

CHALLENGES AND STRATEGIES OF EDUCATIONAL ADMINISTRATION IN REALIZING DIGITAL-BASED SCHOOLS

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Abstract

This study aims to analyze the challenges and strategies of educational administration in realizing digital-based schools. Educational administration is seen as a crucial element supporting the effectiveness of schools' digital transformation, not only in the learning aspect, but also in data management, finance, and information services. The research method used a descriptive qualitative approach with data collection techniques through in-depth interviews, observations, and documentation studies in several schools implementing digital administration. Data analysis was conducted using the Miles & Huberman model through data reduction, data presentation, and drawing conclusions. The results show that schools face several key challenges, namely limited infrastructure, gaps in human resource competencies, resistance to change, budget constraints, and data security issues. To overcome these challenges, schools implement various strategies, including ongoing training, partnerships with external parties, gradual implementation of digitalization, budget efficiency, and strengthening digital security. This study confirms that the success of digital-based educational administration is determined not only by the availability of technology, but also by leadership, human resource readiness, and stakeholder support.

Keywords: *Educational administration, school digitalization, challenges, strategies*

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1. Introduction

The development of digital technology has influenced almost all sectors of life, including the field of education, by presenting various innovations in the learning process, school management, and administration systems (Masinambow et al., 2025). This change has given rise to the concept of digital-based schools, which utilize technology not only to support teaching and learning activities but also to improve the effectiveness of educational governance, administrative transparency, and connectivity between teachers, students, parents, and school management. This concept also serves as an answer to the needs of education in the modern era, which demands efficiency, accessibility, and readiness to face technology-based global challenges (Arthur-Nyarko et al., 2020).

Educational administration plays a very important role in supporting the effectiveness of implementing digital-based schools, because it covers various aspects of management that are the foundation for the sustainability of the educational process. (Hidayatullah, 2025). Starting from more accurate and integrated student data management, flexible curriculum management, to more transparent and efficient financial management. Furthermore, digital administration also facilitates faster and more effective communication between schools, teachers, students, and parents through various online platforms. Thus, digital-based educational administration is not only a technical support tool but also a managerial strategy that can improve the quality of educational services and ensure the optimal achievement of learning objectives (Hashim et al., 2022).

Many schools in Indonesia still face various challenges in the digitalization of their administration, ranging from limited and unequal access to technological infrastructure, both in terms of internet networks and supporting devices, to low human resource competency in optimally operating digital systems. Furthermore, resistance to change often arises, both from educators and administrative staff who are still accustomed to manual systems, requiring longer adaptation time and effort. Another equally significant challenge is budget constraints, which often hinder the procurement of equipment, training, and maintenance of digital systems. This situation indicates that the successful implementation of digital-based educational administration requires a comprehensive strategy that includes infrastructure improvements, strengthening human resource capacity, changing work culture, and adequate policy and funding support (Kalupe et al., 2025).

On the other hand, a number of schools have successfully implemented digital administration through planned and sustainable strategies. This success is usually supported by the readiness of technological infrastructure, the improvement of human resource competencies through ongoing training, and the full support of school leaders in fostering a work culture that adapts to change (Ismunandar, 2025). Furthermore, collaboration between teachers, administrative staff, students, and parents is also a crucial factor in strengthening an integrated digital ecosystem. These good practices not only improve administrative efficiency but also positively impact the quality of educational services, transparency, and speed of information access. Therefore, successful schools can serve as examples or best practices worthy of emulation and development by other schools, particularly in developing digital implementation strategies tailored to their individual circumstances and needs.

Research on school digitalization has tended to focus more on learning aspects, such as the development of e-learning, the use of digital media in the classroom, and improving students' digital literacy as part of the educational process (Dewi, 2022). This focus is indeed important because it directly relates to the interaction between teachers and students in teaching and learning activities. However, the aspects of educational administration, which are fundamental to school sustainability, have not received much in-depth research. Yet, administrative digitization plays a strategic role in supporting efficient school management, financial transparency, more accurate data management, and improving the overall quality of educational services. This research gap highlights the need to further examine how digital-based administration can be implemented effectively, the challenges faced, and strategies that can serve as a reference in developing modern and sustainable school governance (Basri et al., 2024).

