



Technological Innovation in School Management: A Challenge and Opportunity

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Abstract: This research aims to examine the impact of technological innovation on school management, especially in terms of efficiency, effectiveness and service quality. Through a literature review, this research analyzes various studies that discuss the application of information technology in educational management. The results of the analysis show that technological innovation has great potential to increase operational efficiency, facilitate collaboration, and improve the quality of educational services. However, this research also identified a number of challenges such as the digital divide, data security and lack of human resource competence. This research concludes that despite challenges, technological innovation is the key to improving the quality of education in the digital era. To achieve this, careful planning, cross-sector collaboration and human resource capacity development are needed.

Keywords: School Management Innovation, School Innovation Challenges, Technological Innovation Opportunities.

Introduction

Technological developments have transformed many industrial fields, including education. The education sector is not immune from changes in technological innovation. Technological innovation in education must bring about positive changes, so that education, which is the main key to a nation, will continue to experience good evolution from existing technological innovations. One aspect of education is good school management. is an important thing in helping the development of education, therefore technological developments need to continue to be intensified in order to create efficiency in carrying out school management processes. The use of technology in school management allows the preparation of a curriculum that is more comprehensive and adapted to student needs. Apart from that, information technology also facilitates more efficient communication and collaboration between students, educators and other educational stakeholders. Not only that, technological developments can speed up the education management process, including managing student data, processing financial information, carrying out inventory of goods at school, spreading school awareness, managing attendance, evaluating schools. The existence of technology in educational institutions can improve the quality of services provided to students, teaching staff, external parties and the administrative staff themselves (Ahyani & Duhani, 2024)

The existence of technological developments has succeeded in opening up the possibility of activities that were previously difficult or even impossible to carry out, as evidenced by the technological innovations used which are able to become a means of realizing these activities, in the infrastructure components that began with information and communication technology which has truly marked a revolution. civilization that allows work in the organizational system to be completed quickly, thoroughly, effectively and efficiently, a concrete example of which is the activity of disseminating information



on the acceptance of new students which generally uses banners but now online can be known to the wider community.

The impact of change encourages paradigm changes and a more adaptive, collaborative and innovative approach. School autonomy requires school principals to have more initiative, creativity and independence for school progress. In the era of decentralization, it is hoped that the educational leadership of a school principal can realize an implementation of educational management in the region that provides maximum service to the community, so that general educational goals can be achieved effectively and efficiently. (Ahyani & Duhani, 2024)

Previous research has explored the application of information technology in Islamic education management, a study (Wahyono & Rofi'i, 2023) suggests that information technology can increase efficiency and effectiveness in Islamic education management. The results of this research emphasize the importance of applying information technology in the management of Islamic education because by taking advantage of existing opportunities information technology can be a powerful tool for improving the quality of Islamic education and providing wider access for students. Another study conducted by (Ahyani & Duhani, 2024) found that Digital transformation brings great benefits in increasing operational efficiency, increasing data accessibility, and improving the quality of services provided to various stakeholders.

Sukmawati in Ahyani & Duhani, (2024) The concept of digital transformation in the context of educational office management represents a deep change that involves the comprehensive adoption of technology to increase efficiency and be responsive to current developments. This transformation is not only technical, involving the implementation of new hardware and software, but also includes changes in organizational culture and restructuring of existing management processes.

The many benefits provided by technological innovation also do not deny the challenges that must be faced by schools, problems that can arise, starting from data security which is still a major problem because of course educational institutions store personal data belonging to students and educators in schools. . Challenges in the difficulty of maintaining the integrity and security of information are also accompanied by challenges in procuring school resources, both human resources and facilities, which of course must support and support the movement of educational innovation, then there are problems with the use of technology in education which should be considered on an ongoing basis. both in terms of environmental and social aspects. Strategic thinking and careful planning are required to ensure sustainable use of technology over the long term. The main challenge is limited infrastructure, where several areas still experience problems in terms of internet connectivity, lack of access to technological devices, and limited electrical power. In facing this challenge, cooperation is needed between the government, educational institutions and related parties to improve technological infrastructure in the area. (Wahyono & Rofi'i, 2023) Even though there are challenges that must be overcome, the development of technological innovation should be sustainable and become a commitment of schools or educational institutions to be able to adapt to existing changes so that in the future schools are not left behind by existing technological innovations. (Subroto et al., 2023)

Meanwhile, integrating technology and data analytics in greater depth can enable educational institutions to collect and analyze data better. This helps in making smarter



decisions and provides detailed information about student development, teaching effectiveness and operational sustainability of the Institution (Ahyani & Dhuhani, 2024)

This research discusses what challenges and opportunities schools can have in implementing educational technology innovations so that it is hoped that with the right technological innovations, an effective and sustainable education management process will be created. Therefore, the research has the title "Technological Innovation in School Management: A Challenge and Opportunity", this research emphasizes the challenges and opportunities faced by educational institutions in Indonesia because technological innovation continues to develop. This section emphasizes the importance of innovative approaches in managing education to overcome these challenges and take advantage of future prospects.

