

THE ROLE OF INFORMATION TECHNOLOGY IN ENHANCING THE EFFECTIVENESS OF EDUCATION MANAGEMENT IN SCHOOLS

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Abstract

The advancement of information technology has had a significant impact on educational management in secondary schools (SMP/MTs). This study aims to analyze the role of information technology in enhancing the effectiveness of educational management, particularly in the aspects of administration and communication. The research employs a library research method, collecting data from various secondary sources such as books, journal articles, research reports, and other relevant documents. The findings indicate that information technology contributes to improving school administrative efficiency through the automation of attendance recording, grade management, and financial administration. Additionally, information technology strengthens communication among teachers, students, parents, and school staff through digital platforms, enhancing collaboration in the educational process. However, this study also identifies challenges in implementing information technology, such as the digital divide, lack of teacher training, and resistance to change. Therefore, strategies are needed to improve infrastructure access, strengthen digital literacy among educators, and establish policies that support the optimal utilization of technology in secondary education. This research provides theoretical insights into the impact of information technology on educational management and can serve as a reference for policymakers and practitioners in developing more effective strategies for implementing information technology, particularly in Islamic education within madrasahs.

Keywords: School Management Information System (SMIS), Digital Transformation in Education, Administrative Efficiency, Educational Management in Schools.

A. Introduction

In today's era of globalization, advancements in information technology have had a significant impact on various aspects of life, including the education sector (Baldwin, 2016). Information technology has become a crucial element in educational transformation. Its role is not limited to providing hardware and software but also includes systems and infrastructure that support the learning process and overall educational management (Zhao et al., 2024). The implementation of information technology in educational management has the potential to enhance operational effectiveness and efficiency (Ariyani, 2021). Through integrated information systems, school principals and administrative staff can access real-time data, enabling faster and more accurate decision-making (Biswas et al., 2024). Additionally, information technology strengthens communication between teachers, students, and parents through digital platforms that facilitate direct information exchange and feedback.

In Islamic education, information technology plays a vital role in improving accountability (*mas'uliyah*), transparency, and decision-making efficiency. Qardhawi (1997) emphasizes that transparency in managing Islamic educational institutions is key to ensuring justice and integrity. Information systems applied in educational management must reinforce the principles of *shiddiq* (honesty) and *amanah* (responsibility) in school administration (Karnaini, 2021). Moreover, information technology significantly supports the learning process (M. E. Kurniawan et al., 2021). With e-learning and technology-based educational applications, students can access learning materials anytime and anywhere (Luckyardi & Rahman, 2021). Teachers can also use technology to present lessons interactively and engagingly, thereby increasing students' motivation and participation in the learning process (Darmawan et al., 2024).

Furthermore, (Sundarasan et al., 2023), in his study, asserts that integrating technology into Islamic education accelerates evidence-based decision-making, leading to comprehensive management system improvements. (Firman, 2024), highlights that digitalization in Islamic education enhances resource management efficiency and institutional integrity. (Tolchah & Mu'ammam, 2019) adds that technology in Islamic education is not merely an administrative tool but also a means to achieve the holistic educational goals of *ta'dib* (the formation of civilized character). Despite the numerous benefits of information technology, its implementation in educational management often faces challenges, such as infrastructure limitations, inadequate training for teachers and staff, and resistance to change (Harianto, 2024). Therefore, appropriate strategies are needed to overcome these barriers to maximize the utilization of information technology in enhancing the effectiveness of educational management.

This study aims to evaluate the role of information technology in improving educational management effectiveness in schools. By identifying and analyzing various aspects of information technology implementation, this research seeks to provide solutions

and recommendations for optimizing technology use in supporting more effective and efficient educational management. This study is particularly significant as digitalization in education is becoming an urgent necessity to enhance school management effectiveness and efficiency. Advancements in information technology offer vast opportunities for educational institutions to optimize administrative processes, improve stakeholder communication, and accelerate data-driven decision-making. However, many schools still struggle with implementation challenges, including infrastructure limitations, low digital literacy among educators and staff, and resistance to change. Therefore, this research aims to offer strategic solutions to address these challenges, ensuring that the adoption of information technology in educational management is both optimal and sustainable.

