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Digital Leadership Synergy in Realizing Sustainable and Child-Friendly Education in the Era of Digital Transformation

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ABSTRACT

This study explores the synergy among digital Leadership, adaptive educational management, and data-driven planning to create a sustainable, child-friendly education system at SMAN 112 Jakarta. The transition to a digital education ecosystem in Indonesia faces challenges, including digital literacy gaps, infrastructure disparities, and resistance to change. The study aims to examine how these three elements can work together to improve educational outcomes and student Well-being. Using a qualitative approach with phenomenological case study methods, data were collected through in-depth interviews, participatory observation, and document analysis. The findings show that integrating digital Leadership, adaptive management, and data-driven planning has created an educational environment that is responsive to change and focused on the holistic development of students. The principal's Leadership has been key in driving digital transformation, while adaptive management has allowed the school to stay flexible in addressing challenges. This study contributes to the literature by providing insights into how schools can integrate technology, collaboration, and data to foster inclusive and resilient education systems.

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INTRODUCTION

The wave of digital transformation has fundamentally reshaped the global education landscape, creating a new ecosystem that demands educational institutions not only to use technology but to radically adapt to the learning needs of the 21st century (Sharma, 2024; Motorga et al., 2023). In Indonesia, this transition to a digital education ecosystem has not been without challenges, as the implementation of digital leadership in schools is still hindered by complex issues such as digital literacy gaps among school leaders, uneven technological infrastructure across regions, and organizational resistance to change (Arifah et al., 2024; Masrur, 2023). In this dynamic environment, school principals play a

pivotal role not only as administrators but also as visionary strategic leaders who are expected to mitigate risks, anticipate future challenges, and empower educators with relevant skills to produce an adaptive generation (Reynita et al., 2025; Khalilov et al., 2025). This research is crucial for understanding how digital leadership and data-driven planning can help improve the quality and inclusivity of education in Indonesia, ensuring schools are more adaptable and capable of meeting the demands of future generations (Nurbani et al., 2025).

Despite the growing push for digital transformation in Indonesia's education sector, the implementation of digital leadership in schools continues to face numerous challenges (Evitha, 2024; Umah et al., 2023). Many schools struggle with issues like digital literacy gaps among school leaders, discrepancies in technological infrastructure across regions, and resistance to organizational change (Timotheou et al., 2023). These obstacles hinder the full potential of digital tools and strategies in enhancing educational outcomes. School principals are expected to play a central role not just as administrators, but as strategic leaders capable of mitigating risks, empowering educators, and anticipating future challenges (Jhonshon et al., 2024). However, the existing leadership structures in schools often fail to meet these expectations. The lack of a unified approach to digital leadership and adaptive management strategies has contributed to the slow adoption of technology in schools, preventing the creation of an education system that is both sustainable and child-friendly.

In practice, many schools in Indonesia, particularly public high schools, are attempting to integrate digital tools into their educational processes. However, these efforts are often fragmented, lacking a clear strategic vision. While there is enthusiasm among teachers and students for digital learning, the lack of structured leadership and clear data-driven policies often results in underutilized resources. The concept of a Child-Friendly School (SRA) has become a key aspect of modern education, yet many schools struggle to balance the use of technology with creating a safe and supportive learning environment for students (Astuti, 2025). In this context, the need for a comprehensive approach that integrates digital leadership, adaptive management, and data-driven planning becomes even more apparent. SMAN 112 Jakarta has made strides in adopting digital innovations, but there is limited academic research that comprehensively examines how these elements can work together to create a more resilient and inclusive education system.

Previous research has explored various aspects of digital transformation in education, but few studies have examined the integration of digital leadership, adaptive educational management, and data-driven planning in the context of

child-friendly schools. Many studies have focused on individual components such as the role of technology in classrooms or the importance of leadership in educational settings, but few have looked at how these elements can synergize to create a sustainable educational model. Existing literature also emphasizes the challenges of adopting digital tools in education, but it does not provide a comprehensive framework for effectively implementing these tools across diverse school environments (Timotheou et al., 2023). The gap in the literature lies in the lack of studies that integrate these factors in the context of Indonesian schools, where challenges such as digital literacy and infrastructure disparities are prevalent. This research aims to fill this gap by exploring how digital leadership, adaptive management, and data-driven planning can work together to foster a child-friendly, sustainable education system in Indonesia.

