Digital Transformation in Islamic Religious Education Learning: A Study of Theory and Implementation in Schools

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A R T I C L E I N F O	A B S T R A C T
  	Digital transformation in Islamic Religious Education (PAI) learning is an urgent need in the era of the Industrial Revolution 4.0, in line with the rapid development of technology and changes in students' learning patterns. This research aims to comprehensively analyze the theory and implementation of digital transformation in PAI learning in schools. The research method used is qualitative with a literature study approach and empirical analysis of practices in several schools in Indonesia. The results of the study show that the integration of digital technology, such as Computer-Based Instruction (CBI) and Web-Based Instruction (WBI), Social Digital Learning, and Adaptive Digital Learning, is able to increase the effectiveness, interactivity, and motivation of students to learn in PAI learning. However, the main challenges faced include limited infrastructure, teacher competence in the use of technology, and the availability of digital content that is relevant to Islamic values. This study recommends the need to strengthen teacher training, develop digital content based on Islamic values, and cross-sector collaboration to optimize digital transformation in PAI learning. The implications of this research are expected to be a strategic reference for education stakeholders in designing policies and practices for PAI learning that are adaptive, inclusive, and characterful in the digital era.

INTRODUCTION

The development of digital technology has brought very significant changes in almost all aspects of human life, including in the field of education. In this era of the Industrial Revolution 4.0, digitalization is no longer an option, but an inevitability that must be faced and adopted by all educational institutions, both formal such as schools and universities, and non-formal ones such as course and training institutions.(Moraes, 2023) Digitization of education opens up new opportunities to improve the quality of learning, expand access to education, and create more effective and efficient teaching methods. However, on the other hand, digitalization also requires profound adjustments and transformations, not only in the technical aspect, but also in the paradigm and learning strategies.(Pinto, 2020)

Islamic Religious Education (PAI) as an integral part of Indonesia's national education system is also not immune from the pressure to transform. PAI has a very important position because it not only teaches religious knowledge, but also instills moral and moral values that are the spirit of education itself. Therefore, digital transformation in PAI learning must be carried out very carefully so as not to eliminate the essence of Islamic values that are the basis of learning.(Septiani Selly Susanti et al., 2024) This transformation is not only limited to the use of technological devices such as computers, tablets, or digital learning applications, but also includes changing the teaching paradigm, developing more adaptive learning strategies, and implementing learning models that are interactive and relevant to the needs of today's students.

The need to carry out digital transformation in PAI learning is increasingly urgent along with the increasing internet penetration throughout Indonesia, ease of access to digital devices, and changes in the learning patterns of students who now prefer technology-based interactions. Today's young generation grows up in an environment that is heavily influenced by digital technology, so they tend to more easily understand and absorb learning materials presented digitally and interactively.(Yaseen, 2025) In addition, the COVID-19 pandemic that has hit the world since the beginning of 2020 has accelerated the process of digitizing education globally, including in Indonesia. Schools from various levels of education, both public and private, must immediately adapt to the online and hybrid learning models (a combination of face-to-face and online). This change requires all parties to quickly adapt and master learning technology so that the education process continues to run well even in challenging conditions.(Zhou, 2024)

However, behind the various opportunities offered by digital transformation, there are also a number of major challenges that must be faced. One of the main challenges is the readiness of technological infrastructure in various regions, especially in areas where access to the internet and digital devices are still limited.(Akpan, 2024) In addition, teachers' competence in operating and utilizing learning technology is also a determining factor for the success of digital transformation. Not all teachers have adequate abilities to use technology effectively to support the learning process. This is a separate obstacle that must be overcome through teacher training and professional

development.(Stringer, 2025) In addition, the availability of digital content that is in accordance with the values and learning objectives of PAI is also limited. Existing digital learning content often does not fully accommodate the Islamic aspect in depth and comprehensively, so it needs to be developed specifically to support a quality learning process.(Huda, 2024)

