

DIGITAL-BASED SUSTAINABLE MANAGEMENT TRANSFORMATION IN IMPROVING LEARNING SYSTEM AT STATE JUNIOR HIGH SCHOOL 1 INDRALAYA SELATAN

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Abstract

Digital transformation has become an important element in the development of sustainable education management in the current technological era. This research aims to describe how digital-based sustainable management is implemented in improving the learning system at State Junior High School 1 Indralaya Selatan. The approach used is descriptive qualitative with a case study method. Data was collected through semi-structured interviews with 10 participants consisting of the principal, teachers, administrative staff and school committee. The results showed that the school has adopted some digital practices, such as the use of online learning platforms and cloud-based administration systems, but the implementation is still partial and not fully integrated into long-term managerial policies. The main challenges include low digital literacy, limited infrastructure and the absence of consistent internal policies. Nonetheless, digitalization has been shown to improve learning effectiveness and school operational efficiency. This research recommends the need to strengthen human resource capacity, formulate comprehensive digital policies, and invest in infrastructure and collaboration among educators to support the sustainability of digital transformation in school management.

Keywords: Sustainable Management, Digital Transformation, Learning System

1. Introduction

The development of information and communication technology in the digital era has brought fundamental changes in various aspects of life, including in the management of educational institutions. Schools as the implementing unit of formal education are required to not only be a place for learning, but also as an organization that is able to manage resources effectively, efficiently and sustainably. The concept of digital-based sustainable management emerged as a response to global challenges and the need for adaptive, transparent and future-oriented education governance.

Along with digital transformation in various sectors, educational institutions have started to integrate technology-based management systems to support operational and learning sustainability. Digitalization of school management systems not only improves the efficiency of administrative work, but also opens up opportunities for innovation in teaching and learning strategies. Saputra and Rahman (2023) emphasize that digital school management innovations can drive improvements in the quality of education services and accelerate adaptation to changes in the learning environment. However, the implementation of digital transformation in education units still faces a number of obstacles. In many schools, especially in semi-rural areas such as Indralaya Selatan, limited infrastructure, uneven digital competence of teachers, and resistance to change are still major challenges in realizing digital-based management as a whole. Indrawati

and Pramesti (2022) underline that the digitalization of school management in the regions is not yet fully optimal due to weak systemic support and low digital literacy of educators.

In terms of learning, digitalization also impacts the way teachers deliver materials, students access knowledge, and manage evaluation and assessment. Rohman (2024) notes that technology-based management strategies can help schools design more personalized, flexible and scalable learning, which is in line with the principles of continuing education. On the other hand, Williams and Gupta (2022) point out that digital integration in learning systems globally has increased schools' resilience in the face of crises, such as the COVID-19 pandemic.

Furthermore, managing educational resources through a digital management approach is considered to strengthen transparency, budget efficiency and the quality of public services. Tanaka and Liu (2022) showed that the use of cloud-based systems and digital dashboards in school management supports accurate reporting and data-driven decision-making. This was supported by Fitria and Nuraini (2023), who noted increased collaboration among educators through online-based school information management systems. However, the success of digital management transformation is not only determined by technical aspects but also influenced by the character of school leadership, organizational culture and commitment to sustainability. Putra (2022) highlights the important role of digital leadership in driving systemic change and creating a dynamic learning environment. Similarly, Kumar and Mehta (2024) state that an inclusive and long-term oriented management approach is key in ensuring the sustainability of technology-based educational innovations.

With this in mind, this research aims to examine more deeply how digital-based sustainable management transformation can be implemented at the secondary school level, particularly through a case study at SMP Negeri 1 Indralaya Selatan. This research is important to identify best practices, obstacles faced, and formulate implementation strategies that can be replicated in other schools with similar characteristics. It is hoped that the results of this research will be able to contribute to the academic literature as well as become a reference for sustainable digital-based education policies.