Therefore, it is important to conduct research that specifically examines the challenges and strategies of educational administration in supporting digital-based school transformation (Brunetti et al., 2020). This research is needed to fill the gap in studies that have focused more on the learning aspect, while the managerial and administrative dimensions of schools have received little attention. Through this research, various obstacles faced by schools can be identified, such as limited infrastructure, human resource capacity, institutional policies, and budget constraints, while also exploring effective strategies that have been implemented by schools that are more advanced in administrative digitization. The results of this study are expected to not only provide theoretical contributions to the development of studies in the field of educational administration, but also provide practical recommendations for stakeholders, from school principals, teachers, administrative staff, to policymakers, in designing strategic steps to accelerate the realization of an efficient, transparent, and sustainable digital-based school ecosystem.

The purpose of this study is to identify various challenges faced by schools in implementing digital-based administration, describe the strategies implemented by schools in overcoming these challenges, and provide practical recommendations that can be used as a reference for the development of educational administration in realizing effective, efficient, and sustainable digital-based schools.

Previous research has focused more on digitalization in the learning process, classroom management, and the use of e-learning applications, while studies on educational administration, as a managerial and operational aspect that significantly determines the

success of digital-based schools, remain limited. This lack of research creates a significant gap: the lack of a comprehensive mapping of truly effective strategies for overcoming barriers to digital administration in schools. This empirical gap is even more pronounced in the Indonesian context, where infrastructure conditions, human resource competencies, and policy support vary, necessitating more in-depth research to find solutions that meet real-world needs.

The novelty of this research lies in its primary focus on educational administration in the context of digital-based schools, rather than solely on the learning aspect as has been widely studied in previous studies. This research simultaneously examines the challenges and strategies of digital administration, resulting in a more holistic understanding of the dynamics of implementation in the field. Furthermore, this research offers a practical model or strategic framework that schools can use as a reference in developing digital-based administration according to their individual conditions and needs. Thus, this research makes a significant contribution to the educational management literature, particularly by emphasizing the importance of digital administration as a primary foundation in transforming schools into modern, effective, efficient, and sustainable educational ecosystems.

2. Method

This type of research uses a descriptive qualitative approach with the aim of describing the phenomena of challenges and strategies of educational administration in implementing digital-based schools (Haq et al., 2023). The research was conducted in several schools (elementary, junior high, and senior high schools) that are currently implementing or have implemented a digital administration system within a certain timeframe, for example, three months. The research subjects included principals, teachers, administrative staff, and education personnel selected through purposive sampling based on their direct involvement in digital administration. Data collection techniques included in-depth interviews, direct observation of the use of the digital administration system, and documentation studies of archives, reports, and school administration data. The research instruments used were interview guides, field notes, and cameras or recording devices for documentation purposes. Data analysis used the Miles and Huberman model, which includes data reduction to sort out important information, data presentation in narrative form, tables, or charts, as well as drawing conclusions and verification. Data validity was maintained through source triangulation (teachers, principals, and administrative staff), technical triangulation (interviews, observations, documentation), and member checking to ensure data conformity with informants (Rosmini et al., 2024).

3. Results and Discussion

Challenges in Digital Education Administration

Not all schools have stable internet connections and adequate digital devices. This situation creates a gap in access to technology-based education, particularly between schools in urban and rural areas (Setyowati et al., 2023). In remote areas, limited infrastructure often hampers the implementation of educational digitalization programs, such as online learning, application-based administration systems, and the use of online educational platforms. Furthermore, the availability of digital devices such as computers, laptops, and projectors remains uneven, with some schools even relying on manual facilities. This factor is exacerbated by limited and unstable electricity in some areas, reducing the effectiveness of technology use. Thus, limited infrastructure impacts not only the learning process but also schools' efforts to develop modern administrative governance (Mufidah & Tauran, 2024).

