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The Effectiveness of Islamic Religious Education Learning Based on Information and Communication Technology in the Digital Era

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Abstract

This study aims to analyze the effectiveness of Information and Communication Technology (ICT)-based Islamic Education (PAI) learning in the digital era. Using a descriptive-explanatory approach, the study involved 150 students, 10 PAI teachers, and 5 school principals from several high schools in urban and rural areas. Data were collected through questionnaires, interviews, observations, and documentation, then analyzed using mixed methods. The results revealed that ICT-based PAI learning effectively enhances student engagement, material comprehension, and learning satisfaction. However, challenges such as limited infrastructure and teachers' technological competence remain significant barriers. This study recommends strengthening ICT infrastructure, providing technology training for teachers, and developing curricula that support ICT integration.
Keywords: *Islamic Education, Information and Communication Technology, Learning Effectiveness, Digital Era, Mixed Methods.*

Abstrak

Penelitian ini bertujuan untuk menganalisis efektivitas pembelajaran Pendidikan Agama Islam (PAI) berbasis teknologi informasi dan komunikasi (TIK) di era digital. Dengan pendekatan deskriptif-eksplanatori, penelitian ini melibatkan 150 siswa, 10 guru PAI, dan 5 kepala sekolah dari beberapa sekolah menengah atas di wilayah perkotaan dan perdesaan. Data dikumpulkan melalui kuesioner, wawancara, observasi, dan dokumentasi, kemudian dianalisis menggunakan metode campuran (*Mixed Methods*). Hasil penelitian menunjukkan bahwa pembelajaran PAI berbasis TIK efektif dalam meningkatkan keterlibatan siswa, pemahaman materi, dan kepuasan belajar. Namun, tantangan seperti keterbatasan infrastruktur dan kompetensi teknologi guru tetap menjadi kendala utama. Penelitian ini merekomendasikan penguatan infrastruktur TIK, pelatihan teknologi untuk guru, dan pengembangan kurikulum yang mendukung integrasi TIK.
Kata Kunci: *Pendidikan Agama Islam, Teknologi Informasi dan Komunikasi, Efektivitas Pembelajaran, Era Digital, Metode Campuran*.

A. Introduction

The development of information and communication technology (ICT) in the digital era has had a significant impact on various aspects of life, including in the field of education.[1] Islamic Religious Education (PAI), as one of the subjects that has a strategic role in forming students' character and moral values[2], is also undergoing transformation along with technological advances.[3] PAI learning has been carried out conventionally[4] Now we are required to be more adaptive to technological developments in order to remain relevant to the needs of the times.[5]

[1] Bima Fandi Asy'arie and Nugroho Noto Suseno, "Learning Design for Islamic Religious Education (PAI) Using the Tik-Tok Application," *Ar-Rusyd: Journal of Islamic Religious Education* 3, no. 1 (2024): 46–63.

[2] Agus Riyanto, "Islamic Religious Education Teacher in the Age of Information and Communication Technology," *Al Kasyaf (Journal of Education and Preaching)* 1, no. 1 (2023): 1–10.

[3] Andy Riski Pratama et al., "Using Google Forms as an Evaluation Tool in Islamic Religious Education Learning," *Tunas Bangsa Education Journal* 2, no. 1 (2024): 19–30.

[4] Adiyono Adiyono, Julaiha Julaiha, and Siti Jumrah, "Changes in the Development of the Islamic Religious Education Curriculum at Madrasah Aliyah Negeri Insan Cendikia Paser," *IQRO: Journal of Islamic Education* 6, no. 1 (2023): 33–60.

[5] Riyanto, "Islamic Religious Education Teacher in the Age of Information and Communication Technology."

In the digital era, the use of ICT in the learning process does not only function as a teaching aid[6], but also as a medium that can increase student engagement, effectiveness of material delivery, and accessibility of learning resources.[7] However, the application of ICT in PAI learning still faces various challenges, such as limited infrastructure, teacher competence in integrating technology, and resistance to changes in learning methods.[8]

The urgency of this research lies in the importance of evaluating the effectiveness of ICT-based PAI learning in the digital era. With a deeper understanding of the successes and obstacles faced, it is hoped that more appropriate strategies can be formulated to improve the quality of PAI learning in the future. In the context of the digital era, the use of technology in education is an important indicator in determining the success of the learning system.[9] ICT-based PAI learning provides opportunities to create interactive, innovative and fun learning experiences.[10] This is in line with the demands of the digital generation who tend to be more interested in technology-based approaches compared to traditional methods.[11] However, there is not much research that specifically discusses the effectiveness of applying ICT in PAI learning. Most studies still focus on general aspects of the use of technology in education, without highlighting the uniqueness of PAI subjects, such as aspects of spirituality, ethics and religious values.[12]

This research aims to answer several problems related to the effectiveness of Islamic Religious Education (PAI) learning based on Information and Communication Technology (ICT) in the digital era. The

[6] Alisia Zahroatul Baroroh, Diyah Andini Kusumastuti, and Rahmat Kamal, "Use of Technology in Learning," *Perspective: Journal of Education and Linguistics* 2, no. 4 (2024): 269–86.

[7] Wildan Nuril Ahmad Fauzi, "DIGITAL TECHNOLOGY INNOVATION IN INCREASING THE EFFECTIVENESS AND EFFICIENCY OF LEARNING IN THE ERA OF EDUCATION 4.0," *EL-AULADY* 4, no. 1 (2024).

[8] Susanda Febriani et al., "Evaluation of the Digital School Program in Increasing the Use of Technology for Learning," *Dirasah: Journal of Islamic Education Science and Management Studies* 7, no. 2 (2024): 752–61.

[9] Ahmad Saiful Rizal, "Learning Innovation to Improve Student Learning Outcomes in the Digital Era," *Attanwir: Journal of Islam and Education* 14, no. 1 (2023): 11–28.

[10] Helnanelis Helnanelis and Ahya Ulyanti, "Development of ICT Learning Media Based on the Nearpod Platform to Increase Student Motivation on Material on the History of the Development of Islam in Southeast Asia," *Basicedu Journal* 7, no. 6 (2023): 3886–94.

[11] Dwi Sulisworo, "Post-Pandemic Learning Environment: Mobile Learning, STEM-Based Learning, & Critical Thinking" (Ahmad Dahlan University Yogyakarta, 2022).