2. Theoretical Background

2.1 The Concept of Sustainable Management in the Education Context

Sustainable management in education is a strategic approach that emphasizes managing school resources efficiently, sustainably and adaptively to change. This approach includes not only administrative efficiency but also the sustainability of learning quality and the development of educational human resources. Sustainable management strategies involve long-term vision, collaborative leadership and the involvement of all stakeholders.

Rohman (2024) states that schools that apply sustainable management principles are able to adapt quickly to challenges and strengthen the quality of education services in a sustainable manner. Meanwhile, Becker and Cruz (2024) in their international study showed that education management based on sustainability principles produces a responsive and future-oriented leadership model.

2.2 Digital Transformation in School Management System

Digital transformation is a structural change that integrates digital technology into organizational systems, including school management. In the context of education, this transformation includes the digitization of administration, cloud-based data management,

the use of learning management applications, and the use of online evaluation platforms. The ultimate goal is to improve the efficiency, transparency and effectiveness of education management.

Tanaka and Liu (2022) highlight that the use of cloud-based management systems contributes greatly to data-driven decision-making and real-time reporting of school performance. At the national level, Ahmad and Susanti (2024) showed that an integrated school management information system (SIMS) helps automate administrative tasks and improve the accuracy of data management.

2.3 Integration of Learning System and Digital Technology

The integration of technology in the learning system is the main pillar of modern education. Technology is not just a tool, but the main medium in the learning process, assessment, and collaboration between teachers and students. In this context, Learning Management System (LMS), collaborative platform, and mobile learning become an integral part of effective learning management.

González and Mori (2023) showed that the use of digital platforms in secondary education can increase flexibility, personalization of learning, and active student engagement. Meanwhile, in Indonesia, Hidayat and Sari (2022) stated that the main obstacles in the integration of digital learning are the lack of teacher training and not optimal management policy support at the school level.

2.4 Leadership and Organizational Culture in School Digitalization

The role of leadership is crucial in the success of digital transformation in schools. Principals and management teams play a role in creating an organizational culture that supports innovation, lifelong learning and technology adoption. In addition, visionary leadership is needed to develop policies that are in line with the principle of sustainability.

Putra (2022) emphasized that adaptive and transformative digital leadership can motivate teachers to explore new technologies and create an active digital learning environment. At the global level, Ahmed and Nolan (2022) point out that data-driven and collaborative leadership is the foundation for sustainable digital school development.

2.5 Teacher Collaboration Model in Technology Implementation

Digital transformation also requires a collaborative approach among teachers to design technology-based learning in a structured manner. This collaboration includes the preparation of digital teaching tools, integration of online learning platforms, and evaluation of technology-based learning outcomes.

Fitria and Nuraini (2023) noted that schools that encourage digital collaboration between teachers tend to be better equipped to implement adaptive and sustainable digital learning strategies. Similarly, Park and Singh (2025) highlighted the importance of strengthening teachers' professional capacity through structured digital training.

3. Methods

3.1 Research Design

This research uses a descriptive qualitative approach to explore in depth the implementation of digital-based sustainable management in the learning system at SMP Negeri 1 Indralaya Selatan. This approach was chosen because it is able to explain social phenomena and complex processes in a contextual and interpretative manner (Miles, Huberman, & Saldaña, 2021).

Qualitative methods are based on scientific, logical principles, as well as direct observation of behavior and practices that occur in the field. This study uses a case study approach that allows for detailed narrative data collection and reflects the complexity of the dynamics of educational digitization at the secondary school level (Tracy, 2023).

3.2 Subjects and Participants

The participants consisted of various education stakeholders at State Junior High School 1 Indralaya Selatan who have direct involvement in the managerial and digital learning processes. A purposive sampling technique was used to ensure that participants met the research criteria, with the following criteria:

- 1) Active principal for at least 2 years
- 2) Teachers who have used digital technology in learning
- 3) School operator or TU staff who manage the school information system
- 4) School committee who are involved in strategic decision-making

10 participants were considered adequate in the qualitative study because it has reached the point of data saturation, which is when additional interviews no longer produce new information (Silverman, 2022).