The findings of this study are expected to serve as a reference for policymakers, school principals, and educators in formulating technology implementation strategies that align with the needs of schools and communities. Academically, this research contributes to the discourse on technology-based educational management, particularly from the perspective of Islamic education, providing a foundation for future studies in this field.

B. Method

This study employs a library research method to identify, analyze, and understand the role of information technology in enhancing the effectiveness of education management in schools through a review of existing literature. This method was chosen as it allows the researcher to gain an in-depth understanding of the topic by referring to various relevant scholarly sources. The data for this study were collected from 30 journal articles indexed in Sinta (at least Sinta 2) published within the last ten years (2014–2024), along with 10 reference books relevant to the research topic. Other secondary sources, such as research reports and policy documents related to information technology in education management, were also used to enrich the analysis. The inclusion criteria for literature selection include: (1) relevance to the research topic, specifically the implementation of information technology in education management; (2) a minimum publication year of 2014 to ensure the study reflects the latest developments in the field; and (3) sources from Sinta-indexed journals or reputable academic publishers. Exclusion criteria include literature lacking a strong academic foundation, content that is not relevant to the research focus, or sources that are unverifiable. Each collected literature source was analyzed using thematic analysis techniques. The analysis was conducted through several stages: (1) thoroughly reading each source to understand its content and context; (2) identifying key patterns or themes related to the effectiveness of information technology in education management; (3) categorizing findings based on emerging themes to facilitate further analysis; and (4) interpreting each theme to uncover meanings and implications relevant to the study's objectives.

To enhance the transparency and credibility of this research, the researcher also acknowledges potential biases in literature selection. One possible bias is the dominance of literature from developed countries that have adopted information technology in education

management earlier, which may not fully reflect the educational context in Indonesia. Additionally, much of the available literature focuses more on technical and pedagogical aspects rather than policy and large-scale implementation. Recognizing these limitations, this study aims to provide a balanced perspective by comparing various sources and highlighting their relevance to the Indonesian education context.

C. Finding and Discussion

The Role of Information Technology in Enhancing School Administration Efficiency

The role of information technology in education management is crucial, particularly in improving administrative efficiency through task automation. With the implementation of school information systems, processes such as attendance recording, grade management, and financial administration can be conducted more quickly and accurately. This not only reduces the workload of administrative staff but also allows them to focus more on strategic tasks that support overall school development. According to (Mustari, 2023), the application of information technology in school administration enhances operational efficiency by accelerating data processing and improving communication systems among education stakeholders. School information systems also help minimize human errors in data management. Manual processes prone to recording mistakes can be replaced with more reliable and integrated automated systems. For instance, student and teacher data can be updated in real-time and easily accessed by relevant parties.

In the context of Islamic education, madrasahs and pesantrens are also beginning to adopt information technology to improve administrative efficiency. Digital-based pesantren management systems, for example, are used to manage student attendance, finances, and both academic and non-academic activities. (Soleh, 2024) emphasizes that technology implementation in Islamic educational institutions enhances data accuracy and ensures transparency and accountability in administrative management. Thus, administrative digitalization is relevant not only to general schools but also to madrasahs and pesantrens in supporting more professional governance.

Furthermore, in the utilization of educational technology, three fundamental principles can be referenced, as stated by (Agustian & Salsabila, 2021):

- a. **System Approach**, A sequential and directed method for problem-solving. This approach views all components as an integrated whole. In Islamic education, this approach is applied in digital-based information management systems that integrate academic, administrative, and communication aspects into a single entity.
- b. **Learner-Centered Approach**, All educational, learning, and training efforts must focus on students. In madrasahs and pesantrens, Islamic-based Learning Management Systems (LMS) can help students access learning materials flexibly according to their needs.

