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The Efficacy of Information and Communication Technology (ICT) Use in Islamic Religious Education Learning

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Abstract:

This study aims to examine the effectiveness of Information and Communication Technology (ICT) use in Islamic Religious Education (PAI) learning at SMA Negeri 1 Baubau. The research employed a qualitative method with a descriptive approach. The vice principal, Islamic Religious Education teachers, and students of SMA Negeri 1 Baubau served as the primary data sources, while documents functioned as secondary data. Observation and interview guidelines were used as research instruments, and data were collected through in-depth interviews, participant observation, and documentation. Qualitative data were analyzed using data reduction, data display, and conclusion drawing or verification techniques. The findings indicate that ICT is implemented through interactive videos and digital presentations. Students reported that learning became more engaging through the use of e-learning applications, which enable them to study from home and access learning materials at any time. Furthermore, the results demonstrate that the use of ICT in Islamic Religious Education has the potential to significantly enhance students' learning experiences, as learners show greater interest and improved comprehension of the material through e-learning platforms and instructional videos. However, challenges emerge when students and teachers are required to adapt to unfamiliar applications. Therefore, further training for teachers is necessary to optimize the use of ICT in the learning process. Overall, the study identifies supporting factors such as strong school commitment and adequate infrastructure, which positively contribute to ICT-based learning, as well as inhibiting factors, including unstable internet connections and difficulties in operating new applications, which may impede the optimal utilization of ICT.

Abstrak:

Penelitian ini bertujuan untuk menelaah efektivitas penggunaan Teknologi Informasi dan Komunikasi (TIK) dalam pembelajaran Pendidikan Agama Islam (PAI) di SMA Negeri 1 Baubau. Penelitian ini menggunakan metode kualitatif dengan pendekatan deskriptif. Wakil kepala sekolah, guru Pendidikan Agama Islam, dan siswa SMA Negeri 1 Baubau menjadi sumber data primer, sedangkan dokumen berfungsi sebagai data sekunder. Pedoman observasi dan wawancara digunakan sebagai instrumen penelitian, dan data dikumpulkan melalui wawancara mendalam, observasi partisipatif, serta dokumentasi. Data kualitatif dianalisis menggunakan teknik reduksi data, penyajian data, dan penarikan kesimpulan atau verifikasi. Hasil penelitian menunjukkan bahwa TIK diterapkan melalui video interaktif dan presentasi digital. Siswa melaporkan bahwa pembelajaran menjadi lebih menarik dengan penggunaan aplikasi e-learning, yang memungkinkan mereka belajar dari rumah dan mengakses materi pembelajaran kapan saja. Selain itu, hasil penelitian menunjukkan bahwa

penggunaan TIK dalam Pendidikan Agama Islam berpotensi meningkatkan pengalaman belajar siswa secara signifikan, karena peserta didik menunjukkan minat yang lebih tinggi dan pemahaman materi yang lebih baik melalui platform e-learning dan video pembelajaran. Namun, tantangan muncul ketika siswa dan guru diharuskan menyesuaikan diri dengan aplikasi yang belum familiar. Oleh karena itu, pelatihan lanjutan bagi guru diperlukan untuk mengoptimalkan penggunaan TIK dalam proses pembelajaran. Secara keseluruhan, penelitian ini mengidentifikasi faktor pendukung seperti komitmen sekolah yang kuat dan infrastruktur yang memadai, yang berkontribusi positif terhadap pembelajaran berbasis TIK, serta faktor penghambat, termasuk koneksi internet yang tidak stabil dan kesulitan dalam mengoperasikan aplikasi baru, yang dapat mengurangi pemanfaatan TIK secara optimal.

Keywords:
Information Communication and Technology (ICT), Learning,
Islamic Religious Education.