3.3 Data Collection Technique

Data were collected using a flexible yet focused semi-structured interview method. An interview guide was developed to explore three main aspects:

- 1) Participants' understanding of sustainable management concepts and practices in schools
- 2) Implementation of digital systems in managerial and learning processes
- 3) Impact of digital integration on the effectiveness of learning and education services

Interviews were conducted face-to-face and lasted between 30 to 60 minutes per participant, depending on the openness and context of the discussion. All interviews were recorded with participants' consent and transcribed verbatim for data analysis purposes.

3.4 Data Analysis Techniques

Data analysis in this study was conducted using thematic analysis approach, which involves systematically identifying, analyzing, and reporting patterns or themes within qualitative data. The analysis process followed several stages. First, data condensation involved selecting, focusing, and simplifying raw data from interview transcripts. Second, data display presented the condensed data in organized formats such as matrices or narrative text to facilitate pattern recognition. Third, conclusion drawing and verification interpreted the displayed data to generate meaningful insights while continuously cross-checking with raw data to ensure accuracy (Miles, Huberman, & Saldaña, 2021).

3.5 Data Validity

To ensure data validity in this qualitative research, the researcher applied the principle of trustworthiness as developed by Lincoln and Guba, which consists of four main criteria: credibility, transferability, dependability, and confirmability. Data credibility was maintained through source triangulation techniques and a member checking process, namely by verifying the results of interviews with participants to ensure accuracy and honesty of interpretation. Transferability was achieved through detailed contextual descriptions of the school background, participants' characteristics, as well as the prevailing learning system, thus enabling readers to assess the relevance of the findings

in other contexts. Meanwhile, dependability was guaranteed by systematically documenting the entire research process, from interview transcripts, field notes, to audit logs. Finally, confirmability was established through presenting direct quotes from participants' narratives to support each key finding, thus minimizing the researcher's subjective bias and enhancing the objectivity of data interpretation (Nowell et al., 2022).

4. Results and Discussion

The results of this study are presented based on the thematic analysis process of interviews with 10 participants, consisting of principals, teachers, administrative staff and school committee representatives. The findings are categorized into four main themes that reflect the practices and challenges of implementing digital-based sustainable management at State Junior High School 1 Indralaya Selatan.



Figure 1. Interview Documentation

Source: Research Documentation (2025)

4.1 Perceptions of Digital-based Sustainable Management

Most participants understood the concept of sustainable management as long-term oriented and structured school management. However, integration with digital technology is still perceived as something "new" and not fully understood strategically.

One participant (school principal), stated:

"We are already using technology, such as e-report cards and attendance applications, but for digital long-term planning, we still need a lot of guidance."

This finding is in line with Rohman's (2024) statement that a lack of in-depth conceptual understanding is an initial obstacle in developing digital-based sustainable management. The perception gap between operational technology use and strategic digital integration reflects a common challenge in educational institutions undergoing digital transformation. While basic digital tools have been adopted, their potential for supporting sustainable management practices—such as data-driven decision making,

long-term resource planning, and continuous quality improvement—remains largely untapped. This limited conceptual understanding may hinder the school's ability to leverage digital technologies for systemic and sustainable improvement.

4.2 Implementation of Digital Systems in School Management Practices

The school has adopted several digital systems such as e-learning platforms, Google Workspace, and online-based staffing applications. However, the implementation is still partial and not yet supported by a complete data integration system.

A participant (teacher) mentioned that:

"We use Google Classroom, but some teachers feel uncomfortable using it. So some still rely on WhatsApp and manual notes."