Teachers and school administration staff have not fully mastered digital administration applications, so the implementation of technology-based management systems still encounters obstacles (Sofiana et al., 2025). Many educators are still accustomed to manual methods for data management, reporting, and internal communications, requiring them to adapt to digital platforms. The lack of ongoing training and technical assistance means that most teachers and staff rely solely on the basic features

of available applications, failing to leverage the full potential of technology to improve work efficiency. Furthermore, age and educational background disparities also impact technology proficiency: senior teachers tend to be slower to adopt new systems than younger generations. This has implications for hindering digital transformation in schools, as the successful implementation of modern administration relies heavily on the competency of human resources (Budi, 2021).

Some educators and administrative staff are still accustomed to manual systems and are therefore reluctant to switch to digital systems. Long-standing habits make them more comfortable with traditional methods, such as manual record-keeping, paper-based filing, or direct face-to-face communication (Ropik & Rosadi, 2025). This reluctance is often triggered by concerns about the complexity of using digital applications, fear of making technical errors, and the perception that digital systems increase the workload rather than lighten it. Furthermore, there are psychological factors such as anxiety about change and a lack of confidence in operating new technological devices. This resistance is exacerbated by a lack of intrinsic motivation and external support, such as insufficient training or inconsistent supervision. As a result, the digital administrative transformation process is not optimal because some groups choose to stick with the old system. If this resistance is not addressed with appropriate change management strategies, the technology adoption gap in schools will widen (Sebastian et al., 2020).

The cost of implementing digital systems is still considered high, especially for schools in areas with limited financial resources. Procuring hardware such as computers, laptops, tablets, internet access, and other supporting devices requires significant funding (Nair, 2024). Furthermore, investment doesn't stop at providing facilities, but also includes maintenance costs, software updates, and teacher and staff training to enable optimal operation of the digital system.

In many regional schools, the limited education budget is allocated primarily to basic needs such as building renovations, textbook procurement, or teacher salaries, making digital transformation a secondary priority. As a result, the gap in technology access between urban and rural schools is widening. The lack of support from local governments and the private sector also exacerbates the situation, as schools struggle to manage limited funds to meet the demands of digitalization. This situation demonstrates that budget constraints are a structural barrier hindering the acceleration of the equitable implementation of digital-based education administration (Nashrullah et al., 2025).

Concerns about student and school data leaks are a serious challenge in implementing digital-based administration (Lutrianto & Riswaldi, 2025). The weak information protection systems in many schools leave students' personal data, academic records, and even administrative documents vulnerable to unauthorized access and misuse. Most schools lack adequate cybersecurity infrastructure, such as data encryption, multi-layered authentication systems, or regular backups. Furthermore, limited digital literacy among teachers and administrative staff often leads to unsafe practices, such as the use of simple passwords, sharing accounts between users, or storing important data on unprotected devices. These risks are exacerbated by low awareness of personal data protection regulations, which are already regulated by the government. As a result, potential privacy breaches can lead to a decline in trust among parents, students, and the public in school digitalization. If data security issues are not immediately addressed with appropriate strategies, such as improving digital literacy, using standard security systems, and ensuring strict regulatory support, digital administrative transformation could face increasing resistance.

Table 1. Challenges and Strategies of Educational Administration in Realizing Digital-Based Schools

Challenge	Impact	Strategies Implemented
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Infrastructure limitations (internet, digital devices)	The digital administration process is not running optimally, technical obstacles often occur.	Partnership with government/private sector, gradual implementation according to school capabilities.
Competency gap of human resources (teachers & staff)	The use of digital applications is not optimal, there are many input errors and delays.	Ongoing training, workshops, mentoring from more expert teachers/staff.
Resistance to change from educators	Inhibits the adoption of new systems, reduces the motivation for implementing digitalization.	Persuasive approach, socialization of benefits, sharing the success of other schools.
School budget limitations	Unable to afford the latest software/hardware, delays in system upgrades.	Efficient use of funds, seeking external assistance, collaboration with the community.
Data security and information protection	Concerns about student data leaks, system disruptions, and cyber vulnerabilities.	Implementation of layered security systems, data backup, digital security literacy.