Digital transformation in PAI learning is very important because it has great potential to improve the quality of learning as a whole. With technology, the teaching and learning process can become more interesting and fun, so that it can increase students' motivation and interest in learning. In addition, technology allows for wider access to various learning resources, whether in the form of text, videos, animations, or interactive simulations that can enrich students' learning experiences. Technology-based learning also facilitates a more interactive, personalized, and collaborative learning process. Interaction between teachers and students can take place more dynamically, and students can learn according to their respective pace and learning styles.(Liew, 2025)

LITERATURE REVIEW

However, to realize this, the implementation of learning technology must be carried out carefully and planned.(Getenet, 2024) Several obstacles such as teachers' lack of understanding of technology, limited infrastructure, and lack of optimal digital content must be overcome immediately. Therefore, research on various models of learning technology is very crucial. This research aims to evaluate the advantages and disadvantages of each digital learning model, so that it can provide practical and applicable recommendations for teachers and educational institutions. Through a qualitative approach with a literature study, this study analyzes the main characteristics of each learning model, including the way the material is presented, the interaction patterns between students and teachers, and the mechanisms of effective feedback.

The results show that learning technology can significantly improve the effectiveness of the teaching and learning process by creating a more interactive, relevant, and personalized learning experience. In addition, this research also emphasizes the importance of integrating various digital learning models to create holistic and holistic learning. Thus, learning technology not only plays a role as a tool, but also as a main catalyst in the transformation of modern education that is able to answer the challenges and needs of the times.

The formulation of the main problem raised in this study is how digital transformation in Islamic Religious Education learning can be studied in theory and how its implementation can run effectively in schools. This study is expected to provide a comprehensive overview of the digital transformation process in PAI, as well as provide strategic recommendations for education stakeholders to optimize the use of technology in PAI learning in order to achieve quality and character education goals.

METHODOLOGY
Research Methodology

This study uses a qualitative approach with literature study methods and empirical analysis on the implementation of digital transformation in several schools. The literature study was conducted by examining various sources, such as scientific articles, books, research reports, and policy documents relevant to the theme of digital transformation and PAI learning, especially from 2020 to 2025. Empirical analysis was carried out by examining implementation reports, observation results, and interviews with teachers and students in several schools that have implemented digital-based PAI learning. The data obtained were analyzed descriptive-qualitatively to identify patterns, challenges, and solutions that emerged in the digital transformation process of PAI learning. The qualitative approach was chosen because it is able to provide a deep understanding of complex phenomena, especially related to the dynamics of changes that occur in PAI learning practices in the digital era. Literature studies are focused on learning technology models such as Computer-Based Instruction (CBI), Web-Based Instruction (WBI), social learning, and adaptive learning. Meanwhile, the empirical analysis was carried out by exploring the experiences and good practices of schools that have successfully implemented digital transformation in PAI learning.

RESULT AND DISCUSSION
Digital Transformation in Islamic Religious Education Learning by Theoretical Study and Its Implementation in Schools.

Digital transformation in Islamic Religious Education (PAI) learning is a very deep and comprehensive process of change, which involves the integration of digital technology into all aspects of learning. This process is not only limited to the use of hardware and software, such as computers, tablets, applications, or online learning platforms, but also includes fundamental changes in mindsets, learning strategies, and interaction patterns between teachers and learners.(Mateo-Guillen, 2025) In other words, digital transformation in PAI means changing the perspective and approach to learning to be more in line with the times and the needs of students in the current digital era, without ignoring Islamic values that are at the core of religious education.

In theoretical studies, digital transformation in PAI learning is rooted in several philosophical and pedagogical foundations that are very relevant to the demands of 21st century learning. One of the most fundamental theories is constructivism, which emphasizes the importance of the active role of learners in building knowledge through direct experience and interaction with the learning environment.(Liangshi, 2024) In this context, digital technology functions as a facilitator that provides a variety of learning resources, interactive media, and virtual discussion spaces that allow students to explore PAI materials independently or collaboratively with their classmates. Thus, learning is no longer one-way from teacher to student, but rather a dynamic and participatory process. In addition to constructivism, the connectivity theory developed by Siemens is also an important foundation in digital learning. Connectivityism

views that knowledge is not only stored in individuals, but is spread throughout a network consisting of humans and technology.(Vokwana et al., 2024) In PAI learning, this theory encourages learners to actively access, verify, and integrate religious information from various credible digital sources, so that they can build a more comprehensive and contextual understanding. This is very important considering the rapid development of information technology and the expansion of digital learning resources available today.