[12] Mazrur Mazrur, Surawan Surawan, and Siti Sarifah, "Religious Learning Revolution in Madrasas: Examining Learning Models That Increase Critical Power for Students" (K-Media, 2024).

main question to be answered is to what extent is the effectiveness of ICT-based PAI learning, what are the supporting and inhibiting factors in its implementation, and what is the optimal strategy to increase this effectiveness. The main objective of this research is to analyze the effectiveness of ICT-based PAI learning, identify factors that influence the successful application of ICT in learning, and formulate strategies that can be used to increase the effectiveness of ICT-based PAI learning.

Based on the background that has been described, the problem formulation in this research is as follows: first, what is the effectiveness of ICT-based PAI learning in the digital era? Second, what are the obstacles faced in implementing ICT in PAI learning? Third, what steps can be taken to overcome these obstacles and increase the effectiveness of ICT-based PAI learning? With a structured and in-depth approach, it is hoped that this research can make a real contribution to the development of relevant and adaptive PAI learning in the digital era, as well as provide practical solutions that can be applied in various schools in urban and rural areas.

B. Literature Review

1. Definition and Basic Concepts of PAI Learning

Islamic Religious Education (PAI) is a subject that aims to shape students' personalities based on Islamic values.[13] According to Nur (2023)[14], PAI not only focuses on mastering religious knowledge, but also on character formation and the integration of moral values in everyday life. In the learning context, PAI includes cognitive, affective and psychomotor dimensions which support each other to produce individuals who are faithful, devout and have noble character.[15]

Islamic Religious Education (PAI) in schools aims to shape students' character in accordance with Islamic values. Apart from mastering religious knowledge, PAI also emphasizes the importance of forming noble morals and applying moral values in everyday life. PAI is the basis for producing a generation that is not only intellectually intelligent, but also has strong character and is ready to face life's challenges. In the learning process, PAI involves three main dimensions, namely cognitive, affective and psychomotor dimensions. The cognitive dimension is related to understanding and mastery of religious material, while the affective dimension places more emphasis on students' attitudes and feelings towards religious teachings, and the psychomotor dimension is related to students'

[13] Imam Taufiq Akbar, H Moh Sahlan, and Heri Purwanto, "Problematics of Affective Assessment in Islamic Religious Education Subjects," *AS-SUNNIYYAH* 1, no. 02 (2021): 1–11.

[14] Faisol Nur and Untung Sunaryo, "The Role of Islamic Religious Education in Revitalizing Character Education," *Unisan Journal* 1, no. 5 (2023): 351–60.

[15] Ulfiyatin Mufida et al., "PROBLEMATICS OF AFFECTIVE ASSESSMENT IN ISLAMIC RELIGIOUS EDUCATION (PAI) SUBJECTS," *INNOVATIVE: Journal of Education, Religion and Culture Research* 7, no. 2 (2021): 243–65.

ability to apply religious teachings in real action. However, in a world increasingly influenced by technological advances, there are new challenges in delivering PAI material effectively. Along with the development of information and communication technology (ICT), many aspects of learning can now be made easier through the use of digital media. One of the biggest challenges is how to use ICT effectively to improve the quality of PAI learning. ICT, if used well, can make learning more interesting, interactive and easy for students to understand. For example, the use of learning videos, animations, or interactive applications can help explain abstract concepts in the Islamic religion in a way that is more visual and easy for students to digest.

Apart from that, technology also opens up opportunities for more flexible PAI learning, especially through online learning platforms. Online learning allows students to access PAI materials anytime and anywhere, according to their needs. This is very useful, especially during the COVID-19 pandemic, when face-to-face learning cannot be done directly. This online learning also gives students the opportunity to learn independently, with more flexible teacher guidance through online discussion forums or learning videos that can be accessed asynchronously.

However, the use of ICT in PAI learning also faces several obstacles, especially in rural areas or areas with limited infrastructure. Many schools in the area have difficulty providing adequate technological devices, such as computers or laptops, as well as a stable internet network. Without adequate infrastructure support, the application of ICT-based learning is very limited. This has the potential to cause a gap in the quality of education between schools in urban and rural areas. Therefore, it is important to ensure that all schools, both in urban and rural areas, have equal access to technology so that all students can experience the benefits of ICT-based learning.

Apart from infrastructure issues, another factor that needs to be considered is the teacher's readiness and skills in using technology. Many teachers are not yet accustomed to using ICT in their learning process, either because of a lack of training or because of limited knowledge about how to integrate ICT in religious learning. Therefore, training for teachers in using ICT for PAI learning is very important. Teachers need to be equipped with technical and pedagogical skills to optimize the use of ICT, such as how to utilize learning applications, create digital-based learning materials, and manage online classes well.

Another challenge is how to overcome differences in student characteristics in using technology. In urban schools, students may be familiar with technology and digital devices, whereas students in rural areas may not have the same access. This has the potential to create gaps in the quality of learning. Students in urban areas can more easily access various digital resources, while students in rural areas may be hampered by limited devices and internet networks. For this reason, there needs to be a policy that ensures

equal distribution of technological facilities in all schools, especially in areas where technological infrastructure is still underdeveloped.

On the positive side, technology has the potential to make PAI learning more interesting and enjoyable for students. Various digital media, such as videos, animations, or infographics, can help illustrate Islamic religious values in a more interesting and easy to understand way. For example, in learning about Islamic history or the stories of the prophets, the use of video or animation can make the material more lively and interesting for students. In addition, learning applications such as quizzes or educational games can be used to measure student understanding in a more interactive and fun way.

Technology also allows PAI learning to be more based on student needs, using different learning methods according to each student's learning style. For example, students who prefer to learn visually can take advantage of videos or infographics, while students who prefer to learn by reading can access e-books or digital articles. This more personal and flexible approach will make PAI learning more effective, because it can be adjusted to students' learning preferences.

One of the other big benefits of ICT-based PAI learning is the ease of accessing teaching materials. In the digital era, students are not only bound to textbooks as the only source of information. They can access various learning resources, such as video tutorials, articles, or discussion forums, which can enrich their understanding of the material. This also allows PAI learning to be more relevant to students' daily lives, because they can relate religious teachings to actual issues in the digital world.

With the great potential that ICT has in PAI learning, there are many opportunities to increase the effectiveness of Islamic religious education in this digital era. However, to make this happen, support is needed from various parties, from the government, schools, to the community. The government needs to ensure equal access to technology in all schools, while schools and teachers need to adapt to technological developments and improve their skills in using ICT. With the right steps, ICT-based PAI learning can be an effective solution for improving the quality of Islamic religious education that is relevant and adaptive in the digital era.