- c. Maximizing and Diversifying Learning Resources, Students should interact with a variety of learning resources as much as possible. In this context, madrasahs and pesantrens can optimize digital media such as interactive e-books, Sharia-based educational videos, and Islamic educational apps to support learning processes.

Additionally, information technology strengthens communication among educational stakeholders, including teachers, students, parents, and school staff. According to (Hariyono et al., 2024), the use of digital communication platforms such as email, instant messaging applications, and school portals enables faster and more efficient information exchange. In madrasahs and pesantrens, Islamic-based communication applications have also been developed to facilitate interactions between ustaz, students, and parents. A study by (Mu'min & Nugraha, 2024), particularly in Islamic educational institutions. They stress that compliance with information security standards is essential to maintaining the integrity, confidentiality, and availability of educational data. The implementation of information technology in madrasahs and pesantrens must consider these aspects to ensure that the applied system is not only efficient but also secure from potential data breaches.

The use of digital communication tools in school environments fosters greater transparency and collaboration. Parents can easily access information about their child's progress, while teachers and school staff can coordinate more effectively in designing and managing learning activities. In the pesantren context, digital-based applications are also used to connect alumni with the institution, strengthening networks and their contributions to pesantren development (Shobri, 2024). Thus, the implementation of information technology in both school administration and learning processes enhances not only operational efficiency but also transparency, accountability, and communication effectiveness within educational environments.

Barriers to Implementing Information Technology in Schools Digital Divide

The digital divide has become one of the main obstacles in the implementation of information technology in schools, especially in areas with limited technological infrastructure. (Hariyadi et al., 2023) explain that not all schools have equal access to technological devices such as computers, tablets, and stable internet networks. Schools in urban areas tend to have more comprehensive facilities compared to those in rural or remote areas, which often still face resource limitations. This disparity in access can create inequalities in the use of information technology, preventing all students and teachers from benefiting equally in both learning and school administration.

In addition to infrastructure limitations, the digital divide can also be caused by economic factors and levels of digital literacy. Schools with budget constraints may struggle to provide adequate technological devices, while teachers and students who are less familiar with technology will face challenges in using it effectively. In the context of Islamic educational institutions, the implementation of information technology systems can add value in institutional competition. Schools that optimize academic services through information technology will enhance institutional management effectiveness. Triwiyono

and Meirawan in (Latar et al., 2022) state that implementing an information technology system aligned with a school's vision and mission will be highly beneficial. However, the digital divide can hinder this implementation, particularly for Islamic educational institutions located in remote areas.

Therefore, efforts from various parties, including the government and educational institutions, are needed to address this digital divide. One solution is to provide training for educators, improve internet access in remote areas, and encourage collaboration with private sectors to support the availability of technology in schools that need it. To bridge the digital divide, national and local education policies should focus on equitable access to technology, including the provision of digital devices in schools with limited infrastructure. Additionally, policies that promote subsidies or technical assistance for underprivileged schools are necessary to ensure that all students have equal opportunities to receive technology-based education.

Lack of Teacher Training

The lack of training for teachers in using information technology poses a major challenge in its implementation in schools. Many teachers feel unconfident or lack the necessary skills to integrate technology into their teaching. This is due to the limited training provided, both in terms of using educational software and implementing technology-based learning strategies (Sipayung et al., 2021). As a result, even when schools provide technological facilities such as computers and digital learning platforms, their use in the learning process is often limited and less than optimal. Without adequate training, the full potential of information technology to enhance learning effectiveness is difficult to harness (Bintang et al., 2024). Teachers unfamiliar with technology may use it in a conventional manner or even avoid it altogether. Therefore, continuous and relevant training programs tailored to teachers' needs—such as workshops, technical guidance, and mentoring in classroom technology implementation—are essential. Additionally, support from schools and education policies that promote digital literacy for educators is crucial to ensuring that information technology truly delivers a positive impact on education (Tyner, 2014).