This corroborates the results of Ahmad and Susanti's research (2024), which states that the success of digital management is strongly influenced by teacher readiness and comprehensive policy support. The partial implementation observed at SMP Negeri 1 Indralaya Selatan reflects a broader pattern in educational digitalization, where technology adoption often outpaces the development of supportive infrastructure, policies, and human capacity. The coexistence of digital and manual systems creates inefficiencies and inconsistencies in data management, undermining the potential benefits of digital transformation. Teacher discomfort with certain platforms highlights the need for differentiated professional development approaches that address varying levels of digital literacy and pedagogical comfort.

4.3 Challenges in the School Digitalization Process

Some of the main challenges faced include limited digital infrastructure, the low digital literacy of some senior teachers, and the absence of a clear SOP (standard operating procedure) in implementing digital management.

Another participant (TU staff) also stated:

"We are still often confused, which data must be inputted into Dapodik, and which into the other new application. Sometimes there is data overlapping."

Indrawati and Pramesti (2022) highlighted that schools in the regions often struggle to harmonize new digital systems with old administrative procedures, creating double workload and technical confusion. The challenges identified reflect systemic issues that extend beyond individual school boundaries. Limited digital infrastructure, particularly in terms of reliable internet connectivity and adequate hardware, remains a persistent barrier in many Indonesian schools. The low digital literacy among senior teachers points to the need for targeted, ongoing professional development that respects adult learning principles and provides sustained support rather than one-time training. The absence of clear SOPs for digital management creates ambiguity in roles and responsibilities, leading to data redundancy and inefficiency. These challenges are interconnected and require comprehensive solutions that address infrastructure, human capacity, and organizational processes simultaneously.

4.4 Impact of Digital Transformation on Learning System

Although not yet optimal, the implementation of the digital system has had a positive impact on the learning process, especially in terms of time efficiency, variety of teaching media, and monitoring student involvement. Teachers become more creative in delivering material, while students are more enthusiastic when digital media is used.

The participant (Math Teacher) also stated:

"When using videos or online quizzes, students are more enthusiastic. But the network is often a problem."

This finding is reinforced by González and Mori (2023), who point out that digital technology supports personalization of learning and improves teacher-student interaction, especially when combined with adaptive pedagogical approaches. The positive impacts observed, despite implementation challenges, suggest significant potential for digital transformation to enhance educational quality. Increased student engagement through multimedia content and interactive platforms indicates that digital tools can address diverse learning styles and increase motivation. Teacher creativity in material delivery demonstrates professional growth and adaptation to new pedagogical possibilities. However, the persistent network problems highlight the critical importance of reliable infrastructure as a foundation for realizing the full benefits of digital transformation. The interplay between technological potential and infrastructure limitations creates a complex dynamic that schools must navigate.

4.5 Discussion

The results of this study indicate that digital-based management transformation at State Junior High School 1 Indralaya Selatan has begun but has not been fully structured and sustainable. The initiatives that have been taken are reactive and not based on a long-term strategic framework. Strengthening the aspects of teacher training, drafting digital-based internal policies, and integrating a comprehensive school management system are needed so that digital transformation can truly support the goal of educational sustainability.

This finding is consistent with an international study by Smith and Liu (2023) that emphasizes the importance of synergy between technology, strategic management and visionary leadership in creating a resilient and adaptive education system in the digital era. The reactive nature of current initiatives reflects the absence of a comprehensive digital transformation strategy that aligns technology adoption with long-term educational goals. Without such strategic framing, digitalization efforts risk becoming fragmented, unsustainable, and ultimately failing to deliver transformative impact.

The findings also reveal important interconnections between the four themes explored. Limited conceptual understanding of digital-based sustainable management (Theme 1) contributes to partial and uncoordinated implementation (Theme 2). These implementation challenges, combined with infrastructure and capacity limitations (Theme 3), constrain the potential positive impacts of digital transformation (Theme 4). Conversely, the positive impacts observed, while limited, provide evidence of potential that could be realized through more systematic approaches. This interconnectedness underscores the need for holistic interventions that address conceptual, technical, organizational, and pedagogical dimensions simultaneously.