The learning technology models used in PAI's digital transformation are very diverse and constantly evolving. In general, these models can be classified into several main categories, such as Computer-Based Instruction (CBI), Web-Based Instruction (WBI), Social Digital Learning, and Adaptive Digital Learning.(He et al., 2025)

Computer-Based Instruction (CBI)

Computer-Based Instruction (CBI) in Islamic Religious Education (PAI) is rooted in the use of computer technology to strengthen the learning process based on behavioristic, cognitive, and constructivistic theories. CBI allows PAI materials to be presented in an interactive, structured, and responsive manner to students' needs. Through CBI, Islamic religious materials can be presented in the form of multimedia, simulations, and practice questions that provide direct feedback, thereby strengthening the understanding and internalization of Islamic values.

The implementation of CBI in PAI is carried out by utilizing computer devices, projectors, and internet access to present material visually and interactively. PAI teachers design digital content such as presentations, videos, and online learning modules that can be accessed by students both individually and in groups. Learning evaluations are also carried out digitally, making it easier for teachers to monitor progress and provide feedback quickly. (Meng, 2025) The practice of applying CBI to PAI can be seen in the following schools:

SMA Negeri 6 Sigi is a public high school located on Jalan Tadulako, Ampera Village, Palolo District, Sigi Regency, Central Sulawesi. The school has been accredited A and is known for having well-equipped facilities, including computer labs and adequate internet access. SMA Negeri 6 Sigi is actively integrating technology in learning, including in PAI subjects. PAI teachers at this school use PowerPoint, learning videos, and online platforms to deliver materials such as fiqh, faith, and Islamic history. The use of CBI has been proven to increase students' interest in learning and comprehension, although challenges such as limited internet networks are still often faced.

Brata State Elementary School is located in Paya Tampah, Karang Baru District, Aceh Tamiang Regency, Aceh Province. As a public elementary school, SD Negeri Brata began to implement CBI with a project-based approach, such as creating digital content with the theme of Islamic history and religious values. Teachers at this school independently develop digital teaching materials and conduct internal training to overcome limited facilities. The implementation of CBI at SD Negeri Brata encourages active and creative involvement of students in PAI learning, although it still faces challenges in infrastructure and human resource aspects.

Madrasah Ibtidaiyah Nahdlatul Ulama (MI-NU) Waru II Sidoarjo is located on Jalan S.Parman Gang V No.83, Waru, Sidoarjo, East Java. This madrasah is under the auspices of the Ma'arif Foundation and is known to be committed to science and technology and IMTAQ-based education. MI-NU Waru II Sidoarjo has developed ICT-based PAI learning, such as the use of e-learning for learning the Qur'an and other Islamic materials. Teachers in this madrasah routinely attend educational technology training and utilize various online learning applications to enrich students' learning experiences. The practice of CBI in this madrasah not only improves students' digital literacy, but also strengthens the Islamic character through reflective activities and online discussions.

The implications of the implementation of CBI in PAI in these schools include increasing student motivation and learning outcomes, the efficiency of the learning process, and strengthening Islamic character and values. However, challenges such as disparity in technology facilities, the need for ongoing teacher training, and curriculum adaptation remain major concerns. School policy support and collaboration between educators are needed so that CBI is truly optimal in forming a generation of Muslims who are technologically literate and have noble character.

Web-Based Instruction (WBI)

Web-Based Instruction (WBI) in Islamic Religious Education (PAI) is a learning approach that uses internet technology as the main medium to deliver material, interact, and evaluate. Theoretically, WBI combines the principles of constructivist learning and information technology, where students actively build knowledge through access to digital materials, online discussions, and independent reflection. In the realm of PAI, this theory emphasizes the integration of Islamic values into the content presented interactively and contextually, so that learning is not only cognitive but also affective and spiritual.(Nuraeningsih, 2025)

The implementation of WBI in PAI is carried out by designing web-based learning modules that include religious materials such as interpretation of the Qur'an, hadith, fiqh, and morals. Teachers act as facilitators who manage learning platforms, provide multimedia materials, and guide online discussions. Students are given tasks that can be done independently through the platform, as well as participate in interactive sessions such as webinars or discussion forums. Evaluations are conducted digitally with online quizzes, essay assignments, and digital portfolios that document the learning process.