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Introduction

Globalization has significantly transformed various aspects of life, including the boundaries between nations, thereby rendering the world increasingly interconnected and transparent. Contemporary advancements in science and information technology have substantially altered how Indonesian society perceives and navigates daily life. The growing presence and role of technology in the education system have ushered in a new era of progress; however, this development has not been accompanied by a commensurate improvement in human resources capable of optimally utilizing information technology in the educational process. Education is a deliberate and systematic effort to create a learning environment and learning process that enable students to actively develop their potential, including spiritual and religious strength, self-control, personality, intelligence, noble character, and the skills required by individuals, society, the nation, and the state (Undang-Undang Sisdiknas, 2014). Within the educational context, teachers play a crucial role in shaping students into individuals who are able to adapt continuously to the dynamics of societal change while preserving their cultural identity, as this significantly determines the future trajectory of the nation's generations. Therefore, teachers are required to effectively bridge these demands by demonstrating professionalism, commitment, and sincere efforts in educating their

students (Darmawan, 2012). Technology may be understood as a force that influences and transforms culture. Its application in Islamic Religious Education reflects a cultural shift within the field, wherein conventional teaching methods are increasingly replaced by contemporary approaches that align with the rapid advancement of the times, characterized by ease of access to information and greater openness.

Nevertheless, Islamic Religious Education is often perceived as being undervalued, as it is frequently viewed as incompatible with the progress of science and technology. In contrast, science and technology, when grounded in religious values, can serve as a strong foundational framework for confronting the challenges of intense global competition. As Albert Einstein, a renowned physicist and the originator of the theory of relativity, once stated:

"Religion without science is blind, Science without religion is paralysed."

When examined closely, Albert Einstein's statement serves as evidence that religion and science are intrinsically interconnected, and that neither can exist independently of the other. In the implementation of effective and efficient Islamic Religious Education, educators are therefore required to make sincere and well-considered efforts to adopt instructional approaches that are readily accepted and understood by students. This principle is reflected in the word of Allah SWT as stated in the Holy Qur'an, Surah An-Nahl, verse 125:

ٱدۡعُ إِلَىٰ سَبِيلِ رَبِّكَ بِٱلۡحِكۡمَةِ وَٱلۡمَوۡعِظَةِ ٱلۡحَسَنَةِۖ وَجَٰدِلۡهُم بِٱلَّتِي هِيَ
أَحۡسَنُۚ إِنَّ رَبَّكَ هُوَ أَعۡلَمُ بِمَن ضَلَّ عَن سَبِيلِهِۦۖ وَهُوَ أَعۡلَمُ بِٱلۡمُهۡتَدِينَ ١٢٥

Translation:

> "Call (humans) to the way of your Lord with wisdom and good lessons and argue with them in a good way. Indeed, your Lord is the One who knows best about those who stray from His path and He is the Best Knower of those who are guided. (Ministry of Religious Affairs, 2009)

A wide range of instructional media is available to support the delivery of learning materials, one of which is Information and Communication Technology (ICT). In addition to facilitating students' learning, information technology also plays a significant role for educators, as ICT tools and facilities can be utilized to enhance teaching effectiveness and instructional quality (Budiman, 2017). Currently, two main types of information technology are utilized in the field of education and learning. The first is the computer-based system, which includes two forms of application: computer-assisted learning and computer-based learning. The second type is the network-based system in the form of the internet. Owing to their interconnectedness, these two systems function as an integrated unit in the learning process (Rusman, 2014).

Based on interviews and pre-survey observations conducted with the Grade XI Islamic Religious Education teacher, Saiful Bahrie, at SMA Negeri 1 Baubau, it was found that conventional teaching methods remain dominant in classroom practices. Learning

resources are still largely limited to printed media, such as textbooks, and the use of the internet is relatively minimal. Although educators have utilized computer media, LCD projectors, and Microsoft PowerPoint applications, these tools are primarily used merely to display instructional content. In practice, Islamic Religious Education teachers tend to present text-based materials resembling modules rather than concept-oriented presentations that highlight core learning ideas. Consequently, students' interest in learning has not been optimally fostered (Saiful, 2024). The novelty of this research lies in its focus on the use of Information and Communication Technology (ICT) in Islamic Religious Education (PAI) instruction, which extends beyond examining the availability of technological media to emphasize teachers' pedagogical practices in meaningfully integrating ICT into the learning process. This study underscores a shift in the role of technology from a tool solely for content presentation to one that can enhance students' learning interest, deepen their understanding of Islamic values, and promote active participation.