Source: 2025 Data Processing Results

This table demonstrates the direct relationship between the challenges schools face and the strategies implemented to address them. Each challenge, from limited infrastructure and gaps in human resource competency, budget constraints, to data security issues, has a significant impact on educational administration performance, requiring specific and measurable steps to address them. Through this approach, schools can develop a more structured, realistic, and tailored digital administration roadmap tailored to their specific circumstances and capacities, enabling more effective and sustainable digital transformation.

Strategies Implemented by Schools

Schools need to provide regular workshops and training to improve teachers' and staff's skills in using digital applications. Training isn't enough just to be done once; it must be ongoing so that educators can keep up with ever-changing technological developments (Alnafrah & Mouselli, 2021). This program covers mastery of the basics of digital literacy, the use of school administration applications, data management, and the use of online learning platforms. In addition to technical aspects, training should also be accompanied by the development of a positive mindset so that teachers and staff are more confident and motivated in adopting digital systems. With ongoing mentoring, obstacles such as competency gaps, resistance to change, and technical errors can be minimized. Furthermore, structured training will create a standard of digital competency that is evenly distributed across schools, so that technology-based educational administration transformation can be more effective and efficient (Yahya, 2025).

Schools can collaborate with various external parties, such as the government, the private sector, and digital platform providers, to accelerate the implementation of technology-

based administration. Through government support, schools can obtain funding, infrastructure, and regulatory assistance that support the digitalization of education (Agustian et al., 2025). Meanwhile, collaboration with private companies and technology providers can provide access to digital tools, school management applications, and training programs at more affordable or even free costs. These partnerships also open up opportunities for new innovations, such as implementing better data security systems, integrating unified administration platforms, and leveraging big data in school management. Beyond technical aspects, collaboration with external parties can strengthen the educational community network, ensuring schools are not left alone in facing the challenges of digitalization. With effective synergy, schools can overcome their internal resource limitations, and the transformation of educational administration into the digital era can be accelerated, equitable, and sustainable.

Digitizing school administration should be done gradually to ensure a more effective transition and minimize resistance. This phased approach allows schools to adapt to technological changes based on the capacity of their human resources and available infrastructure (Pettersson, 2021). The initial stage can begin with the digitization of student administration, such as recording personal data, attendance, grades, and learning reports. Once this system is running stably, the next stage is the digitization of school finances, such as tuition payments, budget management, and app-based financial reports. The next stage can then focus on the digitization of school communications, for example through an information portal, an official messaging app, or an online announcement platform that connects schools with teachers, students, and parents. With this phased strategy, schools can evaluate each phase, address deficiencies, and enhance human resource readiness before moving on to the next stage. This model not only reduces the risk of implementation failure but also ensures that the digital transformation is more sustainable and measurable.

The digitalization of school administration should be carried out in stages so that the transition process runs more effectively and does not cause high resistance (Pettersson, 2021). A phased approach allows schools to adapt to technological changes based on the capacity of their human resources and available infrastructure. The initial phase can begin with digitizing student administration, such as recording personal data, attendance, grades, and learning reports. Once this system is running stably, the next phase is digitizing school finances, such as tuition payments, budget management, and app-based financial reporting (Nur & Hanif, 2024). Next, the next stage can focus on digitizing school communications, for example through an information portal, an official messaging app, or an online announcement platform that connects schools with teachers, students, and parents. With this phased strategy, schools can evaluate each phase, address deficiencies, and enhance human resource readiness before moving on to the next stage. This model not only reduces the risk of implementation failure but also ensures that the digital transformation is more sustainable and measurable.