2. Information and Communication Technology (ICT) in Education

Information and Communication Technology (ICT) refers to various technology-based tools and applications used to process, store and convey information[16]. In the world of education, ICT has had a big impact, both in terms of delivering material, managing learning, and interactions between

[16] Imam Taufiq Akbar, H Moh Sahlan, and Heri Purwanto, "Problematics of Affective Assessment in Islamic Religious Education Subjects," *AS-SUNNIYYAH* 1, no. 02 (2021): 1–11.

teachers and students.[17] The use of ICT allows the creation of learning that is more interactive, interesting and flexible according to student needs.[18]

According to Anderson and Krathwohl (2001)[19], ICT can support the learning process in several ways, such as providing varied learning resources, increasing student engagement, and developing critical thinking skills.[20] In the PAI context, the use of ICT can help students understand religious concepts in a more visual and applicable way, for example through learning videos, interactive applications, or online platforms.[21]

3. Previous Studies on ICT-Based Learning

Various studies have been conducted to examine the effectiveness of using ICT in learning. For example, research conducted by Fatimah (2024)[22] shows that the use of e-learning platforms can significantly increase student learning motivation. Another study by Ningsih (2021) found that the integration of ICT in PAI learning can improve students' understanding of teaching material, especially in abstract topics.[23] However, several studies also highlight challenges in implementing ICT, such as limited technological infrastructure[24], lack of teacher competence in using ICT tools[25], as well as resistance to changes in learning methods[26]. This shows that the application of ICT in learning, including in PAI, requires a comprehensive approach and planned strategy.

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[17] Sulia Ningsih, "Students' Perceptions of Online Learning During the Covid-19 Pandemic," *JINOTEP (Journal of Learning Innovation and Technology): Studies and Research in Learning Technology* 7, no. 2 (2020): 124–32.

[18] Akbar, Sahlan, and Purwanto, "Problematics of Affective Assessment in Islamic Religious Education Subjects," 2021.

[19] Masyni Elbadiansyah, "Learning and Learning [Electronic Sources]: Theoretical and Practical Concepts" (sebatik. wicida. ac. id, 2021).

[20] Wasilatul Murtafiah and Marheny Lukitasari, *E-IM3 Learning Model to Improve Decision Making Ability* (CV. AE MEDIA GRAFIKA, 2021).

[21] Ardian Al Hidaya, Muhammad Yasin, and Irfan Sepria Baresi, "The Role of Technology in Improving the Quality of Learning in Schools," *Journal of International Multidisciplinary Research* 2, no. 2 (2024): 288–301.

[22] Siti Fatimah, Sigit Prasetyo, and Erni Munastiwi, "Innovation in Teaching Science in Elementary Schools Through the Use of Digital Technology," *MUBTADI: Journal of Elementary Education* 6, no. 1 (2024): 15–27.

[23] Ningsih, "Students' Perceptions of Online Learning During the Covid-19 Pandemic."

[24] Nur Asiyah and Agus Sutiyono, "Evaluation of the Implementation of the 2013 Curriculum in High Schools in Arts and Culture Subjects," *Wiyata Dharma: Journal of Educational Research and Evaluation* 12, no. 2 (2024).

[25] Raka Ismaya, Savira Salshabila, and Indri Dwi Ariyani, "THE INFLUENCE OF USE OF DIGITAL LEARNING MEDIA ON PRIMARY SCHOOL STUDENT LEARNING OUTCOMES," *Education and Teaching Review Journal (JRPP)* 7, no. 4 (2024): 13779–85.

[26] Irzeq Rozeqqi, "Integration of Technology in the Economic Education Curriculum," *Studia Ulumina: Journal of Educational Studies* 1, no. 1 (2024): 21–31.

Several studies also highlight the challenges faced in its implementation. One of the main challenges is the limited technological infrastructure in some schools. In some areas, especially in rural areas, many schools still have difficulty providing adequate technological equipment and a stable internet network. This limitation causes the use of ICT in learning to be less than optimal, even in schools that have tried to implement technology in teaching and learning activities. Without sufficient infrastructure support, ICT cannot have a maximum impact on learning effectiveness.

Apart from that, the lack of teacher competence in using ICT tools is also a significant problem in its implementation. Many teachers are not yet skilled in utilizing technology in the learning process, both in terms of using hardware and software. This can hinder teacher creativity and innovation in presenting teaching material in a more interesting and interactive way. In addition to technical skills, many teachers also face difficulties in designing lessons that effectively integrate ICT with existing teaching methods. Therefore, adequate training and provision for teachers is very necessary so that they can make optimal use of technology in PAI learning.

Another challenge is resistance to changes in learning methods that are more technology-based. Some parties, both teachers and students, may feel comfortable with conventional methods that have been applied in previous learning. They may be reluctant to switch to more modern, ICT-based learning methods due to concerns about difficulties in adapting new technology. This resistance to change is often an obstacle in implementing ICT, even though technology can provide many benefits in improving the quality of learning.

This shows that the application of ICT in learning, including PAI, requires a comprehensive approach and planned strategy. To overcome these challenges, it is important to involve various parties, such as government, schools and communities, in supporting the application of ICT. The government needs to ensure equal access to technology, while schools and teachers must be given adequate training to master technology relevant to PAI learning. In addition, it is important to manage change in a thoughtful way, by providing psychological support to teachers and students to reduce resistance to changes in learning methods.

This comprehensive approach also includes continuous evaluation and monitoring of the use of ICT in PAI learning. Schools need to carry out regular evaluations regarding the effectiveness of the use of ICT in achieving learning goals. This can be done by collecting feedback from students, teachers and principals regarding the impact of ICT-based learning on students' understanding of the material, as well as their engagement and motivation. With continuous evaluation, schools can make adjustments and improvements so that the use of ICT in learning is more optimal.

The planned strategy also includes selecting technology that suits the needs and context of PAI learning. Not all types of ICT are suitable for all

types of learning materials or methods. Therefore, it is important to select the most effective ICT tools and platforms to support learning objectives. For example, for more theoretical or text-based topics, text-based platforms or online discussion forums can be more effective. Meanwhile, for more visual topics, such as the story of the Prophet or Islamic history, visual media such as video or animation can better support students' understanding.