Furthermore, this research offers a novel contextual contribution, as it is conducted in a senior high school located in a non-urban area with limited access to technology and educational facilities. The study provides empirical insights into the challenges, readiness, and competencies of Islamic Religious Education (PAI) teachers in utilizing ICT in response to globalization demands, while maintaining religious values as the foundation of education. In light of this phenomenon, the researchers believe that the use of technology in educational contexts will gradually become more widespread. However, several obstacles may hinder the effective integration of technology in education, particularly in Islamic Religious Education. These challenges include limited facilities, such as the remote location of schools that are geographically distant from larger and more technologically advanced urban centers. Such conditions restrict access to technological support and slow the adoption and development of new educational technologies. Beyond the availability of software and hardware, schools also require competent human resources, particularly teachers. Even when technological infrastructure is in place, a lack of teachers' technological competence can constitute a significant barrier to the effective use of technology in the educational process.

Based on classroom observations conducted on March 5, 2025, many students appeared unenthusiastic, showed limited attention to the material presented by the teacher, engaged in off-task conversations, and appeared fatigued during lessons. In addition, students' independent learning abilities and mastery of the instructional material remained low. This was evident when the teacher presented the lesson content or posed questions related to previous or upcoming topics, as very few students were able to respond appropriately. When responses were provided, they were often given without sufficient reflection. Furthermore, teachers' limited proficiency in using computer-based media and LCD projectors in the classroom has negatively affected students' learning outcomes. As a result, many students failed to meet the Minimum Competency Criteria (KKM), with remedial scores reaching only the minimum passing standard of 75.

Previous studies have demonstrated the positive impact of ICT integration in learning. For instance, the use of ICT in instructional activities has been shown to improve students' learning outcomes (Nurdyansah, 2016). Similarly, technology-based learning models have been found to positively influence both learning outcomes and student motivation (Suratman, Afyaman, & Rakhmasari, 2019), while ICT-based media have increased learning completion rates to as high as 91% (Adiko, 2019). In the context of innovation in Islamic Religious Education, there is an urgent need to implement improved learning methods (Nurdin, 2016), and the internet can serve as an effective alternative medium for PAI learning (Jazilah, 2021). Likewise, the integration of ICT in each Islamic Religious Education learning process has increasingly focused on achieving targeted learning objectives (Pulungan, 2017). At present, the role of ICT in education must be further developed, and its potential benefits should continue to be explored (Riyadi, Anwar, Nurhidayati, Julianti, & Yuliana, 2021).

Information and Communication Technology (ICT) is available and used in learning at the research site, but its application is still limited and has not been optimized, especially in Islamic Religious Education (PAI) learning. Therefore, although the research title emphasizes the effectiveness of ICT use, this study is not intended to measure effectiveness quantitatively. Instead, in line with the qualitative approach used, the focus of the research is directed at describing the impact of ICT implementation in IRE learning and identifying the factors that influence the effectiveness of its application, both supporting and inhibiting factors.

This situation indicates that although ICT facilities are physically available, their implementation in Islamic Religious Education (PAI) learning has not yet been fully optimized in accordance with their potential. Conceptually, ICT has the capacity to enhance learning effectiveness through the presentation of instructional materials that are more engaging, interactive, and easily accessible to students. Accordingly, this study does not aim to measure effectiveness in a quantitative sense; rather, it seeks to provide an in-depth qualitative description of the impact of ICT implementation in Islamic Religious Education (PAI) learning and to identify the factors influencing its effectiveness, including both supporting and inhibiting factors. Through a qualitative approach, this research is expected to offer a comprehensive portrayal of the actual conditions of ICT utilization in PAI learning and its implications for students' learning processes and experiences. Given the importance of Islamic Religious Education in shaping students' character and values, the researchers were motivated to conduct a study examining the implementation of ICT in PAI learning through the use of computer media, LCD projectors, and internet-based resources. Accordingly, this study is entitled "The Efficacy of the Use of Information and Communication Technology (ICT) in Islamic Religious Education Learning at SMA Negeri 1 Baubau".

Research Method

This study employed a qualitative research design with a descriptive approach in order to obtain an in-depth understanding of the phenomenon under investigation.