The practice of WBI in PAI has been implemented in several schools, one of which is Al-Azhar Superior High School Medan, a school with a superior reputation in the field of religious and public education. The school uses an e-learning platform to deliver PAI materials online, utilizing video lectures, interactive quizzes, and discussion forums that allow students to learn flexibly and independently. The experience at Al-Azhar Superior High School Medan shows that WBI increases students' motivation to learn and expands access to religious learning, especially during the pandemic. However, the challenge faced

is the need to increase the capacity of teachers in developing interesting and relevant digital materials.

The implications of the application of the WBI model in PAI include improving the quality of learning that is more adaptive to technological developments and the needs of today's students. WBI allows for more personalized and flexible learning, facilitating students to learn anytime and anywhere without the limitations of classrooms. In addition, this model encourages the development of digital literacy as well as religious values in a balanced manner. However, the success of WBI implementation also depends on infrastructure readiness, teacher competence, and support from the school environment and parents.(Usama, 2024) With the right application, WBI can strengthen religious understanding while fostering a religious character that is adaptive to changing times.

Social Digital Learning

Digital social learning in the context of Islamic Religious Education (PAI) refers to the application of Albert Bandura's social learning theory combined with the use of digital technology to increase the effectiveness and relevance of learning. Social learning theory emphasizes the importance of the process of observation, modeling, strengthening, and developing self-efficacy in learning. In PAI, this means that teachers not only deliver material verbally, but also provide examples of Islamic behavior that can be imitated by students, as well as utilize digital media such as videos, images, and interactive applications to strengthen the learning process.(Sungthong, 2025)

The implementation of digital social learning in PAI is carried out using digital media that supports social interaction and virtual observation of Islamic behavior models. For example, teachers use learning videos, worship simulations, Islamic educational game applications, and social media platforms such as WhatsApp and YouTube to deliver material and provide concrete examples of Islamic behavior. This approach allows students to learn contextually and personally, increase motivation, and facilitate the understanding of religious values through digital experiences that are relevant to their daily lives.(Muluk, 2024)

The practice of digital social learning in PAI has been implemented in several schools, one of which is SD Negeri Jetis 2 Yogyakarta. At this school, PAI learning during the Covid-19 pandemic was carried out online by utilizing videos and images sent through the WhatsApp application. Teachers provide re-explanations during face-to-face learning and involve parents to motivate students to study at home. The implementation of modeling principles can be seen from teachers who provide examples of Islamic behavior digitally, although there are obstacles such as limited direct supervision and delays in collecting assignments.

The real implications of the implementation of digital social learning in PAI include increasing students' interest and motivation to learn, a deeper understanding of the material, and the formation of a stronger Islamic character through digital examples. The use of social media and digital technology makes it easier to deliver material in an interesting and interactive manner, so that

learning becomes more effective and efficient. In addition, the integration of Islamic values in digital technology helps to maintain the spiritual essence of learning so that it is not lost in the digital era. However, challenges that still need to be overcome include limited access to technology, low digital literacy of teachers and students, and the need for institutional support and continuous training.

Overall, digital social learning in PAI presents innovations that are relevant to the times, strengthens the relationship between religious learning and students' digital lives, and makes a positive contribution to the formation of character and understanding of religion in a contextual and adaptive manner. Schools such as SD Negeri Jetis 2 Yogyakarta are a clear example of the application of this model which can be used as a reference for the development of digital-based PAI learning in other educational institutions