This literature review aims to provide an in-depth understanding of the impact of technological innovation on management in educational institutions. The focus is on understanding how information technology can increase efficiency and effectiveness, identify obstacles that may be faced, and provide an understanding of opportunities related to the application of innovation in school management. It is hoped that this research can contribute valuable knowledge to inform policies and practices in educational institutions that are or will experience digital transformation in school management at educational institutions.

Method

Research methods are scientific ways to obtain data for certain purposes. The word scientific method means that research activities are based on science, namely rational, realistic and systematic. The rationale for research is that research is carried out in normal ways, not the result of mediation. The reality is that research activities can be observed by human tools as a result of which other people can observe and know the methods used. Systematic means that the process used in research uses exclusive, logical steps

In this research, researchers used a type of library research, namely research using a series of activities related to using library data collection methods, reading and recording research materials. Library research is research whose object is sought using a lot of library information such as books, scientific journals, magazines, newspapers and documents. In this research method, the author did not collect primary data, but used secondary data contained in related literature such as, scientific journals and scientific books. This research uses qualitative research methods with the example of a literature review. Using this data collection technique, the author uses the documentation method, namely reviewing and searching for data in the form of notes, documents, transcripts, books, magazines, and so on. This method is used to obtain the data needed to answer a question that is sought. Because using the library research method makes it possible to explore relevant and up-to-date literature to support research. It is important to conduct a comprehensive literature search, conduct critical analysis, and organize the findings in a systematic and clear research report. Thus, a literature review is the appropriate method to answer the research objectives in this article. (Maulida et al., 2023)

Literature collection will be carried out through access to academic databases, digital libraries and leading journals in the fields of education, management and technological innovation. The literature selection criteria will consider the year of publication, relevance to the literature review problem and focus on aspects of school management. After the relevant literature has been collected, the next step is analysis and



grouping of the literature. This analysis will involve an in-depth understanding of the main findings contained in the literature related to school management in the technological innovation process carried out. Literature will be grouped based on the positive aspects of technological innovation, the challenges faced and how to handle the challenges faced and the opportunities obtained. (Wahyudin & Rahayu, 2020)

The next process is synthesis of findings, the results of literature analysis will be synthesized to form a comprehensive conceptual framework. Through this synthesis, the research will be able to provide a comprehensive understanding of the impact of digital innovation on school management as well as provide an in-depth look at the key issues that arise. During the analysis process, knowledge gaps will be identified that still need to be filled. This identification will help establish potential directions for further research and provide new contributions to the understanding of this topic. This research will end with the preparation of conclusions and recommendations. The conclusion will summarize the main findings and their implications, while the recommendations will provide practical guidance for educational institutions wishing to adopt or enhance digital transformation in their office management. Through this method, it is hoped that this literature research can provide a valuable contribution in understanding and describing the role of digital transformation in the context of office management of educational institutions and provide a basis for further research and implementation of best practices in this field.

Results and Discussion

Results

The use of information technology in education offers a number of significant benefits. First, technology provides comprehensive information from primary to secondary school levels. Second, this increases the knowledge of educators and students about informatics through training. Third, technology allows easy and complete access to information related to science. By utilizing the right technology, educational institutions can optimize time, energy and resources to achieve more efficient results. Additionally, technology also facilitates better collaboration between teachers, students, parents, and administrative staff, speeding up the planning and implementation of educational activities. Overall, information technology in education management has great potential to increase educational efficiency through resource optimization and better collaboration.

Rosmini et al., (2024) The use of information technology in educational planning management provides many benefits, but also faces challenges and obstacles. Among them are limited access and unequal infrastructure, especially in remote areas, as well as inadequate infrastructure, such as unstable electricity and outdated equipment. Lacking skills and training, many teachers and administrative staff are inexperienced in this technology. Data security and data privacy have the risk of leakage of students' personal data must be addressed with strict information security policies, including encryption and other protection methods. Technology-based learning design involves many elements, selecting an efficient learning management platform and involving experienced professional resources in system development and management is very necessary to ensure the success of technology implementation. (Haq et al., 2023)



Discussion

In the rapidly developing digital era, technological innovation plays an important role in designing solutions to improve the efficiency of education management. Technological innovation is an urgent need to optimize every process, enabling goals to be achieved more efficiently. The application of technology in education management has changed the learning paradigm through digital systems and smart applications, creating a revolution in the way education is delivered. Although the application of technology in education brings positive benefits, there are a number of challenges that arise. One of the biggest challenges is the difference in access to technology between urban and rural areas. Efforts are needed to ensure that all groups of society, regardless of geographic location, can enjoy the benefits of this technological innovation equally. (Harini et al., 2023)