Specifically, an intrinsic case study approach was adopted, as the focus of the research was to explore and describe a particular case in its real-life context, namely the implementation of Information and Communication Technology (ICT) in Islamic Religious Education (PAI) learning at SMA Negeri 1 Baubau. The intrinsic case study approach was selected because it allows researchers to gain a comprehensive understanding of the nature, characteristics, and challenges of a specific case that is of inherent interest, rather than aiming to generalize findings to broader populations (Moleong, 2017). The data sources in this study were divided into primary and secondary data. Primary data were obtained directly from key informants who were actively involved in the learning process at the research site. These included the vice principal of SMA Negeri 1 Baubau, Islamic Religious Education teachers, and students participating in PAI learning activities. These informants were selected purposively based on their relevance and direct involvement in the implementation of ICT in the teaching and learning process. Secondary data were collected from various supporting documents and reference materials, such as school profiles, lesson plans, curriculum documents, institutional policies, and other relevant records that provided contextual and supplementary information for the study.

To ensure systematic data collection, the researchers employed observation guidelines and interview guidelines as the main research instruments. Observations were conducted to examine teaching and learning activities, classroom interactions, and the actual use of ICT tools during PAI lessons. Participant observation was chosen to allow the researchers to directly engage with the learning environment and obtain authentic insights into classroom dynamics. In-depth interviews were conducted with the selected informants to explore their experiences, perceptions, and views regarding the use of ICT in PAI learning. Additionally, documentation was used to collect written and visual data that supported and corroborated the findings obtained from observations and interviews. The data collection process involved several techniques, including in-depth interviews, participant observation, and documentation. These techniques were applied to achieve data triangulation, thereby enhancing the credibility and trustworthiness of the research findings. Throughout the research process, data collection and analysis were conducted simultaneously to allow for continuous refinement of emerging themes and interpretations.

Qualitative data analysis in this study followed the analytical framework proposed by Miles and Huberman, as cited in Emzir (2010). This framework consists of three interrelated stages: data reduction, data display, and conclusion drawing or verification. Data reduction involved selecting, focusing, simplifying, and transforming raw data obtained from the field into meaningful units of analysis. Data display was carried out by organizing the reduced data into descriptive narratives, matrices, or thematic categories to facilitate interpretation. Finally, conclusions were drawn through careful interpretation of patterns, relationships, and themes that emerged from the data, and these conclusions were continuously verified through cross-checking with data sources to ensure their validity. Through this methodological approach, the study aimed to

provide a rich and comprehensive depiction of the implementation of ICT in Islamic Religious Education learning at SMA Negeri 1 Baubau, as well as to identify the factors influencing its effectiveness from the perspectives of various stakeholders.

Result and Discussion

Result

Model of Information and Communication Technology (ICT) Use in Islamic Education Learning at SMA Negeri 1 Baubau

The model of ICT utilization in Islamic Religious Education learning at the secondary school level demonstrates strong potential for enhancing the overall quality of instruction. Through the integration of various digital tools and resources, teachers are able to present learning materials in ways that are more engaging, interactive, and contextualized. In particular, the use of videos, animations, and multimedia presentations enables students to better comprehend complex Islamic concepts, including Islamic history, jurisprudence (fiqh), and moral and ethical teachings. As a result, the learning process is no longer limited to conventional textbook-based instruction but is enriched by diverse digital information sources that support deeper understanding. Moreover, ICT facilitates more flexible and accessible learning opportunities. Learning materials can be accessed through e-learning platforms or educational applications at any time and from various locations, allowing students to engage in self-directed learning beyond the classroom setting. This flexibility supports individual learning paces and encourages students to take greater responsibility for their own learning. In addition, ICT enables interaction and collaboration outside formal school hours through online discussion forums, messaging platforms, and virtual study groups. Such interactions contribute to improved comprehension and allow students to clarify learning difficulties through peer and teacher support.

Despite its considerable potential, the implementation of ICT in Islamic Religious Education learning also faces several challenges. One major obstacle is inadequate infrastructure, particularly unstable internet connectivity and the limited availability of technological devices in certain areas. These constraints hinder the consistent and effective use of ICT during learning activities. Furthermore, not all teachers possess sufficient technological competence to integrate ICT optimally into their instructional practices. Limited digital literacy and a lack of continuous professional development reduce teachers' confidence in using ICT as an instructional tool. Therefore, it is essential for schools to provide systematic training programs for teachers and to improve technological infrastructure to ensure that ICT can be utilized effectively and sustainably. Consequently, the integration of ICT in Islamic Religious Education learning must be implemented through a balanced and value-oriented approach. While technology offers opportunities to promote innovation, interactivity, and engagement in learning, the fundamental values and objectives of Islamic Religious Education must remain central. ICT should function as a supportive medium that strengthens students' understanding of

Islamic teachings rather than replacing or diminishing their spiritual essence. When appropriately integrated, ICT can contribute to broader educational goals, including the development of students who are not only academically competent but also possess strong moral character and religious values.