To prevent data leaks and misuse, schools need to strengthen digital security systems by implementing adequate information protection standards (Alfitri et al., 2024). One step that can be taken is to use a multi-layered authentication system, such as a combination of strong passwords, two-factor authentication, and restricting access to only certain users. Furthermore, schools need to perform regular data backups, either to internal servers or secure cloud-based storage services, to ensure that important data remains protected even in the event of device failure or cyberattacks. Another equally important effort is to improve cybersecurity literacy for teachers, administrative staff, and students through regular training. With a good understanding, school personnel will be more alert to threats such as phishing, the use of unauthorized devices, and risky account sharing practices. Strengthening digital security not only protects student privacy and school data but also increases public trust in the implementation of technology-based administrative systems in education (Mufron & Wei, 2024).

Positive Impacts of Digital Administration

Digitizing school administration offers significant benefits in increasing the efficiency of data management, both related to student information and finances. With a digital system, recording student data such as biographical data, attendance, grades, and academic history can be done in an integrated manner and easily accessed at any time (Walker et al., 2023). This reduces the potential for manual errors, simplifies the reporting process, and accelerates decision-making by schools. From a financial perspective, the use of digital applications or platforms allows schools to manage tuition payments, budget records, and prepare financial reports with greater transparency and accountability. Furthermore, digital systems can provide analytical features that help schools monitor cash flow, plan budgets, and identify potential inefficiencies. With these efficiencies, schools not only save time and effort but also increase accuracy, transparency, and build trust in school governance from parents and the community (Nugraha et al., 2025).

The implementation of a digital administration system allows schools to increase transparency, particularly in the presentation of academic and financial reports. Through the digital platform, parents can directly monitor their children's academic progress, from attendance to grades to behavioral records. This not only strengthens communication between schools and parents but also encourages their involvement in supporting the educational process. On the financial side, the digital system allows for more open and accountable reporting, for example, regarding tuition payments, budget allocations, and the realization of school funds. With easier and more structured access, the potential for data manipulation or misuse of funds can be minimized. This transparency ultimately builds public trust in schools, increases accountability in educational institution management, and supports the creation of good governance within the educational environment (Hidayah et al., 2025).

The use of digital communication applications can significantly improve the quality of school services, both for students and parents. Through digital platforms, schools can convey important information quickly, accurately, and transparently, from activity schedules and academic announcements to administrative notifications (Kraft & Bolves, 2022). For students, digital services facilitate access to learning materials, exam schedules, and evaluation results, allowing them to better focus their learning. Meanwhile, for parents, digital communication applications facilitate real-time monitoring of their children's academic progress and direct interaction with teachers or school staff without requiring physical attendance. This not only accelerates the flow of information but also increases parental involvement in supporting their children's education. This, in turn, makes school services more responsive, efficient, and adaptive to the needs of society in the digital age (Purwani et al., 2024).

The digitalization of educational administration plays a crucial role in strengthening school management accountability, especially amidst the demands of an era of open information. With digital systems, recording, reporting, and archiving processes become more structured, documented, and easily audited (Rusmiyati et al., 2025). Every administrative activity, both academic and financial, can be tracked transparently, minimizing the potential for data irregularities and manipulation. Furthermore, the transparency of information presented through digital platforms allows external parties, such as parents, school committees, and even local governments, to access relevant reports according to their needs and authority. This transparency directly strengthens public trust and encourages a culture of good governance in the educational environment. Thus, schools are not only able to improve the quality of their services but also demonstrate moral and professional responsibility in managing educational institutions in the digital age.