Adaptive Digital Learning

Digital adaptive learning in Islamic Religious Education (PAI) is a learning approach that combines digital technology with the principle of adaptation to individual students' needs, abilities, and learning styles. Theoretically, this learning is based on the integration of behavioristic, cognitive, and constructivist theories that are adapted to the development of educational technology. In the context of PAI, digital adaptive learning not only focuses on delivering religious materials in a personalized manner, but also enriches the spiritual and moral dimensions of students through responsive and interactive technology. This concept is in line with the revitalization efforts of PAI in the Society 5.0 era, where adaptive technology acts as a bridge between the digital potential and the educational mission of religious education, allowing curriculum and learning methods to be designed flexibly and contextually according to the needs of students.(Ramesh, 2025)

The implementation of digital adaptive learning in PAI involves the use of an e-learning platform that is able to adjust the material, speed, and delivery method based on student performance and learning preferences. Teachers use technologies such as Learning Management Systems (LMS) equipped with learning analytics features to monitor student progress in real-time and provide appropriate feedback. PAI materials are presented in a variety of digital formats, such as interactive videos, adaptive quizzes, and learning modules that can be accessed at any time. This approach also integrates student-centered learning and blended learning methods, so that students actively explore Islamic values independently and in interactions with teachers and classmates online and offline.(Zhuang, 2024)

The practice of digital adaptive learning in PAI has been implemented at SMK Negeri 2 Kraksaan, a vocational high school that has begun to integrate artificial intelligence technology in the PAI learning process. In this school, teachers use AI platforms such as ChatGPT to compile learning materials, answer student questions, and create practice questions tailored to the needs of each student. Canva AI is also used to create engaging visual tools, such as infographics and creative presentations, making the delivery of material more effective and engaging. The implementation of this technology has been proven

to increase student learning motivation and make it easier for teachers to prepare adaptive and personalized learning materials. However, the challenges faced include the need for digital literacy training for teachers, supervision of the validity of information, and the management of students' dependence on AI technology.

The real implications of the application of digital adaptive learning in PAI can be seen in increasing the effectiveness and efficiency of the teaching and learning process. Students become more focused and motivated because the material is presented according to their abilities and interests, so that learning becomes more meaningful and deep. The use of adaptive technology also allows teachers to conduct real-time evaluations and assessments with methods such as online quizzes and e-portfolios, which provide an accurate picture of student development. This learning environment that is responsive to individual needs supports the optimal development of students' character and spirituality. In addition, the application of digital adaptive technology encourages the improvement of teachers' digital competence and the transformation of the PAI curriculum that is more relevant to the development of the times and the needs of students.

To better understand the explanation above, here is a brief graphical data table that summarizes the core of digital transformation in Islamic Religious Education (PAI) learning in theory and its implementation in schools. This table makes it easy to understand model differences, basic theories, implementation examples, benefits, and challenges in the field.

Table 1. Summarizes the Core of Digital Transformation in Islamic Religious Education (PAI) Learning

PAI Digital Learning Model	Basic Theory	Examples of Implementation in Schools	Key Benefits	Challenge
Computer-Based Instruction (CBI)	Constructivism, Behaviorism	- SMA Negeri 6 Sigi: PowerPoint, videos, worship simulation - SD Negeri Brata: Digital project of Islamic history - MI-NU Waru II Sidoarjo: E-learning Al-Qur'an	- Materials are more interactive and visual - Live feedback - Increase motivation to learn	- Device limitations - Teacher training - Internet infrastructure

Web-Based Instruction (WBI)	Constructivism, Concectivism	- Al-Azhar Flagship High School Medan: E-learning, discussion forums, video lectures	- Flexible (accessible at any time) - Online collaboration - Digital literacy is increasing	- Teacher readiness - Quality of content - Parent and school support
Social Digital Learning	Social Theory (Bandura)	- SD Negeri Jetis 2 Yogyakarta: WhatsApp Video, Islamic Behavior Modeling	- Formation of Islamic character - Contextual learning - Digital social interaction	- Limited supervision - Low digital literacy - Limited access to technology
Digital Adaptive Learning	Constructivism, Concectivism, Student-Centered	- SMK Negeri 2 Kraksaan: AI (ChatGPT, Canva AI), adaptive LMS	- Materials according to students' needs - Real-time feedback - Personalized learning	- Dependence on technology - Information validation - Teacher training

Visual Captions:
- **Model**: The type of technological approach used in PAI learning.
- **Basic Theory**: The foundation of the educational theory that supports the model.
- **Implementation Example**: Real practice in several schools in Indonesia.
- **Key Benefits**: Added value felt by students and teachers.
- **Challenges**: The main obstacles that are often faced in implementation.