These findings are supported by interview data obtained from various stakeholders. Ahmad, an Islamic Religious Education teacher, explained the pedagogical benefits and existing challenges of ICT use in PAI learning as follows:

> "The use of ICT in Islamic Education learning is very beneficial, especially for explaining complex materials. For example, videos and interactive presentations significantly increase students' engagement and understanding of topics such as Islamic history. However, we still face challenges related to unstable internet connections in some areas" (Ahmad, 2025).

Similarly, the Vice Principal for Curriculum, Amrullah, emphasized institutional efforts and ongoing limitations in ICT implementation:

> "We are making efforts to integrate ICT into the Islamic Education curriculum. This includes providing teacher training and supplying appropriate technological devices. Despite the progress that has been made, further improvements in training are still required to ensure teachers' proficiency in using technology" (Amrullah, 2025).

The students' perspectives further reinforce these findings. One student, Siti Nurhaliza, shared her experience with ICT-based learning in Islamic Religious Education:

> "I feel that learning Islamic Education has become more interesting with the use of technology. E-learning applications allow me to study at home and access learning materials at any time. However, I sometimes experience difficulties when I have to use unfamiliar applications."

Overall, these findings illustrate that the ICT utilization model implemented at SMA Negeri 1 Baubau has positively influenced the learning process in Islamic Religious Education. At the same time, the study highlights the importance of addressing infrastructural limitations and enhancing teachers' technological competencies to optimize the effectiveness of ICT integration in PAI learning.

Based on the interview findings, it can be concluded that the model of ICT utilization in Islamic Religious Education learning demonstrates that technology has the potential to significantly enhance students' comprehension of complex subject matter, particularly topics such as Islamic history, through the use of videos and interactive presentations. Students reported that learning becomes more engaging with access to e-learning applications, which enable them to study independently at home and access learning materials at any time. Nevertheless, several challenges remain, including unstable internet connectivity, difficulties in operating unfamiliar applications, and the need for continuous teacher training. Addressing these issues through the improvement of teachers' digital competencies and the provision of adequate technological infrastructure is essential to fostering a more interactive and effective learning

environment. Such efforts are expected to encourage students to further explore Islamic teachings in ways that are both engaging and relevant to contemporary contexts.

The novelty of this study lies in its emphasis on the meaningful integration of ICT with pedagogical needs in the context of Islamic Religious Education. The interview findings indicate that the use of ICT tools, such as instructional videos, interactive presentations, and e-learning platforms, substantially enhances students' understanding of challenging materials while making learning more flexible and stimulating. By explicitly highlighting practical challenges, including unreliable internet access and difficulties in using digital applications, this study reflects the realities encountered in educational settings and provides concrete recommendations for improving teachers' technological skills and strengthening infrastructural support. Through the creation of an interactive and contextually relevant learning environment, this research not only supports academic understanding but also motivates students to engage more deeply with Islamic teachings, thereby contributing to the development of innovative instructional practices and the advancement of future-oriented education.

Effectiveness of ICT Use in Islamic Education Learning at SMA Negeri 1 Baubau

At SMA Negeri 1 Baubau, the implementation of ICT in Islamic Religious Education learning has demonstrated a positive impact on students' learning experiences. The integration of e-learning applications, instructional videos, and online discussion platforms has enabled students to access Islamic Education materials more easily and in a more engaging manner. This approach has increased students' interest in learning and supported autonomous learning, as students are able to study independently outside school hours. Although challenges persist, particularly related to teachers' technological proficiency and limitations in infrastructure, the school's ongoing efforts to enhance teachers' digital literacy have contributed to the development of a more interactive learning atmosphere. Consequently, ICT plays an important role in enriching students' learning experiences and strengthening their understanding of Islamic values.