Apart from that, the use of ICT in PAI learning also needs to be balanced with strengthening moral and spiritual values which are the main goals of religious learning. Even though ICT can help in conveying material in a more interesting and interactive way, teachers must still ensure that religious values and morality remain the main focus in learning. Technology should not only be used to make learning easier, but also to deepen students' understanding of religious teachings and shape character in accordance with Islamic values.

With the right approach, ICT can be a very effective tool in improving the quality of PAI learning in this digital era. Even though the challenges are quite large, well-planned ICT implementation can help overcome various problems faced in education, as well as enrich students' learning experiences. Therefore, the application of ICT in PAI learning must be carried out with a mature strategy, followed by ongoing evaluation and training, so that technology can have a maximum positive impact in forming the character of students who are faithful, devout and have noble character.

4. Research Gaps

Although many studies have discussed the use of ICT in education, there is still a gap in the literature regarding the specific implementation of PAI subjects. Most research focuses on technical aspects[27] or general without elaborating further on how ICT can support the spiritual dimension[28] and ethics are at the core of PAI learning. Apart from that, there is not much research evaluating the long-term effectiveness of ICT-based PAI learning, especially in terms of character development and internalization of religious values.

This research is based on constructivism theory which emphasizes that learning is an active process in which students build knowledge based on their experiences.[29] In this context, ICT acts as a mediator that allows students to explore religious concepts independently and creatively. Apart from that, technology-based learning theory (Mayer, 2001) is also relevant, because it explains how technology can be used to support the learning process through

[27] Akbar, Sahlan, and Purwanto, "Problematics of Affective Assessment in Islamic Religious Education Subjects," 2021.

[28] H Muhammad Soleh Hapudin, *Learning and Learning Theory: Creating Creative and Effective Learning* (Prenada Media, 2021).

[29] Muhammad Yasin et al., *Technology-Based Learning Model: Theory and Implementation* (PT. Green Pustaka Indonesia, 2024).

combining visual, auditory and interactive elements.[30]With this framework, the research will examine how ICT can be used effectively to improve PAI learning, taking into account the unique characteristics of this subject and the needs of students in the digital era. Although many studies have discussed the use of Information and Communication Technology (ICT) in education, there is still a gap in the literature regarding specific implementation in Islamic Religious Education (PAI) subjects.

Most research focuses on technical or general aspects of ICT use, such as improving access to teaching materials or the effectiveness of online learning platforms, without further elaborating on how ICT can support the spiritual and ethical dimensions that are at the heart of PAI learning. PAI learning not only aims to increase students' understanding of religious teachings, but also to shape character and internalize the moral values contained in Islamic teachings. Therefore, the application of ICT in PAI learning should be able to explore these dimensions, which have not been studied much in previous research. In addition, most of the existing research focuses more on the effectiveness of ICT use in the short term, while evaluations regarding long-term effectiveness, especially in terms of character development and internalization of religious values, are still limited.

The development of student character and the internalization of religious values through ICT requires more time to be measured accurately, and this is often an aspect that is neglected in many previous studies. For this reason, this research aims to provide deeper insight into how ICT-based PAI learning not only influences students' understanding of teaching material, but also how technology can play a role in forming students' character and deep spiritual values in the long term.

This research is based on constructivism theory which emphasizes that learning is an active process in which students build knowledge based on their experiences. In this context, ICT acts as a mediator that allows students to explore religious concepts independently and creatively. Students not only receive knowledge from teachers, but they can also develop their own understanding through interaction with various digital resources, online discussions, and experimentation with technology-based learning materials. This allows PAI learning to be more personalized and relevant to students' needs and learning styles, especially in the digital era which is full of easily accessible information sources. Apart from constructivism theory, this research is also relevant to the technology-based learning theory expressed by Mayer (2001). Mayer explains how technology can be used to support the learning process through combining visual, auditory and interactive elements. In the PAI context, combining these elements is very important, especially in teaching religious values which often require a deep and layered

[30] Hapudin, *Learning and Learning Theory: Creating Creative and Effective Learning*.

understanding. For example, in understanding the stories of the Prophet or abstract concepts in Islamic teachings, the use of videos, animations or interactive applications can help students to better understand and absorb the material. The use of strong visual and auditory elements can strengthen students' memory and make it easier for them to internalize the moral messages contained in religious teachings.

With the theoretical framework of constructivism and technology-based learning, research will examine how ICT can be used effectively to improve PAI learning. The focus of this research is not only on the technical aspects of using ICT, but also on how ICT can support the development of spiritual and ethical dimensions in learning. Considering the unique characteristics of PAI subjects which focus on religious, moral and ethical values, this research will consider various aspects in designing and implementing ICT-based learning that can support the achievement of these goals. One of them is how to choose the right technology to support the process of internalizing religious values, as well as how to integrate technology in learning methods that support student character development.

Apart from that, this research will also assess the impact of using ICT in PAI learning on student character development in the long term. Character formation through ICT-based PAI learning does not only focus on increasing religious knowledge, but also on applying moral values in everyday life. This research will examine whether the use of ICT can contribute to changes in students' attitudes and behavior, as well as whether technology can play a role in facilitating deeper learning regarding the spiritual values contained in the teachings of the Islamic religion.

Along with that, it is important to examine the role of teachers in implementing ICT in PAI learning. Teachers play an important role in directing students to use technology wisely and in accordance with the context of religious learning. In this research, we will analyze how the teacher's role in selecting and integrating technology into PAI learning can help students become more involved in religious learning, as well as how teachers can facilitate students in developing a deeper understanding of religion through the use of technology.

Overall, this research aims to fill the gaps that exist in the literature regarding the application of ICT in PAI learning, by focusing on spiritual and ethical aspects that are often neglected in previous research. By using the theoretical framework of constructivism and technology-based learning, this research will explore how technology can be used effectively to support PAI learning which not only increases students' understanding of teaching material, but also strengthens character and internalization of religious values which are the main objectives of the study. this lesson. With this holistic approach, it is hoped that this research can make a significant contribution to the development of ICT-based PAI learning in the digital era.

C. Research Methods

This research uses a quantitative approach with a descriptive-explanatory design. This approach was chosen to describe the effectiveness of PAI learning based on information and communication technology (ICT) in the digital era and to explain the relationship between various factors that influence its success. Descriptive-explanatory research allows researchers to not only describe phenomena, but also identify relevant patterns or relationships.