The existing body of literature on digital transformation in education primarily focuses on theoretical aspects of technology adoption, with little emphasis on practical frameworks for school leadership and management in developing countries (Timotheou et al., 2023). Additionally, while studies have highlighted the importance of data-driven planning in improving educational outcomes, there is limited research on how this can be practically implemented in schools, particularly those in the early stages of technology adoption. This research will provide a more holistic approach by combining these elements into a unified framework that can be applied in real-world educational settings. It will also offer insights into how these practices can be adapted to the specific challenges faced by schools in Indonesia, especially considering the country's evolving digital landscape. This approach is crucial for informing policies and practices that can help make schools more adaptable and resilient in the face of rapid technological change.

This study introduces a novel approach by examining the intersection of digital leadership, adaptive educational management, and data-driven planning in child-friendly schools. By integrating these factors, the research aims to provide new insights into how educational institutions can respond to the challenges of digital transformation while prioritizing student well-being and inclusivity. The study highlights the importance of leadership in fostering innovation and resilience, offering a comprehensive model for school leaders to navigate the complexities of the digital age. The central research question is how the synergy between digital leadership, adaptive management, and data-driven planning can contribute to creating a sustainable and child-friendly education system in Indonesia. The hypothesis suggests that integrating these elements will enhance school management effectiveness, improve learning outcomes, and

foster a more inclusive environment. The study will analyze how school leaders at SMAN 112 Jakarta implement these practices and evaluate the impact of data-driven decision-making on school policies, providing valuable insights for policymakers and leaders to better manage the complexities of digital transformation in education.

RESEARCH METHOD

This research uses a qualitative approach with a phenomenological case study method to uncover the school's efforts to realize sustainable and child-friendly education through the synergy of digital leadership, educational institution management, and data-driven planning. The phenomenological approach was chosen because this research aims to deeply understand the lived experiences and real-world practices of educational actors in the field, namely principals, teachers, students, and other school stakeholders. By using case studies, this research can explore the specific context of the school and provide a more detailed understanding of the dynamics occurring in the school as it implements digital transformation and data-driven management.

This research was conducted at SMAN 112 Jakarta, a public high school actively adopting digital technology in its learning process. This school was selected as the research location based on its progressive steps in implementing various digital innovations and its commitment to creating a child-friendly and sustainable education system. By implementing various data-driven policies and digital leadership, this school serves as a relevant example for research in the context of technology-based education. This school was chosen because it provides a concrete illustration of the challenges and solutions implemented in realizing inclusive and adaptive education to changing times.

The data in this study were collected using a triangulation method consisting of four main techniques: (1) in-depth interviews with school principals, teachers, and students to gain an understanding of the implementation of digital leadership, adaptive management, and data-driven planning; (2) participatory observation of learning practices, technology use, and interactions between stakeholders in schools to directly observe the dynamics that occur in the field; (3) document analysis including educational report cards, Annual Work Plans (RKT), School Activity and Budget Plans (RKAS), and school planning and evaluation documents related to digital and managerial policies; and (4) literature studies related to digital leadership, educational management, and continuing education to provide a relevant theoretical basis in the research context.

RESULT AND DISCUSSION

Result

Implementation of Digital Leadership

The implementation of digital leadership at SMAN 112 Jakarta refers to the principal's efforts to integrate digital technology into the school's leadership, learning, and management processes. This includes improving digital literacy among educators, utilizing digital platforms for learning, developing technology infrastructure, and establishing a culture of technology-based innovation. In this context, the principal plays a strategic role as a leader responsible for facilitating change and ensuring that technology supports broader educational goals.

One informant, the principal, stated, "Improving digital literacy among educators is the first step we are focusing on. We recognize that without adequate digital competencies, we will not be able to utilize technology optimally. Therefore, we prioritize ongoing training and workshops on educational technology." From this interview, it can be concluded that the principal strongly emphasizes the importance of training to improve educators' digital skills, which lays the foundation for implementing technology in learning. This training is intended to facilitate the transition from traditional to digital methods and accelerate technology adoption throughout the school.

Subject teachers also responded to this issue, stating, "We feel there are still some obstacles in implementing technology, particularly in terms of infrastructure and limited time. However, the principal always provides support through mentoring and incentives for those of us who take the initiative to improve our digital competencies." From this interview, it is clear that despite the obstacles of limited infrastructure and time, the principal has created mechanisms to support teachers through mentoring programs and incentives for those actively developing their digital competencies. This demonstrates that digital leadership extends beyond simply adopting technology, but also encompasses effective and sustainable change management at the teacher level.