Furthermore, the use of ICT provides opportunities for students to collaborate and engage in online discussions, thereby enriching social interaction within the learning process. Through platforms such as discussion forums and virtual study groups, students are able to exchange ideas, ask questions, and reflect on Islamic Education materials. This collaborative learning environment not only enhances conceptual understanding but also fosters essential communication and teamwork skills. With the integration of technology, learning is no longer confined to the classroom but extends beyond school hours, creating a more dynamic and responsive learning environment. Such conditions encourage students to participate more actively in the learning process and to develop greater curiosity about Islamic teachings.

These findings are supported by student interview data. One student, Rani, shared her experience as follows:

> "I really enjoy learning Islamic Education using technology. I can study at home and access materials at any time through learning applications. Watching learning videos makes it easier for me to understand Islamic

> historical stories. However, I sometimes find it difficult when using unfamiliar applications, so I need time to adapt" (Rani, 2025).

In support of these findings, an Islamic Religious Education teacher, Mr. Ahmad, explained his experience with ICT integration as follows:

> "The use of ICT in teaching Islamic Education has greatly helped me in presenting learning materials. I frequently use interactive presentations and videos to explain complex concepts. However, many teachers still lack sufficient training and technological skills. Some of my colleagues require further guidance to be able to use technology optimally in the classroom" (Ahmad, 2025).

Based on the interview results, it can be concluded that the use of ICT in Islamic Religious Education learning demonstrates considerable potential to enhance students' learning experiences. Students, such as Rani, reported feeling more engaged and gaining a better understanding of learning materials through e-learning applications and instructional videos. Nevertheless, challenges arise when students are required to adapt to unfamiliar applications, which may temporarily hinder learning effectiveness. From the teachers' perspective, educators such as Mr. Ahmad acknowledge the benefits of technology in facilitating the delivery of instructional content, while simultaneously emphasizing the need for continuous professional development to enable teachers to utilize ICT to its fullest potential. By addressing these challenges through targeted training programs and sustained institutional support, ICT integration can foster a more dynamic and productive learning environment that ultimately enhances students' understanding of Islamic teachings.

In addition, effective learning through ICT requires strong collaboration between teachers and students. ICT-based learning environments do not merely position students as passive recipients of information; rather, they actively involve learners in discussion, interaction, and collaboration through digital platforms. Online discussion forums, learning management systems, and collaborative applications enable students to exchange ideas, express perspectives, and reflect on Islamic Education content collectively. This interactive learning atmosphere encourages active participation and deepens students' conceptual understanding of Islamic teachings. Therefore, to support the effective utilization of ICT and achieve optimal educational outcomes, schools must continue to integrate technology into the curriculum while providing systematic and ongoing training for teachers.

The novelty of these research findings lies in the recognition that ICT utilization in Islamic Religious Education learning not only enhances students' comprehension of subject matter but also promotes interaction and collaboration between educators and learners. This approach creates a dynamic learning environment in which students actively participate in discussions and knowledge-sharing activities rather than merely absorbing information passively. Furthermore, the emphasis on teacher training highlights the importance of adopting a holistic approach to ICT integration, acknowled that technological advancement must be accompanied by the development of human

resources. By combining technology with meaningful social interaction, this study offers new insights into how Islamic Religious Education can be optimized to support deeper understanding and relevance in contemporary educational contexts.

Supporting and Inhibiting Factors in the Utilization of ICT in Islamic Religious Education Learning at SMA Negeri 1 Baubau

The utilization of ICT in Islamic Religious Education learning at SMA Negeri 1 Baubau is influenced by various supporting and inhibiting factors. One of the primary supporting factors is the school's strong commitment to integrating technology into the educational process. This commitment is reflected in ongoing efforts to improve infrastructure, such as providing better internet access and adequate digital tools, which enable teachers and students to access learning materials more easily. In addition, training programs aimed at improving teachers' technological competencies play a crucial role in maximizing the effective use of ICT in classroom instruction. Despite these supporting conditions, several inhibiting factors continue to pose challenges to optimal ICT implementation. One major constraint is the unstable internet connection in certain areas, which frequently disrupts the learning process, particularly when instructional activities rely on real-time online access. Furthermore, both teachers and students often experience difficulties adapting to new digital applications, which can limit the effectiveness of ICT-based learning. Another significant challenge is the limited time allocated for teacher training and professional development, which restricts opportunities for educators to enhance their technological skills and pedagogical integration of ICT.