The research was carried out in several high schools (SMA) in urban and rural areas that have implemented ICT-based PAI learning. Location selection is based on variations in the context of ICT application, such as technology accessibility, teacher competency level, and infrastructure readiness

Participants in this research consisted of three main groups, namely Islamic Religious Education (PAI) teachers, students, and school principals. Sample determination was carried out using a purposive sampling technique, with several criteria that participants had to fulfill. The criteria for PAI teachers are those who have used Information and Communication Technology (ICT) in PAI learning for at least one year. The students who participated were those in classes XI and XII and took part in ICT-based PAI learning. Meanwhile, the school principals involved are those who have policies that support the integration of ICT in the learning process. The number of participants in this research consisted of 150 students, 10 PAI teachers, and 5 school principals.

Data collection in this research was carried out using several different instruments to obtain comprehensive information. The first instrument is a questionnaire, which is used to measure students' perceptions of the effectiveness of ICT-based PAI learning. This questionnaire covers aspects of student engagement, understanding of the material, and learning satisfaction. The second instrument is an interview, which aims to explore the views of teachers and school principals regarding the challenges and opportunities in implementing ICT in PAI learning. In addition, observations were carried out to document the learning process in the classroom, including the use of ICT devices and the teaching methods applied. The final instrument is documentation, which is used to collect additional data such as curriculum, syllabus, and learning evaluation reports.

The data collection procedure was carried out in several structured stages. The first stage is preparation, which includes preparing research instruments, obtaining research permits, and training the research team. The second stage is data collection, which includes classroom observations, distribution of questionnaires to students, interviews with teachers and school principals, as well as collecting relevant documents. The final stage is data verification, which is carried out to ensure the validity and completeness of the data obtained through triangulation of data sources.

The collected data was then analyzed using mixed methods to provide a more comprehensive understanding of the effectiveness of ICT-based PAI learning. Quantitative analysis is carried out using descriptive and inferential statistics, which aims to measure learning effectiveness and identify relationships between variables. Meanwhile, qualitative analysis was carried out using a thematic approach, which was used to gain in-depth insights from interviews and observations. The analysis stage includes data coding, where interviews and observations are organized into thematic categories. Statistical tests are also carried out using statistical software such as SPSS to test the relationship between variables. In the end, the results of the quantitative and qualitative analysis will be interpreted to relate them to the theoretical framework and research context.

To ensure the validity and reliability of the data obtained, several steps were taken. The construct validity test was carried out by involving educational experts to assess the relevance and accuracy of the research instrument. Reliability testing was carried out using the Cronbach's Alpha test to ensure the internal consistency of the questionnaire. In addition, data triangulation is used to combine results from various data sources such as questionnaires, interviews, and observations to verify research findings. With this systematic and structured approach, it is hoped that this research can provide valid, reliable and reliable results in evaluating the effectiveness of ICT-based PAI learning in the digital era.

D. Research Results and Discussion

Islamic Religious Education (PAI) is a subject that aims to shape students' personalities based on Islamic values.[31] According to Nur (2023)[32], PAI not only focuses on mastering religious knowledge, but also on character formation and the integration of moral values in everyday life. In the learning context, PAI includes cognitive, affective and psychomotor dimensions which support each other to produce individuals who are faithful, devout and have noble character.[33]

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[31] Imam Taufiq Akbar, H Moh Sahlan, and Heri Purwanto, "Problematics of Affective Assessment in Islamic Religious Education Subjects," *AS-SUNNIYYAH* 1, no. 02 (2021): 1–11.

[32] Faisol Nur and Untung Sunaryo, "The Role of Islamic Religious Education in Revitalizing Character Education," *Unisan Journal* 1, no. 5 (2023): 351–60.

[33] Ulfiyatin Mufida et al., "PROBLEMATICS OF AFFECTIVE ASSESSMENT IN ISLAMIC RELIGIOUS EDUCATION (PAI) SUBJECTS," *INNOVATIVE: Journal of Education, Religion and Culture Research* 7, no. 2 (2021): 243–65.

information[34]. In the world of education, ICT has had a big impact, both in terms of delivering material, managing learning, and interactions between teachers and students.[35] The use of ICT allows the creation of learning that is more interactive, interesting and flexible according to student needs.[36]

According to Anderson and Krathwohl (2001)[37], ICT can support the learning process in several ways, such as providing varied learning resources, increasing student engagement, and developing critical thinking skills.[38] In the PAI context, the use of ICT can help students understand religious concepts in a more visual and applicable way, for example through learning videos, interactive applications, or online platforms.[39]

Various studies have been conducted to examine the effectiveness of using ICT in learning. For example, research conducted by Fatimah (2024)[40] shows that the use of e-learning platforms can significantly increase student learning motivation. Another study by Ningsih (2021) found that the integration of ICT in PAI learning can improve students' understanding of teaching material, especially in abstract topics.[41]

However, several studies also highlight challenges in implementing ICT, such as limited technological infrastructure[42], lack of teacher competence in using ICT tools[43], as well as resistance to changes in learning

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[34] Imam Taufiq Akbar, H Moh Sahlan, and Heri Purwanto, "Problematics of Affective Assessment in Islamic Religious Education Subjects," *AS-SUNNIYYAH* 1, no. 02 (2021): 1–11.

[35] Sulia Ningsih, "Students' Perceptions of Online Learning During the Covid-19 Pandemic," *JINOTEP (Journal of Learning Innovation and Technology): Studies and Research in Learning Technology* 7, no. 2 (2020): 124–32.

[36] Akbar, Sahlan, and Purwanto, "Problematics of Affective Assessment in Islamic Religious Education Subjects," 2021.

[37] Masyni Elbadiansyah, "Learning and Learning [Electronic Sources]: Theoretical and Practical Concepts" (sebatik. wicida. ac. id, 2021).

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[42] Nur Asiyah and Agus Sutiyono, "Evaluation of the Implementation of the 2013 Curriculum in High Schools in Arts and Culture Subjects," *Wiyata Dharma: Journal of Educational Research and Evaluation* 12, no. 2 (2024).

[43] Raka Ismaya, Savira Salshabila, and Indri Dwi Ariyani, "THE INFLUENCE OF USE OF DIGITAL LEARNING MEDIA ON PRIMARY SCHOOL STUDENT LEARNING OUTCOMES," *Education and Teaching Review Journal (JRPP)* 7, no. 4 (2024): 13779–85.

methods[44]. This shows that the application of ICT in learning, including in PAI, requires a comprehensive approach and planned strategy

Learning Islamic Religious Education (PAI) based on Information and Communication Technology (ICT) is an approach that is increasingly important to apply in this digital era. With the rapid development of technology, the use of ICT in PAI learning provides new opportunities to improve the quality of learning, both in terms of student engagement, understanding of the material, and accessibility of the learning itself. The digital era has brought various changes in the way of accessing information, communicating and learning, which must be utilized optimally in education, including in the field of PAI.