The role of leadership emerges as a critical factor in driving successful digital transformation. The principal's acknowledgment of needing guidance for digital long-term planning highlights the importance of developing leadership capacity for strategic digital management. Visionary leadership that understands both the technical and pedagogical dimensions of digital transformation, and can articulate a compelling vision that mobilizes stakeholders, is essential for moving from reactive, piecemeal adoption to proactive, strategic integration.

Teacher readiness and professional development constitute another crucial element. The varying levels of digital literacy and comfort among teachers, and the persistence of manual practices alongside digital systems, indicate that technology adoption is as much

a human challenge as a technical one. Effective professional development must go beyond technical training to address pedagogical integration, build confidence, and foster positive attitudes toward digital tools. Differentiated approaches that respect teachers' diverse starting points and provide sustained, contextualized support are more likely to succeed than one-size-fits-all training programs.

The challenges related to infrastructure and standard operating procedures point to the need for systemic support at multiple levels. Reliable internet connectivity, adequate hardware, and clear data management protocols are foundational requirements for effective digital transformation. Without these basics, even the most motivated teachers and well-designed digital tools cannot function optimally. The overlapping data requirements between different systems, such as Dapodik and newer applications, reflect broader coordination challenges that may require policy-level interventions to streamline and harmonize data collection and reporting requirements.

Despite these challenges, the positive impacts observed on student engagement and teacher creativity provide encouraging evidence of digital transformation's potential. Students' enthusiasm for video and quiz-based learning suggests that digital tools can address the motivational challenges that often characterize traditional instruction. Teachers' increased creativity in material delivery indicates professional growth and the emergence of new pedagogical possibilities. These positive outcomes, while currently constrained by implementation challenges, provide a foundation upon which more systematic efforts can build.

In conclusion, the findings from SMP Negeri 1 Indralaya Selatan reflect both the promise and the challenges of digital-based sustainable management in Indonesian schools. Realizing the full potential of digital transformation requires comprehensive, strategic approaches that address conceptual understanding, leadership capacity, teacher development, infrastructure, and organizational processes in an integrated manner. The school's current experience, with both its achievements and its struggles, provides valuable lessons for other schools embarking on similar transformation journeys and for policymakers seeking to support effective digitalization across the education system.

5. Conclusion

Based on the results of qualitative research conducted at State Junior High School 1 Indralaya Selatan, it can be concluded that the understanding of digital-based sustainable management is still limited. Although there is awareness of the importance of digital transformation, most education implementers do not understand the digital management framework fully and strategically. The implementation of digitalization in school management has been done gradually, such as the use of online learning platforms, cloud-based administration systems and digital communication media, but it has not been integrated systemically and has not been part of long-term planning. The main challenges faced include limited infrastructure, uneven digital literacy of teachers, and the lack of integration between the digital systems used, so there is still overlap between manual and digital systems that have not been synergized. Digital transformation has had a positive impact on the learning process, especially in terms of media variety, increased student engagement and communication efficiency, but these benefits have not been maximized due to constraints on technical readiness and human resources. Digital-based sustainable management can only be achieved if supported by strong school leadership, collaboration among educators, and structured internal policies, because digital transformation is not

just a matter of devices, but also requires an organizational culture that supports innovation and adaptation.

Given these findings, it is recommended that State Junior High School 1 Indralaya Selatan strengthen human resource capacity through structured and ongoing digital literacy training for teachers, administrative personnel and principals, focusing not only on technology use but also on data management, system integration and digital learning strategies. Schools also need to develop internal digital policies that encourage the implementation of digital management in a structured manner, including the formulation of clear SOPs in the utilization of digital information systems and applications to avoid overlap or redundancy. In addition, investment in digital infrastructure such as strengthening internet networks, hardware, and technical support must be a priority so that digitalization can run smoothly. Finally, encouraging the formation of digital learning communities among teachers is essential for sharing good practices and developing technology-based teaching tools, so that this collaboration can strengthen a digital culture that supports sustainability and innovation in the school environment.

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