Understanding these supporting and inhibiting factors is essential for SMA Negeri 1 Baubau in formulating more effective strategies to optimize ICT utilization in Islamic Religious Education learning. By addressing infrastructural limitations, strengthening teacher competencies, and providing sufficient support for students' technological adaptation, the school can create a more engaging, interactive, and relevant learning environment. These findings are reinforced by an interview with one of the Islamic Religious Education teachers, who stated:

> "The use of ICT in classroom teaching significantly benefits the teaching and learning process. We have access to a wide range of online learning resources that make teaching materials more interesting. However, the most significant challenge we face is frequent instability in internet connections, which makes it difficult to use applications that require real-time data access. In addition, some students are still adjusting to new technologies, so further guidance and training are necessary."

This conclusion is further supported by interview data obtained from a student, Andi, who expressed his perspective as follows:

> "I really appreciate the use of technology in Islamic Education learning. The applications we use make the materials easier to understand and more interactive. However, I sometimes experience difficulties when using new features that I am not familiar with. In addition, unstable internet

> connections often disrupt online learning activities. I hope the school can provide more support, such as additional training and improved internet access, to enhance our learning experience" (Andi, 2025).

The findings of this study regarding the use of ICT in Islamic Religious Education learning at SMA Negeri 1 Baubau indicate that technology has considerable potential to improve the overall quality of education. Supporting factors, including strong school commitment and access to adequate infrastructure, contribute positively to the effectiveness of the teaching and learning process. Conversely, inhibiting factors such as unstable internet connectivity and difficulties in adapting to new digital applications may hinder the optimal utilization of ICT. Therefore, it is essential for schools to provide continuous training for both teachers and students, as well as to enhance technological infrastructure, in order to facilitate more effective and interactive learning environments. What distinguishes this study from previous research is its emphasis on the understanding that successful ICT integration does not depend solely on the availability of technology, but also on the synergy among infrastructural support, capacity-building through training, and users' ability to adapt to technological innovations. By foregrounding the real-life experiences of teachers and students in confronting challenges and leveraging opportunities, this study offers novel insights into how a comprehensive and integrated approach can be employed to maximize the use of technology in education. In particular, within the context of Islamic Religious Education, such an approach contributes to the creation of learning experiences that are more relevant, engaging, and responsive to contemporary educational needs.

Discussion

Based on the research findings, the model of ICT utilization in Islamic Religious Education learning is primarily implemented through the use of instructional videos and interactive presentations. Students perceive the learning process as more engaging and meaningful due to the availability of e-learning applications that enable independent study at home and provide continuous access to learning materials. These findings are consistent with constructivist learning theory, which emphasizes active learner participation, interaction, and the construction of knowledge through meaningful learning experiences (Mayer, 2020; Scherer, Siddiq, & Tondeur, 2021). The integration of multimedia resources and digital learning environments supports learner-centered instruction and has been shown to enhance cognitive engagement across diverse educational contexts (Bond, Bedenlier, Marín, & Händel, 2020)

Furthermore, the effectiveness of ICT utilization in Islamic Religious Education learning indicates that technology has considerable potential to enrich students' learning experiences and deepen their understanding of instructional content. Students report increased motivation and improved comprehension when digital media, such as videos and e-learning platforms, are incorporated into the learning process (Almahasees, Mohsen, & Amin, 2021). Previous studies in international educational settings similarly demonstrate that multimedia-based learning environments can significantly improve learning outcomes by combining visual, auditory, and interactive elements that facilitate

deeper conceptual understanding (Mayer, 2020). Nevertheless, challenges related to adapting to unfamiliar digital applications remain evident. This finding reinforces the argument that successful ICT integration in education depends not only on the availability of technological tools but also on teachers' digital literacy and pedagogical competence (Scherer, Siddiq, & Tondeur, 2021; König, Jäger-Biela, & Glutsch, 2020). Without adequate professional training, teachers may encounter difficulties in fully harnessing the instructional potential of technology, thereby limiting its effectiveness (Trust, Whalen, & Brown, 2022).