In observations conducted at SMAN 112 Jakarta, researchers noted that the use of digital platforms in learning was already quite widespread, with most teachers using online learning applications to access materials and conduct evaluations. On the other hand, observations also revealed a reliance on technology, which sometimes presented difficulties for teachers who had not yet fully mastered the platform. The researchers interpreted that although the integration of technology into the learning process was already significant, a major challenge lies in the teachers' varying understanding and digital competencies. Therefore, further efforts are needed to improve digital competency comprehensively. Based on interviews and observations, it can be

concluded that the principal of SMAN 112 Jakarta has successfully implemented digital leadership through several key strategies, including ongoing training, technology integration in learning, infrastructure development, and the establishment of a culture of innovation. Despite challenges such as limited digital competency among some teachers and resistance to technological change, the principal actively manages these changes by providing necessary support, including mentoring and incentives for teachers who take the initiative to improve their digital skills. Thus, despite these obstacles, the principal's efforts have had a positive impact on the more efficient learning process.

Adaptive Educational Institution Management Practices

Adaptive educational management at SMAN 112 Jakarta refers to the school's ability to respond quickly and relevantly to changes in both student needs and technological developments. This approach includes adaptive leadership that is responsive to change, human resource management focused on continuous competency development, curriculum innovation that integrates digital literacy and 21st-century skills, and the development of ethics and professionalism in the use of educational technology. This adaptive management allows the school to remain flexible in the face of emerging challenges and focus on improving the quality of education that is relevant to current developments.

In an interview with the principal, he stated, "Adaptive leadership at our school focuses on the ability to quickly adapt to changes, both in student needs and in evolving technology. We ensure that every decision is made with consideration for its long-term impact on education."Researchers interpreted the principal as playing a key role in creating an environment that is responsive to change. Adaptive leadership is essential to ensure that every policy implemented addresses digital challenges and evolving student needs, maintaining the relevance of education amidst changing times.

Subject teachers also shared their views, saying, "We are trained to continuously develop ourselves and adapt to the use of technology in learning. Technology-based learning allows us to utilize digital resources more effectively, despite the challenges of implementation." From these interviews, the researchers concluded that despite the challenges of implementing technology in the classroom, adaptive educational management through continuous competency development is crucial. Continuous training is key to ensuring that teachers can optimize the use of technology, which is a crucial element in supporting effective and relevant learning.

During observations at SMAN 112 Jakarta, the researchers noted that the use of technology in learning continues to grow, with teachers actively using digital platforms. Furthermore, the researchers observed more structured collaboration among teachers through a community of practice facilitated by the principal. A culture of collaboration and team learning is evident, with each member of the school supporting each other in addressing technological challenges. The researchers interpreted that adaptive educational management at this school focuses not only on the use of technology but also on creating a collaborative culture that strengthens continuous development efforts in learning. This pattern suggests that despite challenges, continuous efforts to improve team competencies and collaboration are crucial to creating a school that is adaptive and ready for change.

Table 1. Adaptive Educational Management

Informant Position	Interview Excerpt	Indicator
School Principal	"Adaptive leadership in our school focuses on the ability to quickly adapt to change..."	Adaptive Leadership
Subject Teachers	"We are trained to continuously develop ourselves and adapt to the use of technology in learning."	Continuous Competency Development
Head of Administration	"Every decision is made with consideration of its long-term impact on education."	Technology-Based Decision Making

The table shows a pattern illustrating the important role of principals and teachers in implementing adaptive educational management. Principals play the role of adaptive leaders by ensuring policies are responsive to changes in both technology and student needs. Principals' decision-making, which considers long-term impacts, demonstrates an approach oriented toward sustainability and educational relevance. Meanwhile, teachers' continued development of their digital competencies, both through training and the implementation of technology in learning, reflects a continuous effort to ensure that education remains relevant to current developments. The revealed pattern demonstrates the synergy between adaptive leadership and competency development in creating a flexible and future-ready educational environment.

