannya di Pondok Pesantren Al-Amin Indramayu). *Islamic Management: Jurnal Manajemen Pendidikan Islam*, 6(01), 49-64.
<https://doi.org/10.30868/im.v4i02.361>
- 15) Indriyani, D., Imron, A., & Deni Wijayatiningsih, T. (2022). ACCEPTANCE OF INTERFAITH VALUES: A CASE STUDY OF ISLAMIC RELIGIOUS EDUCATION IN NON-MUSLIM STUDENTS. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 4(1), 28-39.
<https://doi.org/10.47006/ijierm.v4i1.146>
- 16) Junaidi, K., Hitami, M., & Zaitun, Z. (2024). Dampak Transformasi Digital terhadap Metode Pengajaran di Pondok Pesantren Kabupaten Kampar: Peluang dan Tantangan. *Instructional Development Journal*, 7(1), 173-184.
- 17) Mukhlisin, M., Isnaeni, F., Nurjaya, N., Mukhoyyaroh, M., & Masyhuri, A. A. (2021). Urgensi literasi digital bagi santri milenial di Pondok Pesantren Rahmatutthoyibah Al Iflahah Gunung Kaler Tangerang. *Jurnal Pengabdian Kepada Masyarakat (JPKM)-Aphelion*, 1(2), 208.
- 18) Maulana, R., Muzakky, R., Mahmuudy, R., & Faristiana, A. R. (2023). Transformasi pesantren menghadapi era revolusi digital 4.0. 1(3).
<https://doi.org/10.59246/aladalah.v1i3.371>



- 19) Muchasan, A., & Rohmawan, D. (2024). Pemanfaatan teknologi di pesantren (Dampak dan solusi dalam konteks pendidikan). INOVATIF: Jurnal Penelitian Pendidikan, Agama, dan Kebudayaan, 10(1), 16–33. <https://doi.org/10.55148/inovatif.v10i1.849>
- 20) Muchasan, A., Syam, N., & Humaidi, A. (2024). Use of technology in Islamic boarding schools (Impact and solutions in educational context).
- 21) Muid, A., Arifin, B., & Karim, A. (2024). Peluang dan Tantangan Pendidikan Pesantren di Era Digital (Studi Kasus di Pondok Pesantren Al-Islah Bungah Gresik). MODELING: Jurnal Program Studi PGMI, 11(1), 512-530. <https://doi.org/10.69896/modeling.v11i1.2254>
- 22) Munti, N. Y. S., & Syaifuddin, D. A. (2020). Analisa dampak perkembangan teknologi informasi dan komunikasi dalam bidang pendidikan. Jurnal Pendidikan Tambusai, 4(2), 1799-1805.
- 23) Mustapa, K., Gagaramusu, Y. B. M., Palandi, E. H., Syakhrani, A. W., & Towpek, H. (2023). Technology-enhanced education: Nurturing the digital generation-experiences in Islamic schools in Indonesia. International Journal of Teaching and Learning, 1(1), 16-40.
- 24) Muttaqien, A. Z. M. Z., & Ripai, A. (2023). Implementasi pemasaran digital di Pondok Pesantren Al-Multazam dalam upaya meningkatkan minat calon peserta didik. JIEM (Journal of Islamic Education Management), 7(2), 206–217.
- 25) Nikmatullah, C., Wahyudin, W., Tarihoran, N. A., & Fauzi, A. (2023). Digital Pesantren: Revitalization of the Islamic Education System in the Disruptive Era. Al-Izzah: Jurnal Hasil-Hasil Penelitian, 1-14. <http://dx.doi.org/10.31332/ai.v0i0.5880>
- 26) Ning Safitri, T. (2020). Potensi santri dalam transformasi digital literacy memasuki era revolusi industri 4.0 di pondok pesantren modern. 6(2).
- 27) Niswah, S. A., Asiyah, N., Nasikhin, N., & Wahyudi, W. (2024). Technology-Based Education Management In Salaf Islamic Boarding Schools. Evaluasi: Jurnal Manajemen Pendidikan Islam, 8(2), 270-292. <https://doi.org/10.32478/pzx84n77>