Education policies should establish structured and ongoing training programs for teachers in the use of information technology. Furthermore, regulations should mandate the integration of technology into teacher education curricula so that future educators acquire digital competencies before they begin teaching.

Resistance to Change

Resistance to change in the implementation of information technology in schools often arises due to various factors, including fear of the unknown, lack of understanding, and limited technological skills (Khotimah et al., 2019). Educators who have long been accustomed to conventional teaching methods may feel that using technology will drastically change their teaching approach or even diminish their role in the learning process (Sanjaya, 2020). Additionally, inadequate training and suboptimal infrastructure availability can further reinforce this resistance to change.

To overcome this resistance, an inclusive approach is needed by involving all stakeholders, including teachers, students, parents, and school staff, in the transition process (Hayadi et al., 2024). Continuous training and technical guidance should be provided to help teachers feel more confident in using information technology (K. Kurniawan et al., 2024). Schools must also create an environment that supports technological adaptation by ensuring easy access to devices and adequate technical support.

Effective communication is also key to addressing resistance to change. Schools need to clearly explain the benefits of implementing information technology, both in terms of improving learning quality and administrative efficiency (Shobri, 2024). With the right approach, resistance to change can be minimized, allowing schools to adapt more easily to technological advancements and improve education quality (Nasution, 2024). The government needs to develop policies that promote a culture of innovation and technological adaptation in schools. Additionally, regulations that support incentive systems for teachers and educators who innovate in utilizing technology can help accelerate digital transformation in education.

To address challenges and seize opportunities, a multi-sectoral collaboration between the government, educational institutions, the private sector, and the community is essential. The government can play a role in formulating policies and regulations that support technology integration, reduce the digital divide, and provide the necessary infrastructure and resources (Judijanto et al., 2025). The technology industry can offer relevant innovations and solutions, while educational institutions can integrate technology into the curriculum and train educators. Community participation is also crucial to ensure that all children benefit from these advancements (Heydebreck et al., 2000).

Overall, integrating technology into the education sector presents various opportunities to create a more inclusive, effective, and adaptive education system. However, existing challenges require a holistic and collaborative approach to realize this vision. Therefore, national and local education policies must ensure infrastructure support, enhance educators' competencies, and develop strategies to overcome resistance to change. By doing so, digital transformation in schools can be more effective and provide broader benefits for the education sector.

Effective Strategies for Overcoming Barriers to Information Technology Utilization in Schools

Information technology plays a crucial role in improving the quality of education, both in learning and school administration. However, its implementation in various schools still faces many challenges, such as the digital divide, lack of teacher training, limited infrastructure, and policy and budget constraints. Therefore, effective strategies are needed to overcome these obstacles so that information technology can be optimally utilized in the education sector. Overall, the integration of technology in education offers various opportunities to create a more inclusive, effective, and adaptive education system. However, the existing challenges require a holistic and collaborative approach to realize this

vision. Additionally, comparing experiences from other countries can serve as a reflection and cross-context learning opportunity. Several countries have successfully addressed technological barriers in education through various approaches that can serve as inspiration for Indonesia's education system.

Bridging the Digital Divide

One of the main obstacles to utilizing information technology in education is the digital divide, where not all schools have equal access to adequate technological devices and stable internet connectivity. To address this issue, governments and educational institutions need to:

1. Expand infrastructure access by building stable internet networks in remote areas and providing sufficient digital devices for schools in need.
2. Encourage collaboration with the private sector through device donation programs, internet subsidies, or technology partnerships to improve schools' accessibility to technology.
3. Develop inclusive policies that ensure all schools, both in urban and rural areas, have equal opportunities to utilize information technology (Hadiyat, 2014).