The effectiveness of ICT-based PAI learning can be measured through several dimensions. First, in terms of student involvement, ICT allows students to more actively interact with learning materials through various digital media, such as learning videos, online discussion forums, and interactive learning applications. This can increase students' interest in studying PAI material, which is often considered less interesting if it is only delivered using conventional methods. Second, understanding of the material can be deeper because ICT allows teachers to present material in various formats that are easier to understand, such as multimedia presentations, simulations, or even game-based material which can make learning more fun and effective.

Apart from that, the use of ICT in PAI learning also provides advantages in terms of flexibility and accessibility. Students are no longer tied to a certain time and place to obtain learning materials, because materials can be accessed anytime and anywhere via digital platforms. This is very relevant to learning conditions in the digital era, where students and teachers can utilize various learning applications to support the teaching and learning process, both face-to-face and in the form of online learning.

However, the application of ICT in PAI learning is not without challenges. One of the main challenges is the limited ICT facilities and infrastructure in schools, especially in areas that do not yet have adequate access to technological devices or a stable internet network. Apart from that, the teacher's ability to integrate ICT in learning also needs to be considered. Teachers need to be given training and support so that they can optimize the use of ICT in PAI learning, both in terms of creating interesting learning materials and in managing digital classes.

On the other hand, school principals also play an important role in ensuring that policies at the school level support the integration of ICT in learning. School principals must create an environment that supports the use of ICT, both in terms of policy, resource support, and providing the necessary

[44] Irzeq Rozeqqi, "Integration of Technology in the Economic Education Curriculum," *Studia Ulumina: Journal of Educational Studies* 1, no. 1 (2024): 21–31.

facilities. This policy can include providing adequate ICT devices, increasing teacher skills in using technology, as well as increasing student access to digital resources. ICT-based PAI learning in the digital era has great potential to increase learning effectiveness, as long as it is balanced with adequate infrastructure support, training for teachers, and supporting policies at the school level. Thus, ICT-based PAI learning can be an effective solution for optimizing the learning process in this fast-paced and challenging digital era.

This research aims to evaluate the effectiveness of Islamic Religious Education (PAI) learning based on Information and Communication Technology (ICT) in several senior high schools (SMA) in urban and rural areas. The research results show that there are significant differences in the application of ICT between schools in urban and rural areas. In urban schools, the application of ICT is quite intensive with the use of various devices such as projectors, digital learning applications, and online platforms to deliver PAI material. In contrast, in rural schools, although there are efforts to use ICT, limited facilities and infrastructure such as computer equipment and unstable internet connections hinder the effectiveness of its implementation. In addition, although students in urban schools feel more involved and interested in ICT-based PAI learning, students in rural areas also feel the same thing even though they are constrained by limited access. Teachers in the two regions show differences in readiness to use ICT in learning. Teachers in urban areas feel better prepared because they receive better training and have access to adequate equipment, while teachers in rural areas still feel difficulties due to a lack of training and technical support. Observations also show that school principals play an important role in the successful integration of ICT in learning, with urban schools having clearer and more structured policies to support the use of ICT, whereas in rural areas, these policies are often hampered by budget and infrastructure constraints. Overall, ICT-based PAI learning has great potential to increase student engagement and understanding of the material, especially in urban areas, but in rural areas, major challenges in terms of access and facilities need to be overcome to achieve more equitable effectiveness. Therefore, infrastructure development and teacher training are very important to maximize the application of ICT in PAI learning in all regions. Based on the research results, several important findings were found regarding the application and effectiveness of ICT-based PAI learning.

1. **Application of ICT in PAI Learning**

In general, the application of ICT in Islamic Religious Education (PAI) learning in the schools studied shows significant variations between schools in urban and rural areas. In schools in urban areas, the use of ICT in PAI learning is quite intensive. These schools have integrated various ICT devices such as projectors, digital learning applications, and online platforms to deliver PAI material. The use of this technology allows students to more

easily access learning materials and increases their involvement in the learning process. In contrast, in schools in rural areas, the use of ICT is still limited. Many schools in this area only rely on a limited number of computers or laptops, and an internet network that is often unstable. This causes ICT-based PAI learning to not be carried out optimally, considering the limitations of existing facilities. As a result, technology-based learning in rural areas experiences obstacles that reduce its effectiveness.

In urban areas, the application of ICT in PAI learning seems to be more driven by better infrastructure readiness. Schools in urban areas have wider access to hardware and software that supports technology-based learning. For example, many schools have provided devices such as projectors, laptops and interactive boards, which allow teachers to present PAI material in a more interesting multimedia format. In addition, a stable and fast internet network makes it easier for students and teachers to access digital learning resources, such as learning videos, e-books and interactive learning applications. All of this creates a more dynamic learning atmosphere and allows teachers to be more creative in delivering PAI material.

On the other hand, schools in rural areas face major challenges in terms of ICT infrastructure and facilities. Many schools in this area only have a few computers or laptops which are used in turns by teachers and students. These limitations limit the ability of schools to thoroughly integrate ICT in learning. In addition, many rural areas do not have adequate internet access, with networks that are often intermittent or even non-existent. This is certainly a big obstacle in utilizing various online learning platforms and internet-based applications which are now widely used in ICT-based learning. As a result, PAI learning in rural areas often only relies on conventional methods, such as lectures and textbooks, which are limited in attracting student interest. However, there are efforts by some schools in rural areas to overcome this challenge in creative ways. For example, some schools use learning media that can be accessed offline, such as learning CDs or hardware-based learning applications that do not require an internet connection. Although this solution is more limited, it shows that despite limited ICT facilities and infrastructure, teachers and schools are still trying to provide more diverse and interactive learning experiences for students. However, this effort of course requires further support, both from the government, educational institutions and the community to ensure that all schools, both in urban and rural areas, have equal access to technology.