This table can be used as a summary for presentations, discussions, or quick learning materials on digital transformation in PAI learning in schools. If you want to visualize graphics

Fact and Empirical Analysis: Benefits, Successes, and Challenges of Digital Transformation in Islamic Religious Education (PAI) Learning

Digital transformation in Islamic Religious Education (PAI) learning brings various tangible benefits that can be felt directly. One of them is to improve the quality of learning through the presentation of more interactive and multimedia materials, such as videos, simulations, and digital quizzes. This

approach makes learning more engaging, relevant, and easy for students to understand. For example, the use of Computer-Based Instruction (CBI) in several schools such as SMA Negeri 6 Sigi and Madrasah Ibtidaiyah Nahdlatul Ulama Waru II Sidoarjo has been proven to increase the understanding and internalization of Islamic values. In addition, the Web-Based Instruction (WBI) model allows students to learn flexibly, anytime and anywhere without being tied to a physical classroom. Al-Azhar Medan Superior High School, for example, utilizes e-learning platforms to expand access to online PAI learning, especially during the COVID-19 pandemic.

Digital transformation also plays a role in strengthening Islamic character and values. Digital social learning that adopts Albert Bandura's social learning theory helps students learn through digital observation and modeling of Islamic behavior, so that their religious character is stronger. The use of digital technology encourages active involvement of students in the learning process, such as the creation of digital content at SD Negeri Brata and online discussions on the WBI platform, which ultimately increases students' motivation to learn and creativity. In addition, digitalization makes it easier for teachers to design materials, provide feedback instantly, and conduct evaluations more quickly and in a structured manner.

The form of success in the implementation of this digital transformation can be seen from the improvement of student learning outcomes. Schools that implemented CBI and WBI reported an increase in students' understanding of PAI material, as happened at SMA Negeri 6 Sigi and MI-NU Waru II Sidoarjo. In addition, digital transformation also develops students' digital and religious literacy, making them a generation that not only masters religious materials, but also has adequate technological skills and noble character. The rapid adaptation to the COVID-19 pandemic conditions also shows the success of digital transformation in maintaining the continuity of PAI learning, both online and hybrid. Through digital platforms, students can learn independently and collaboratively, expand learning networks, and access various credible learning resources.

However, digital transformation in PAI learning cannot be separated from challenges. Limited technological infrastructure is still a major obstacle, especially in remote areas, such as those experienced at SMA Negeri 6 Sigi and SD Negeri Brata, where internet access is not evenly distributed. Teachers' competence in developing and managing digital learning materials is also uneven, so continuous training is needed so that teachers can optimize learning technology. In addition, the availability of relevant and quality digital content in accordance with PAI values is still limited and needs to be continuously developed so that learning remains meaningful and inspiring. Adapting school curriculum and policies is also an important factor so that technology integration can run effectively and sustainably. No less important, the involvement of parents and the school environment is needed, especially in online learning that requires supervision and motivation to learn at home.

Overall, digital transformation in Islamic Religious Education learning has provided significant benefits in the form of improving the quality of learning,

wider access, increased learning motivation, and strengthening student character. This success is reflected in increased learning outcomes, growing digital literacy, and rapid adaptability to pandemic situations. However, challenges such as limited infrastructure, teacher competence, and digital content development must continue to be addressed through appropriate policies, ongoing training, and collaboration between stakeholders. With an integrated approach, digital transformation can be the main driver of the modernization of PAI education that still adheres to Islamic values.