The success of digitalization in education requires the integration of policies, resources, and a supportive educational ecosystem. Studies show that with an inclusive approach, the potential of digitalization can be harnessed to enrich learning, including in Islamic Religious Education (PAI) (Ciptadi, 2025). Therefore, equitable digital infrastructure development and policies that promote educational digitalization are key factors in overcoming disparities in access to information technology (Rydzewski, 2025).

As a comparison, countries like South Korea have successfully reduced the digital divide through aggressive government policies in building internet infrastructure and providing technology subsidies for schools in underprivileged areas.

Enhancing Teacher Training and Digital Literacy

The lack of teacher training in utilizing technology often becomes a major obstacle in its implementation in schools. Therefore, the following strategies are necessary:

1. Conducting continuous training programs for teachers and education staff on the effective use of technology for both teaching and school administration.
2. Establishing digital learning communities where teachers can share experiences and knowledge about integrating technology into their teaching methods.
3. Implementing a mentoring system that allows senior teachers or technology experts to assist their colleagues in incorporating technology into the learning process (Rivalina, 2014).

In Finland, technology-based teacher training programs have been integrated into teacher education curricula, ensuring that educators possess adequate technological skills before they begin teaching in schools.

Strengthening School Policies and Management

To effectively utilize information technology, strong school policies and management are essential. The following steps can be taken:

1. Establishing clear technology policies regarding device usage, internet access, and digital security within the school environment.
2. Allocating a dedicated budget for procuring and maintaining technology infrastructure, including hardware, software, and operational costs.
3. Raising awareness among parents and the community about the importance of technology in education so they can support school digitalization programs (Nikmah et al., 2023).

To address challenges and seize opportunities, multisectoral collaboration between the government, educational institutions, the private sector, and the community is necessary. The government can play a role in formulating policies and regulations that support technology integration, reduce the digital divide, and provide the necessary infrastructure and resources (Warschauer, 2004). The technology industry can contribute innovations and relevant solutions, while educational institutions can integrate technology into curricula and train educators. Community participation is also crucial to ensure that all children benefit from these advancements (West, 2012).

Optimizing the Use of Information Technology in Schools

The implementation of information technology in schools should be tailored to the needs and conditions of each educational institution. The following strategies can be applied:

1. Utilizing digital learning platforms that align with the curriculum and student needs, such as Learning Management Systems (LMS) or online-based educational applications.
2. Developing blended learning methods, which combine face-to-face and online learning, allowing students more flexibility in accessing learning materials.
3. Ensuring digital security by educating students and educators about internet ethics and personal data protection (Marisana et al., 2023).

Countries like Singapore have successfully implemented AI-based technology in their learning systems to personalize materials according to individual student needs, enabling a more effective and personalized learning experience. By considering these strategies and learning from the experiences of other countries, the implementation of information technology in Indonesia's education system can become more optimal, inclusive, and sustainable.

E. Conclusion

The findings of this study conclude that information technology plays a crucial role in enhancing the effectiveness of educational management in schools by optimizing administration and strengthening communication among stakeholders. However, challenges such as the digital divide, lack of training for educators, and resistance to change remain significant barriers to its implementation. Therefore, strategic efforts are necessary,

including improving infrastructure access, strengthening digital literacy among teachers and staff, and establishing policies that support the optimal utilization of technology. Theoretically, this study contributes to the growing body of literature on technology-based educational management, both in general education and Islamic education contexts. By connecting technology, management, and the socio-cultural aspects of education, this research provides broader insights into the implementation of technology in educational systems. This study offers several recommendations for various stakeholders to ensure optimal implementation of its findings. Policymakers are encouraged to formulate regulations that support technology integration in schools and allocate budgets for infrastructure development and educator training. School administrators should develop internal policies and ensure the availability of digital tools. Additionally, future researchers are advised to adopt a comparative approach to examine the implementation of information technology across different education systems, leading to more applicable recommendations for digital-based education management.

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