Implementation of Data-Driven Planning

Data-driven planning at SMAN 112 Jakarta involves the use of data analysis to plan and make strategic decisions within the school. This process begins with an analysis of educational report cards to identify learning achievement gaps. Furthermore, the IRBB (Identification, Reflection, Improvement Planning, Improvement Implementation) approach is used to

address root causes. Teacher collaboration within a learning community is also crucial, where learning data is jointly analyzed to design appropriate interventions. Integrating the results of this analysis into educational planning, such as the Annual Work Plan (RKT) and the School Activity and Budget Plan (RKAS), aims to create a more transparent, evidence-based education system that can respond more effectively to change.

In an interview with the principal, he stated, "We use educational report card data as a basis for joint reflection with teachers and stakeholders. From there, we can analyze learning achievement gaps and plan more targeted improvement measures." Researchers interpreted the principal as using data as a tool to increase transparency and collaboration among stakeholders in the school. On the other hand, a subject teacher stated, "We are directly involved in analyzing learning data and designing necessary interventions. Through the learning community, we not only share knowledge but also seek concrete solutions to problems identified from the data." The researcher concluded that the teachers' active involvement in the learning community ensures that the data obtained is effectively used to design relevant intervention programs and creates a collaborative culture that fosters continuous improvement.

During observations, the researcher noted that educational report cards are routinely used in teacher meetings to analyze student learning outcomes. Discussions of data analysis results are conducted collaboratively, involving teachers, the principal, and the school committee to design interventions tailored to student needs. The researcher interpreted that the use of data in decision-making has helped the school respond to learning challenges in a more structured and evidence-based manner. Overall, data-driven planning at SMAN 112 Jakarta is well-functioning, and the implementation of the IRBB approach allows the school to systematically identify problems, plan improvements, and implement solutions, involving all stakeholders. This has proven effective in fostering sustainable change in school culture.

Table 2. Data-Driven Planning

Informant Position	Interview Excerpt	Indicator
Principal	"We use educational report card data as a basis for collaborative reflection with teachers and stakeholders."	Use of Data for Reflection and Planning
Subject Teachers	"We are directly involved in analyzing learning data and designing necessary interventions."	Collaboration in Data Analysis and Interventions
Head of Administration	"We ensure data-driven planning and involve all stakeholders in every decision."	Stakeholder Involvement in Planning

The table illustrates how the principal and teachers at SMAN 112 Jakarta utilize data-driven planning to improve educational quality. The principal plays a role in ensuring that educational report card data is used as a basis for reflection and collaborative planning, while teachers play an active role in analyzing learning data and designing interventions. The involvement of stakeholders, such as teachers and the principal, in this process creates a collaborative atmosphere that is crucial for the successful implementation of data-driven planning. This also demonstrates that data-driven planning is not just about numbers, but about how data can be used to design interventions that are more appropriate and relevant to students' needs.

Synergy Towards Sustainable and Child-Friendly Education

The synergy towards sustainable and child-friendly education at SMAN 112 Jakarta is defined as an integrated effort between digital leadership, adaptive management, and data-driven planning to create a learning environment that supports student well-being holistically. This includes creating a safe and enjoyable learning environment, developing students' digital literacy, implementing a culture of digital ethics, personalized learning based on data, and developing student character prepared to face future challenges. Child-friendly education at SMAN 112 Jakarta focuses not only on physical aspects but also on students' social, emotional, and digital development to ensure they can interact with technology positively and responsibly.

In an interview with the principal, he stated, "We prioritize a safe and enjoyable learning environment. With technology, we strive to create a space that is not only comfortable but also supports students' social-emotional development." Researchers interpreted the principal's emphasis on the role of appropriate technology in creating a child-friendly learning environment, which supports not only academic learning but also students' social and emotional well-being. Meanwhile, a subject teacher stated, "Digital literacy is an important foundation in our school. We not only teach students about technology, but also how to use it responsibly." Researchers concluded that digital literacy at SMAN 112 Jakarta serves as a foundation for preparing students to face the digital world in an ethical and safe manner, strengthening child-friendly education by balancing technology instruction with moral and ethical values.

During observations, researchers noted that SMAN 112 Jakarta successfully integrated technology into learning, incorporating the 5S culture (greeting, smiling, greeting, being polite, and being courteous), which was integrated with digital ethics. Students appeared more active in using digital platforms for learning, but they were also taught how to interact with technology in a healthy and safe manner. Researchers interpreted this approach as

successfully creating a child-friendly environment, with instruction on digital ethics, digital safety, and healthy screen time management. This demonstrates that the school not only integrates technology effectively but also safeguards student well-being by providing guidance for responsible online interactions. Overall, the synergy between digital leadership, adaptive management, and data-driven planning has created an educational ecosystem that supports students' holistic development.