Overall, the application of technological innovation to improve the efficiency of education management in the digital era is no longer an option, but an urgent need. This transformation not only builds an educational ecosystem that is more inclusive and adaptive to changing times, but also plays an important role in preparing future generations with relevant skills to face global challenges. By continuing to maximize the potential of technology, we can pave the way to a brighter and more sustainable educational future. It is important to carefully pay attention to the positive impact of technology integration in increasing the efficiency of education management and community service. (Widodo et al., 2023). One of the key aspects of this innovation is not only related to administrative efficiency, but also its ability to support project-based learning and practical experience, which helps improve students' skills holistically. With existing technology, education not only focuses on academic improvement, but also provides experiences that broaden students' understanding of the world of work and everyday life. Technology opens up opportunities for students to develop practical skills, creativity and problem-solving abilities. This equips them with relevant knowledge to face real-world challenges. Thus, technology integration not only enriches learning, but also prepares students for the realities of more complex learning tools, but also opens windows of opportunity for the development of skills that support student success in various life contexts. (Halim, 2020)

By implementing an integrated management system, educational institutions can more optimally use physical facilities, energy and time, thereby reducing operational costs and environmental impacts. Technology enables continuous monitoring and evaluation, providing insight into resource use and operational efficiency. With data from technology, institutions can identify areas that need improvement, and make the necessary adjustments to achieve maximum efficiency. Technology is a catalyst for sustainable transformation in educational asset management. (Shofiyyah et al., 2023)

Innovation is an idea, practice, or object that is considered/perceived as new by an individual or group of people. Expressions are considered/felt new to an idea, practice or thing by some people, not necessarily by others. It all depends on how the individual or group feels about the idea, practice or object. Acceptance or rejection of an innovation is a decision made by an individual in accepting an innovation. The innovation decision-making process is a process where individuals start from first knowledge about an innovation by forming an attitude towards the innovation, until deciding to reject or accept, implementing new ideas and confirming innovation decisions, both optional (individual) innovative decisions, decisions –collective innovation, as well as decision–



authority innovation. From experience in the field, Rogers revised the decision theory regarding innovation to be as follows: Knowledge, Persuasion, Decision, Implementation, and Confirmation. (Safitri et al., 2023). Educational institutions are now expected to develop Management Information Systems to improve the quality of educational services. Currently, educational institutions have various needs related to the implementation and management of their organizations. One of the crucial needs is providing access to data and information originating from the process of collecting, processing and storing data, as well as sending information to decision makers. If this activity is carried out manually, it will be less effective, especially considering changes in human behavior which tends to want a fast and easy process. Febrianti et al., in Putri et al., (2024)

Although exploring the potential of technological innovation offers many opportunities in the world of education, it is important to strike a balance by prioritizing the ethical aspects of its use. Primary focus should be given to protecting data privacy, cyber security and preventing misuse of technology. It is important to ensure that any application of technology in an educational environment is based on applicable ethical principles and values. In addition, attention also needs to be paid to preventing gaps in access and opportunities that may arise due to the use of technology. Efforts to promote inclusivity and fairness must be implemented so that every individual or group can access and utilize technological innovation equally. By prioritizing ethical aspects, the use of technology in education can become a tool that opens up various opportunities without leaving anyone behind, creating an educational environment that is fair, inclusive and sustainable.

By using data generated by technology for monitoring and evaluation purposes, educational institutions can quickly identify areas that require improvement and make the necessary adjustments to achieve higher levels of efficiency. In this context, technology is not only a tool for managing resources, but also a catalyst for sustainable transformation in the management of educational assets, creating an environment that is sustainable and adaptive to continuous changes in educational demands and the global environment. (Aeni, 2021)

Technological innovation in school management not only improves operational efficiency but can also contribute to a better learning experience. By integrating technology ethically and inclusively schools can create an educational environment that is responsive to the needs of students and society. Proper and sustainable implementation of technological innovation will be the key to advancing education in the digital era. In addition, attention must be paid to preventing gaps in access and opportunities that may result from the use of technology. Efforts in line with the principles of inclusivity and justice must be implemented to ensure that every individual or group can access and utilize technological innovation equally. (Subroto et al., 2023). By prioritizing ethical aspects, the use of technology in education can become a tool that opens doors of opportunity without leaving anyone behind, creating an educational environment that is fair, inclusive and sustainable.