Challenge vs Strategy Discussion

Infrastructure challenges in the digitalization of education, such as limited internet networks, digital devices, and implementation costs, can be overcome through partnership strategies with various parties and gradual implementation of use (Schmidt & Tang, 2020). Schools can collaborate with the government, the private sector, and digital platform providers to obtain adequate infrastructure, devices, and data security systems. Furthermore,

the gradual implementation of digitalization, starting with student administration, then continuing with finances and finally school communications, can help schools adapt more measurably and reduce the risk of failure. Thus, resource limitations do not become permanent obstacles but can be strategically managed through collaboration and systematic planning.

Meanwhile, the human resource competency gap can be addressed by providing ongoing digital training for teachers and administrative staff. This training focuses not only on technical mastery but also on fostering a positive mindset, enabling educators to become more confident in using technology. Furthermore, resistance to change can be minimized through a persuasive approach, inclusive communication, and the presentation of success stories from schools that have successfully implemented digital administration. By presenting concrete examples of success, teachers and staff who are still hesitant will be more motivated to adapt.

These efforts will ultimately create an education ecosystem that is better prepared for the comprehensive digital transformation through internal budget efficiency strategies and the optimization of existing resources. Schools can prioritize funding, for example, by focusing budget allocations on the procurement of core equipment and basic administrative systems before undertaking expansion. Furthermore, schools can access external assistance through partnerships with the government, private institutions, or community organizations concerned with the digitalization of education. With a combination of internal efficiency and external support, budget constraints can be managed more wisely without hindering the digital transformation process.

Meanwhile, concerns about data security can be addressed by implementing adequate digital security standards accompanied by cyber literacy education for all school personnel. Schools can adopt technical measures such as the use of multi-layered authentication systems, regular data backups, and restricting access to authorized parties. However, technology alone is insufficient without increasing user awareness. Therefore, cyber literacy is crucial for teachers, staff, and students to understand digital security practices, such as the use of strong passwords, vigilance against phishing, and prohibiting account sharing. With the combination of technical protection and cyber literacy education, trust in digital administration systems can be maintained while minimizing the risk of data leaks or misuse.

Indonesian context

Urban schools are generally better prepared for digitalization than rural schools. This is due to the availability of more adequate infrastructure, such as a stable internet connection, a relatively complete range of digital devices, and access to human resources with higher levels of technology competency. Furthermore, urban environments, closer to government centers and technology service providers, also support the accelerated adoption of digital administration systems.

However, a significant digital divide exists between schools in urban and rural areas. Schools in rural areas often face challenges such as limited devices, limited internet access, and a shortage of digitally literate educators. This situation has the potential to widen the gap in the quality of education services, as schools in underdeveloped areas are unable to utilize technology optimally. This gap demonstrates that digitalization in education is not only about technical aspects, but also closely related to issues of equitable access and educational justice.

In this context, government policy support is a crucial driving factor in ensuring equitable digital transformation. The school digitalization program initiated by the Ministry of Education, Culture, Research, and Technology (Kemdikbudristek), for example, is a strategic step to strengthen infrastructure, improve teachers' digital literacy, and expand technology access to schools in remote areas. With consistent and targeted policy interventions, it is hoped that the digital divide between regions can be narrowed, giving all schools an equal opportunity to adapt to the digital era.

4. Conclusions and Suggestions

In conclusion, educational administration is a crucial foundation for supporting the realization of digital-based schools, not merely as a complement to learning but as the school's core management system. Key challenges include limited infrastructure, gaps in human resource competency, resistance to change, budget constraints, and complex data security issues. To address these challenges, schools need to implement strategies that encompass ongoing training, partnerships with external parties, gradual implementation of digitalization, efficiency and collaboration in budget management, and strengthening data security systems. The implementation of these strategies has been shown to have positive impacts in the form of work efficiency, transparency, improved service quality to students and parents, and strengthened accountability of school management. However, the success of digital administrative transformation depends not only on the availability of technology but also on school leadership, human resource readiness, and support from internal and external stakeholders. This research confirms that appropriate educational administration strategies can serve as practical models for other schools in implementing digital transformation in a planned, adaptive, and sustainable manner.

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