Significant differences in the application of ICT between urban and rural areas can also be seen from students' perceptions of ICT-based PAI learning. In urban schools, most students feel that ICT-based PAI learning makes them more involved and interested. The use of technology allows them to access teaching materials in a more interesting way, such as learning videos, interactive quizzes, and online discussions. This makes the teaching and learning process more fun and less boring, and increases students'

understanding of the material being taught. Apart from that, students also feel that the use of ICT in learning helps them to study independently outside class hours, because they can access material anytime and anywhere through the available online platforms.

In contrast, in rural schools, although students are also interested in ICT-based learning, the access constraints they face reduce the effectiveness of their learning experience. Students in rural areas often cannot access learning materials online due to limited devices and internet networks. As a result, they have to rely on learning materials provided by teachers in class, which are sometimes less interesting and less interactive than materials that can be accessed via ICT. Despite this, students in rural areas continue to show interest in the use of ICT in learning, indicating there is great potential to improve learning in these areas if adequate facilities are provided.

Teachers in both areas, both urban and rural, have varying views about the application of ICT in PAI learning. In urban schools, teachers feel better prepared to integrate ICT in their learning. They admitted that they had received sufficient training regarding the use of ICT devices and applications to support the learning process. Apart from that, they also have more time and opportunities to develop more creative and interactive technology-based learning materials. These teachers also feel that the use of ICT helps them to more easily explain concepts in PAI that are sometimes difficult for students to understand, such as abstract concepts or the history of religion. However, in rural schools, many teachers find it difficult to utilize ICT for PAI learning. Although they recognize the importance of using technology in education, many of them have not received adequate training to operate ICT tools effectively. In addition, the lack of adequate infrastructure and equipment support makes it difficult for them to optimally integrate ICT in their teaching. Several teachers in rural areas also admitted that they were more accustomed to conventional methods of teaching, so they felt less confident in using technology in the classroom. Therefore, more intensive training and technical support is needed to help teachers in rural areas to be better prepared to integrate ICT in PAI learning.

Apart from challenges related to infrastructure and teacher training, the policies of school principals also influence the successful implementation of ICT in learning. In urban schools, policies supporting the use of ICT in learning are clearer and more structured. School principals in urban areas often encourage teachers to utilize technology in every subject, including PAI, by providing adequate facilities and supporting training for teachers. This kind of policy allows teachers to more easily access the technology and learning materials they need, as well as creating a learning environment that is more supportive of the use of ICT. However, in rural schools, although principals also try to support the use of ICT, existing policies are often limited by budget and resource constraints. Many school principals in rural areas find it difficult to provide sufficient ICT equipment or to improve existing

infrastructure. Even if there are policies that support the use of ICT, the biggest challenge is how to implement them with limited resources. Therefore, support from the government and educational institutions is very important to strengthen policies at the school level, so that all schools can make maximum use of ICT in PAI learning.

Although ICT-based PAI learning has great potential to improve the quality of education in schools, there is a significant gap between schools in urban and rural areas in terms of the application of this technology. Schools in urban areas have advantages in terms of better infrastructure and facilities, while schools in rural areas still face major challenges related to limited devices, internet access and teacher training. For this reason, greater efforts need to be made to improve ICT infrastructure in rural areas and provide more intensive training to teachers in these areas. Apart from that, policies that support the use of ICT at the school level also need to be strengthened so that technology can be utilized optimally in PAI learning in all regions.

2. **Student Perceptions of ICT-Based PAI Learning**

Based on a questionnaire distributed to 150 students, the majority of students in urban schools revealed that they felt more involved and interested in ICT-based PAI learning. The use of digital media such as videos, interactive quizzes and online discussion forums has proven effective in increasing their interest in learning. With the variety of learning media provided by the teacher, students feel more motivated and understand the material being taught more easily. This interactive learning also helps them not only passively listen to lectures, but also actively participate in the learning process, either through group discussions or activities involving technology.

In contrast, in rural schools, although students also express satisfaction with the use of ICT in learning, the challenges they face are quite significant. One of the main problems faced is difficulty in accessing adequate devices and limited stable internet networks. Many students in rural areas do not have access to personal devices such as laptops or tablets that allow them to easily access ICT-based learning materials. Additionally, although most students in these areas show interest in the use of technology in learning, they are often hampered by slow or unstable internet connections, which prevent them from accessing online learning platforms smoothly. This limited access means that ICT-based learning in rural schools cannot be implemented optimally, even though students' potential and enthusiasm for using technology in learning is quite large.

This challenge also influences the frequency of ICT use in learning activities. In urban schools, with better infrastructure support, the use of ICT can be carried out routinely in every learning session. The use of various online learning platforms, interactive applications and learning videos can be done without significant obstacles. Students can not only access the material directly, but can also take online quizzes or exams that help measure their

understanding of the material that has been taught. On the other hand, in rural schools, ICT-based learning is often limited to the use of devices at school or during certain hours due to limited internet access and available hardware. As a result, learning is more dependent on traditional methods, and the use of ICT in PAI learning becomes more sporadic and not fully integrated.

Apart from that, there are also psychological factors that influence student involvement in ICT-based learning. Students in urban schools tend to feel more comfortable and familiar with the use of technology because they are frequently exposed to digital devices from an early age. They feel more confident and less awkward in operating technology-based learning applications or platforms. On the other hand, students in rural schools may not be used to using sophisticated technological devices, so they feel more difficulty or even anxious when asked to use ICT in learning. This may also affect their level of involvement in ICT-based learning, even though they are aware of its benefits.

Although there are significant differences in the influence of ICT on student engagement between urban and rural schools, there are similarities in terms of student interest in learning. Even though students in rural areas are limited by access factors, they still show high interest in ICT-based learning. This interest indicates that there is great potential that can be exploited if access factors and facilities can be improved. With increased access to devices and a more stable internet, ICT-based PAI learning in rural schools can provide a more comprehensive and interesting learning experience for students.

To increase the effectiveness of using ICT in PAI learning, schools in rural areas need assistance in terms of procuring equipment and improving the quality of the internet network. In addition, training for teachers is also very important to increase their understanding of how to integrate ICT effectively in PAI teaching. With adequate support, students in rural areas can experience the same benefits as students in urban areas, thereby creating more equal opportunities to obtain quality education through technology. and slow connections affect learning effectiveness.

3. Teachers' Perceptions of ICT-Based PAI Learning

Interviews with 10 PAI teachers showed that in urban schools, teachers felt better prepared to use ICT for PAI learning. Most teachers in urban areas claim to be familiar with technology and have better access to various learning devices and applications. They use applications such as Google Classroom, Kahoot, and other online learning platforms to facilitate the teaching and learning process. The use of digital media not only makes it easier to deliver material, but also provides space for students to participate more actively in learning activities. Urban teachers feel that ICT allows them to be more creative in packaging learning materials, making them more interesting and interactive, as well as giving students the opportunity to learn independently outside school hours through the digital resources provided.