This challenge requires close collaboration between educators, technology developers, and other stakeholders. By thoroughly understanding the challenges and opportunities that exist, technological innovation can be a driving force that drives progress while increasing the efficiency of education management and community service in the digital era. Active involvement of all stakeholders in designing,



implementing, and evaluating technology solutions can produce an educational ecosystem that is responsive to current and future needs. Therefore, the development of wise policies, ongoing training for educators, and a deep understanding of the impact of technology on learning and community service are the keys to success. With this approach, educational institutions can maximize the benefits of technological innovation while maintaining core educational values to create a resilient and relevant learning environment. (Fitrian, 2024)

The use of information technology in educational planning management can indeed bring many benefits, but it also faces a number of challenges and obstacles. These challenges are varied, and some of the common ones are:

1. Limited access and infrastructure. Uneven internet access, especially in remote areas, is one of the main obstacles. Inadequate infrastructure, such as unstable electricity availability or outdated equipment, also hinders technology implementation. To overcome this, collaboration between the government and educational institutions is very important to expand internet access and improve existing infrastructure. Apart from that, routine maintenance of technological devices is key to keeping the system functioning optimally.

2. Lack of skills and training. Using information technology in education requires adequate skills. Unfortunately, teachers and administrative staff may not have sufficient experience in using this technology. The solution that can be implemented is holding regular training and workshops to improve the ability of teachers and staff in using information technology systems.

3. Data security, data security and privacy are crucial aspects in the application of information technology, especially in maintaining the confidentiality of student data. The risk of personal data leakage needs to be anticipated by implementing strict information security policies, including the use of data encryption and other protection methods.

4. Management and integration of complex systems. Technology-based learning design includes many elements, such as data collection, analysis, progress monitoring, and communication. Integrating all these aspects can be a challenge. To overcome this, it is important to choose a learning management platform or system that is able to integrate various elements efficiently. Additionally, involving IT professionals experienced in developing and managing complex systems can also ensure successful implementation of the technology. (Sholeh & Efendi, 2023)

With these solutions, it is hoped that the use of technology in educational planning can run more smoothly, enable more efficient management, and of course bring greater benefits to all parties involved. According to (Febrianti et al., 2023) The use of technological innovation in school management provides various significant benefits. Here are some of them:

1. More efficient data collection and analysis: Information technology makes it possible to collect and process educational data more efficiently. With a good database system, information such as number of students, graduation rates, test results, and other data can be collected and analyzed quickly. This helps education managers to make decisions based on accurate and up-to-date data.

2. Increased administrative efficiency: IT contributes to increased efficiency in the administration of educational planning management. Processes such as student registration, schedule management, inventory management, and financial administration can be automated through educational information management software and systems.



This reduces the need for time-consuming manual administrative work, as well as increasing staff productivity.

3. Better collaboration and communication: Information technology makes collaboration and communication easier among various stakeholders in education, including students, teachers, parents, and educational managers. By utilizing tools such as online learning platforms, email, discussion forums, and instant messaging applications, they can interact and share information more easily. This increases cooperation between individuals and teams, improves communication, and strengthens parental involvement in their children's education.

4. More effective planning and monitoring: Through IT, educational planning can be carried out more efficiently. Education managers can utilize planning software to create annual plans, lesson schedules and resource allocation can be managed more efficiently. Additionally, with the right information systems, they can monitor the implementation of educational plans, identify problems, and quickly take necessary corrective actions.

5. Access to wider educational resources: By utilizing IT, access to educational resources can be expanded. Students and teachers can access online learning materials, e-books, interactive learning resources, and distance learning platforms. This allows them to gain knowledge and information from a variety of sources, thereby improving the quality of the education they receive.

6. Performance monitoring and evaluation: IT can be used to monitor and evaluate the performance of students, teachers and educational institutions more effectively. Through an education management information system, data regarding student performance, test results and teacher evaluations can be recorded and analyzed periodically. This helps in identifying areas that need improvement.

Conclusion

Technological innovation has great potential to improve the quality of education. However, to achieve this, comprehensive efforts from various parties are needed. Schools need to develop adequate technological infrastructure, provide quality training for teachers and staff, and build strong data security systems. The government also needs to play an active role in supporting the development of educational technology and ensuring equal access for all schools. One of the positive impacts of implementing technology is increasing administrative efficiency. Routine tasks such as student registration, creating lesson schedules, and inventory management can be automated, saving time and effort. In addition, technology also enables better data collection and analysis, thereby enabling more informed decisions based on accurate data. However, despite all its benefits, the application of technology in school management is also faced with a number of challenges. One of the main challenges is the digital divide, especially in remote areas. Lack of internet access and adequate devices is an obstacle to optimal use of technology. Apart from that, data security is also a serious concern. Personal data of students and teachers must be protected from unauthorized access.



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