To better understand the explanation above, here is an analysis of digital transformation in Islamic Religious Education (PAI) learning which is presented in a table format with analysis data columns, based on literature reviews and empirical findings from various sources:

Table 2. Analysis of Digital Transformation in Islamic Religious Education (PAI) Learning

Analysis Aspect	Description and Empirical Facts	Sources/Methods of Data Collection
Real Benefits	Digital transformation improves the quality of PAI learning through interactive media such as videos, simulations, and digital quizzes that make the material more interesting and easy to understand. Learning becomes flexible with online access anytime and anywhere. Strengthening Islamic character also occurs through digital social learning. Technology drives student motivation and engagement as well as the efficiency of the evaluation process.	Case studies at SMA Negeri 6 Sigi, MI-NU Waru II Sidoarjo, and SMA Unggulan Al-Azhar Medan; Observation and documentation [1][2][3]

A Sense of Success	There was an increase in learning outcomes and students' understanding of PAI material. Students' digital and religious literacy is developing. Rapid adaptation to online learning during the COVID-19 pandemic. Strengthening independence and learning collaboration through digital platforms.	Interviews with teachers, students, principals; documentation of curriculum and learning outcomes; Triangulation of sources and methods [2][4][5]
Challenges Faced	The limitations of technology infrastructure, especially in remote areas, uneven teacher competence in the management of digital materials, limitations of relevant and quality digital content, adaptation of curriculum and school policies that are not optimal, and the need for the involvement of parents and the school environment in supporting online learning.	Literature analysis, interviews, observations, documentation; Data triangulation techniques for validation [6][1][2][3]
Data Analysis Methods	Data is collected through documentation, interviews, and observations. The analysis was carried out by qualitative descriptive methods, data reduction, data presentation, and conclusion drawn. Data validation uses triangulation of sources and methods to ensure credibility and consistency.	Miles & Huberman analysis method (reduction, display, conclusion drawing); hermeneutics; Content and thematic analysis [7][2][5]

Development Recommendations	It is necessary to improve technological infrastructure, teacher training and mentoring on an ongoing basis, develop contextual and inspirational digital content, adjust the curriculum, and increase the active role of parents and the school environment in supporting digital learning.	Conclusions from data analysis and interview results; literature review related to digital PAI learning development strategies [6][3]

This table systematically summarizes the benefits, successes, and challenges of digital transformation in PAI learning, as well as explaining the data collection and analysis methods used in the study. This approach helps to understand the real conditions in the field and provides a comprehensive picture for the development of digital technology-based PAI learning.

CONCLUSIONS AND RECOMMENDATIONS

Based on the theoretical study and implementation of digital transformation in Islamic Religious Education (PAI) learning in various schools, this study concludes that the integration of digital technology has had a significant impact on improving the quality of learning, student motivation, and strengthening Islamic values. Digital transformation not only modernizes learning methods but also facilitates a more interactive, personalized, and adaptive approach, according to the needs of students in the era of the Industrial Revolution 4.0 and Society 5.0. Empirically, the application of models such as Computer-Based Instruction (CBI), Web-Based Instruction (WBI), digital social learning, and digital adaptive learning has been proven to increase students' understanding of PAI materials, expand access to learning resources, and develop digital literacy and religious character. This success is reflected in case studies in schools such as SMA Negeri 6 Sigi, MI-NU Waru II Sidoarjo, and SMA Unggulan Al-Azhar Medan, which show improved learning outcomes and rapid adaptation to online learning, especially during the COVID-19 pandemic.

Digital transformation also faces complex challenges, such as infrastructure gaps (especially in remote areas), uneven teacher competence in technology management, limited quality digital content, and the need to adjust school curriculum and policies. To address this, multidimensional collaboration between governments, educational institutions, teachers, parents, and the community is needed, as well as ongoing training to ensure that digital transformation runs effectively without neglecting the essence of PAI values. Holistically, this research emphasizes that digital transformation in PAI learning is not just a trend, but a must to create a generation of Muslims who are

technologically literate, have noble character, and are ready to face the dynamics of the times. Recommendations for further research are the development of a hybrid model that integrates technology with a humanist approach, as well as an in-depth study of the long-term impact of digitalization on the spirituality of students.

FURTHER STUDY

This study still has limitations so that further research is still needed on the topic "Digital Transformation in Islamic Religious Education Learning: A Study of Theory and Implementation in Schools".

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