On the other hand, interviews with PAI teachers in rural schools revealed that many of them still find it difficult to utilize ICT for learning. One of the main challenges faced is the limited ICT facilities and infrastructure in these schools. Many schools in rural areas only have a few computers or laptops which are used interchangeably by teachers and students. In addition, limited and often intermittent internet networks exacerbate this condition, so that many teachers find it difficult to access online learning materials or use learning applications that require a stable internet connection. In fact, some teachers expressed that they were more comfortable using traditional methods such as lectures and textbook-based teaching, due to the limitations of existing devices and technology.

In addition, many teachers in rural schools also expressed that they felt they did not receive adequate training regarding the use of ICT in learning. They realize that technology can improve the quality of learning, but limited knowledge and skills in operating technological devices are the main barrier. These teachers feel they need further training on how to make optimal use of ICT, as well as how to integrate various digital applications and platforms in PAI learning. Without adequate training, many teachers feel hesitant and lack confidence in using technology in their teaching.

Most teachers in rural areas also stated that they had limited time and resources to develop ICT-based learning materials. In contrast to teachers in urban areas who have more time to explore various digital tools and resources, teachers in rural areas often focus on teaching material in more conventional ways due to lack of time and facilities. However, some teachers in rural schools still try to use digital media that can be accessed offline, such as learning CDs or applications that do not require an internet connection. This shows that there are efforts by teachers to continue to integrate technology in learning even though they face limited facilities.

Overall, although there are significant differences in teachers' readiness and ability to utilize ICT in urban and rural areas, this interview shows that there is great potential for the development of ICT-based learning in both areas. In urban areas, teachers are better prepared and have better access, while in rural areas, despite difficulties regarding facilities and training, teachers still show enthusiasm for utilizing ICT in teaching. Therefore, it is important for governments and educational institutions to provide greater support in the form of training for teachers, improving ICT facilities in rural schools, as well as providing resources that can facilitate more effective implementation of ICT throughout the region.

4. Challenges and Opportunities for Implementing ICT

Classroom observations and interviews with school principals revealed that although there are great opportunities to increase the effectiveness of PAI learning through ICT, there are several challenges that must be faced, both in urban and rural areas. In urban schools, the main challenge is how to maximize the use of existing ICT. Although ICT

infrastructure and facilities in urban schools are adequate, there is still room for improvement in terms of technology integration in learning. Several school principals expressed that although hardware and software are available, teachers and students have not fully exploited the full potential of ICT, especially in creating more interactive and comprehensive learning experiences. This includes developing more creative learning materials and using various learning applications that can increase student engagement.

On the other hand, in rural schools, the main challenge is limited access to technology and stable internet. School principals in rural areas stated that although they strongly support the use of ICT in learning, limited infrastructure is a major obstacle. Many schools in rural areas only have a few computers that are used interchangeably, and internet networks are often intermittent or even non-existent, making it difficult to implement ICT-based learning optimally. Even though some schools are trying to overcome this by utilizing technology that can be accessed offline, such as learning CDs or hardware-based applications, this still limits the scope for optimizing ICT-based learning. However, even though these challenges are quite large, several emerging opportunities can also increase the effectiveness of PAI learning through ICT. One of the main opportunities identified in this research is the ease of access to teaching materials via digital platforms. In both urban and rural areas, online learning platforms provide opportunities for students to access materials anytime and anywhere, allowing for more flexible and in-depth learning. Students are no longer limited to material only taught in class, but can take advantage of various digital learning resources that can help them deepen their understanding of PAI material.

Distance learning (PJJ) is also a significant opportunity to increase the effectiveness of PAI learning. In urban areas, even though face-to-face learning is going well, distance learning still has the potential to provide more flexibility for students. With digital platforms and learning applications, students can take part in lessons outside of school hours, giving them the opportunity to learn in a more independent way. In rural areas, distance learning becomes very relevant, especially amidst limited facilities and infrastructure. Online learning provides an opportunity for students in hard-to-reach areas to still receive material equivalent to students in urban areas, as long as internet access and adequate devices can be provided.

School principals in both regions also emphasized the importance of training and support for teachers in making optimal use of ICT. They realized that to improve the quality of ICT-based learning, teachers must be given adequate training on how to use technology effectively in the teaching and learning process. This training not only covers the use of hardware and software, but also how to integrate ICT with relevant learning methods for PAI. School principals in urban areas revealed that although most teachers already have basic skills in using ICT, they still need further training to further optimize its use, especially in designing materials that are more interactive

and interesting for students. In rural areas, this training becomes even more important because many teachers do not yet have sufficient skills in using technology in learning, and this support can be key to overcoming the challenges they face. Overall, although there are significant challenges in implementing ICT in PAI learning, both in urban and rural areas, existing opportunities can be exploited to improve the quality of learning. With improved infrastructure, training for teachers, and stronger policy support, the application of ICT in PAI learning can develop into a more effective and inclusive solution for improving Islamic religious education in the digital era.

E. Conclusion

This research shows that Islamic Religious Education (PAI) learning based on Information and Communication Technology (ICT) has great potential to increase the effectiveness of learning in the digital era. The application of ICT in PAI learning in urban schools has shown positive results, where students are more involved and interested in the material delivered through various digital media. The use of learning applications, videos and online discussion forums increases students' interactivity and understanding of the material. However, the main challenge in urban areas is how to maximize the use of existing ICT to create a more holistic learning experience. On the other hand, although great potential for the application of ICT also exists in rural schools, the challenges faced are more complex. Limited access to adequate technological devices and unstable internet networks are the main obstacles in optimizing ICT-based learning. However, despite limited facilities, students and teachers in rural areas still show enthusiasm and desire to utilize ICT in learning, which shows that there is potential that has not been fully explored. Overall, ICT-based PAI learning can improve the quality of Islamic religious education, provide flexibility in learning, and expand student access to teaching materials. To achieve maximum effectiveness, greater support is needed in terms of improving infrastructure, providing equipment and training for teachers, especially in rural areas. By fulfilling these aspects, ICT-based learning can be an inclusive and sustainable solution in improving the quality of Islamic religious education in all regions, both urban and rural, in the digital era.

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