Discussion

The results of this study indicate that the implementation of digital leadership, adaptive management, and data-driven planning at SMAN 112 Jakarta has created a child-friendly and sustainable educational environment. This finding aligns with the literature suggesting that digital leadership is a key factor in driving educational transformation in the digital era (Connolly et al., 2023). The principal at SMAN 112 Jakarta demonstrated a strategic role in integrating technology into educational policies, which aligns with research suggesting that adaptive leaders can ensure the optimal use of technology to support learning. Furthermore, the challenges related to limited infrastructure and digital competency among some teachers identified in this study also align with the findings of other studies that suggest the digital divide can hinder technology adoption in schools (Afzal et al., 2023). Nevertheless, the principal has addressed these barriers through ongoing training programs and incentives, which have proven effective in increasing teacher engagement in developing their digital competencies.

The theoretical implication of these findings is that responsive, data-driven digital leadership can strengthen the role of technology in creating more efficient and relevant education. In this regard, the findings of this study reinforce the idea that data-driven planning, as proposed by the Technology Acceptance Model (TAM), helps drive technology adoption by reducing uncertainty and increasing user comfort with new systems (Abdalla et al., 2024). Furthermore, the digital leadership model involving collaboration between stakeholders, as found at SMAN 112 Jakarta, contributes to the literature highlighting the importance of collaboration between teachers and principals in implementing technology in schools. This collaboration not only enhances the use of technology in learning but also helps create an innovative and adaptive learning culture.

Practically, these findings provide valuable insights for decision-makers in the education sector, particularly in facilitating the transition to technology-based education. SMAN 112 Jakarta's experience in implementing ongoing training and mentoring programs can serve as a model for other schools seeking

to optimize the use of digital technology in their educational environments. Furthermore, the integration of the 5S culture with digital ethics at SMAN 112 Jakarta highlights the importance of developing student character in the digital world, a topic relevant to the challenges of modern education. This underscores the importance of introducing digital literacy from an early age to ensure students are not only proficient in technology but also ethically responsible in its use (Eden et al., 2024).

The application of adaptive educational management found in this study also contributes to the understanding that an education system that is flexible and responsive to student needs and technological developments is essential. Previous research has shown that adaptive management can accommodate change quickly and provide space for competency development among educators (Vindigni, 2023; Jena et al., 2024). In this regard, SMAN 112 Jakarta demonstrates how the principal acts as an adaptive leader who not only manages change but also ensures that every decision made remains relevant to long-term educational needs. These findings provide clear guidance for other schools in implementing adaptive leadership, particularly in facing the challenges of increasingly rapid change.

Overall, the synergy between digital leadership, adaptive management, and data-driven planning found at SMAN 112 Jakarta has a significant impact on creating a child-friendly and sustainable educational environment. The integration of technology with a data-driven approach and a culture of ongoing collaboration demonstrate that technology-based education can function effectively and support the holistic development of students. These findings not only enrich the literature on the application of technology in education but also provide important practical contributions for other schools seeking to implement technology-based education with an approach that focuses on student well-being and adapts to changing times.

CONCLUSION

This study reveals that the synergy between digital leadership, adaptive educational institution management, and data-driven planning proved effective in creating sustainable and child-friendly education at SMAN 112 Jakarta. A key finding is the importance of integrating these three elements in creating an educational ecosystem that is responsive to changing times and focused on student well-being. The principal's digital leadership acts as a catalyst in educational transformation, while adaptive management enables schools to respond to change quickly and relevantly. Data-driven planning ensures that decisions are more targeted and evidence-based, supporting the holistic development of students in line with 21st-century demands. This study adds to

the literature on the implementation of digital leadership and adaptive management in education and provides practical recommendations for improving technology infrastructure, strengthening ongoing training for educators, and encouraging the adoption of data-driven approaches in educational planning.

However, this study is limited by its focus on a single school, so the results may not fully reflect conditions in other schools with different characteristics. While these findings demonstrate the success of synergy in creating sustainable and child-friendly education, the long-term impact of implementing this model on student learning outcomes and well-being requires further exploration. Further research is recommended to examine the application of this synergy model in other schools with diverse characteristics, as well as to conduct in-depth evaluations of the long-term impact on the quality of education and student development.

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