- 28) Nuryana, Z. (2019). Pemanfaatan teknologi informasi dalam pendidikan agama Islam. TAMADDUN, 19(1), 75. <https://doi.org/10.30587/tamaddun.v0i0.818>
- 29) Nurasyiah, Candra Wijaya, S. N. (2021). the Influence of Learning Strategies and Logical Thinking Skills on the Learning Outcomes of Islamic Religious Education and Ethics. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 3(3), 197–215. <https://doi.org/10.47006/ijierm.v3i3.122>
- 30) Oktaviani, N. (2023). Kreativitas guru dalam inovasi pendidikan di Indonesia.
- 31) Oliveira, K. K. D. S., & De Souza, R. A. (2022). Digital transformation towards education 4.0. *Informatics in Education*, 21(2), 283-309.
- 32) Rajab, R., Zulmuqim, Z., & Hidayatullah, R. (2020). Pengembangan model pembelajaran berbasis teknologi informasi pada pesantren di Sumatera Barat. *Ta'allum: Jurnal Pendidikan Islam*, 8(2), 246–266. <https://doi.org/10.21274/taalum.2020.8.2.246-266>
- 33) Ritonga, M. (2020). Internet, Pesantren and management strategies educational building. *Pesantren and Management Strategies Educational Building* (April 1, 2020).
- 34) Rofi'i, A. (2023). Penerapan teknologi informasi dalam manajemen pendidikan Islam: Tantangan dan peluang. *JIEM (Journal of Islamic Education Management)*, 7(2), 157–163. <https://doi.org/10.24235/jiem.v7i2.14964>
- 35) Rustandi, R., & Kusnawan, A. (2023). Management of Islamic Boarding Schools in the Implementation of Digital Da'wah Literacy Based on Religious Moderation and Gender Relations in West Java. *Jurnal Dakwah Risalah*, 34(1), 72-91. <https://doi.org/10.24014/jdr.v34i1.24545>
- 36) Saputra, D. E., & Sirozi, M. (2025). Strategi Penguatan Daya Saing Pesantren Di Era Digital. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 10(01), 85-99. <https://doi.org/10.23969/jp.v10i01.20618>
- 37) Siregar, A. (2020). Religious Foundation in Guidance and Counseling. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 1(1), 51–62. <https://doi.org/10.47006/ijierm.v1i1.15>



- 38) Subahri, B., & Khosim, M. (2024). Edukasi Dakwah Berbasis Teknologi Perspektif Psikologi Pendidikan. *Dakwatuna: Jurnal Dakwah Dan Komunikasi Islam*, 10(1), 50-60.
<https://doi.org/10.54471/dakwatuna.v10i1.2924>
- 39) Syamsul Bahri, Djunaidi Ghony, & Hasan Busri. (2023). Implementation Of Multicultural Islamic Religious Education Learning In Sd Taman Harapan And Sd Bina Budi Mulia Malang City. *International Journal of Islamic Education, Research and Multiculturalism (IJIERM)*, 5(1).
<https://doi.org/10.47006/ijierm.v5i1.208>
- 40) Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., ... & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and information technologies*, 28(6), 6695-6726
- 41) Turban, E., Pollard, C., & Wood, G. (2018). *Information technology for management: On-demand strategies for performance, growth and sustainability*. John Wiley & Sons
- 42) Yamani, A. Z. (2022). Optimalisasi pemanfaatan platform digital untuk kegiatan ngaji online di pondok pesantren. *IJCOSIN: Indonesian Journal of Community Service and Innovation*, 2(2), 102-111. <https://doi.org/10.20895/ijcosin.v2i2.606>
- 43) Yuliani, Z., Amala, A., Safira, T., Pratiwi, K., Syraif, U., & Jakarta, H. (2023). Model pemanfaatan teknologi digital di pesantren. *Edium Jurnal Manajemen Pendidikan Islam*, 1(2)
<https://doi.org/10.35905/edium.v1i2.7312>