In addition, supporting factors such as strong institutional commitment and access to adequate technological infrastructure play a critical role in the successful implementation of ICT-based learning. School leadership support, policy alignment, and sustained investment in infrastructure contribute positively to the continuity and effectiveness of technology integration initiatives (Howard, Tondeur, Siddiq, & Scherer, 2022). This perspective aligns with educational systems theory, which conceptualizes learning effectiveness as the outcome of dynamic interactions among curriculum design, teacher competencies, student engagement, infrastructure, and institutional management (Fullan, 2020). However, the study also identifies ongoing challenges, particularly unstable internet connectivity and difficulties in operating new applications, which impede the optimization of ICT utilization. These challenges reflect broader issues of digital inequality, wherein disparities in infrastructure readiness and access quality significantly affect the success of technology-enhanced learning (Van Deursen & Van Dijk, 2021).

Furthermore, this study differs from many previous investigations that predominantly highlight the effectiveness of ICT integration in educational contexts characterized by stable technological access and well-established digital ecosystems Bond, Bedenlier, Marín, & Händel, 2020). In contrast, the present research reveals that limited internet connectivity and insufficient teacher competence in operating digital learning applications remain substantial barriers, particularly in schools situated in non-urban or resource-constrained areas. This contextual distinction underscores the novelty of the study, as it offers an empirical depiction of the actual conditions of ICT implementation in Islamic Religious Education (PAI), where technological devices may be available but are not yet utilized to their full pedagogical potential.

Accordingly, the originality of this research lies in its confirmation that the successful integration of ICT in Islamic Religious Education learning is not determined solely by the availability of digital media. Rather, it is significantly shaped by teachers' readiness, institutional support from schools, and the adequacy of technological infrastructure. Consistent with both national and international research findings, this study emphasizes the importance of continuous teacher professional development and systematic improvements in technological facilities and infrastructure to achieve meaningful, effective, and sustainable PAI learning outcomes in the digital era.

Conclusion

The findings of this study indicate that: (1) the model of ICT utilization in Islamic Religious Education learning is implemented through the use of instructional videos and interactive presentations. Students perceive the learning process as more engaging due to the availability of e-learning applications that enable them to study independently at home and access learning materials at any time; (2) the effectiveness of ICT utilization in Islamic Religious Education learning demonstrates that technology has considerable potential to enhance students' learning experiences. Students report increased interest and improved comprehension of learning materials through the use of e-learning platforms and instructional videos. However, challenges remain, particularly in adapting to unfamiliar digital applications and in the need for continuous teacher training to ensure the optimal use of ICT; and (3) supporting factors, such as strong school commitment and access to adequate technological infrastructure, contribute positively to the learning process. Conversely, inhibiting factors, including unstable internet connectivity and difficulties in operating new applications, hinder the optimization of ICT utilization.

The implications of this study suggest that the integration of Information and Communication Technology (ICT) in learning can significantly enhance the quality of students' learning experiences, especially through the use of interactive videos and e-learning applications. To fully realize this potential, sustained professional development is required to equip teachers with the necessary technological and pedagogical competencies. In addition, robust infrastructure support, particularly stable and reliable internet connectivity, is a critical factor in addressing challenges related to students' adaptation to new digital applications. Therefore, strong institutional commitment, collaboration with technology service providers, and regular evaluation of ICT implementation are essential to creating an effective, engaging, and sustainable learning environment.

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Ethical Statement

This study was conducted in accordance with ethical standards for educational research. Permission was obtained from SMA Negeri 1 Baubau prior to data collection. All participants participated voluntarily and provided informed consent. Confidentiality and anonymity were ensured by removing personal identifiers and using pseudonyms. The data were used solely for research purposes, and no harm was caused to any participant during the study.

CRediT Authorship Contribution Statement

- **Author 1**: Conceptualization, Methodology, Investigation, Data Curation, Writing – Original Draft.
- **Author 2**: Conceptualization, Supervision, Writing – Review & Editing, Validation.
- **Author 3**: Formal Analysis, Data Curation, Investigation, Writing – Review & Editing.
- **Author 4**: Methodology, Visualization, Resources, Writing – Review & Editing.
- **Author 5**: Supervision, Project Administration, Validation, Writing – Review & Editing.

Conflict of Interest

The authors declare that there are no competing financial interests or personal relationships that could have influenced the work reported in this article.

Data Availability

The datasets generated and analyzed during the current study are available upon reasonable request

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