Jurnal Elementaria Edukasia
Volume 8. No. 3, September 2025, 495-510
DOI: 10.31949/jee.v8i3.14191

p-ISSN 2615-4625
e-ISSN 2655-0857

The School Principal's Strategy for Promoting Digital Transformation through Chromebook Utilization in Elementary School Settings

Endang Tri Mulyani*
*Master of Elementary Education, Universitas Muhammadiyah Surakarta
q200240012@student.ums.ac.id
Harsono**
**Master of Elementary Education, Universitas Muhammadiyah Surakarta har152@ums.ac.id
Yulia Maftuhah Hidayati***
***Master of Elementary Education, Universitas Muhammadiyah Surakarta
ymh284@ums.ac.id
Fitri Puji Rahmawati****
fpr223@ums.ac.id
******Master of Elementary Education, Universitas Muhammadiyah Surakarta
Minsih*****
*******Master of Elementary Education, Universitas Muhammadiyah Surakarta
min139@ums.ac.id

Submitted: 2025-06-10
Revised: 2025-09-02
Accepted ; 2025-09-22

ABSTRACT
Digital transformation in elementary schools is a strategic step to improve the quality of learning while equipping students with digital literacy relevant to the demands of the 21st century. The use of Chromebooks supports the creation of more interactive, collaborative, and adaptive learning in line with technological developments. However, in practice, digital transformation in elementary schools is not free from various problems. Many schools still face infrastructure limitations such as unstable internet access, unequal distribution of devices, and gaps in teacher skills in utilizing technology. On the other hand, resistance from some teachers and students to change also poses a challenge that slows the digitalization process. This study aims to describe the principal's strategy in implementing digital transformation through the use of Chromebooks at Gondangmanis 01 Public Elementary School, identify the challenges faced, and explore ways to overcome them. A qualitative approach was used using interview, observation, and documentation techniques, and data validity was assessed through triangulation of sources and methods. Data analysis was conducted using the Miles and Huberman interactive model. The results indicate that the principal's strategy to encourage digital transformation in elementary schools can be an important foundation in strengthening teacher competency while fostering a technology-based learning culture among students.
Keywords: *Digital Transformation, Chromebook, School Principal, Educational Technology, Education*

ABSTRAK
Transformasi digital di sekolah dasar menjadi langkah strategis untuk meningkatkan kualitas pembelajaran sekaligus membekali siswa dengan literasi digital yang relevan dengan tuntutan abad

ke-21. Pemanfaatan *Chromebook* mendukung terciptanya pembelajaran yang lebih interaktif, kolaboratif, dan adaptif sesuai perkembangan teknologi. Namun, dalam praktiknya, transformasi digital di sekolah dasar tidak terlepas dari berbagai problematik. Masih banyak sekolah yang menghadapi keterbatasan infrastruktur seperti akses internet yang tidak stabil, perangkat yang belum merata, serta kesenjangan kemampuan guru dalam memanfaatkan teknologi. Di sisi lain, resistensi sebagian guru maupun siswa terhadap perubahan juga menjadi tantangan yang memperlambat proses digitalisasi. Penelitian ini bertujuan untuk mendeskripsikan strategi kepala sekolah dalam implementasi transformasi digital melalui penggunaan *Chromebook* di Sekolah Dasar Negeri 01 Gondangmanis, mengidentifikasi tantangan yang dihadapi, dan mengeksplorasi upaya mengatasinya. Pendekatan kualitatif digunakan dengan teknik wawancara, observasi, dan dokumentasi, serta validitas data melalui triangulasi sumber dan metode. Analisis data dilakukan dengan model interaktif Miles dan Huberman. Hasil penelitian menunjukkan bahwa strategi kepala sekolah untuk mendorong transformasi digital di sekolah dasar dapat menjadi fondasi penting dalam memperkuat kompetensi guru sekaligus menumbuhkan budaya belajar berbasis teknologi di kalangan siswa.
Kata Kunci: Transformasi Digital; *Chromebook*; Kepala Sekolah; Teknologi Pembelajaran; Pendidikan

INTRODUCTION

The urgency of digital transformation in education in Indonesia has become increasingly prominent, along with government policies encouraging the integration of information technology into the learning process and real-world experiences during the Covid-19 pandemic. During the pandemic, distance learning became an urgent necessity, forcing schools to adapt by utilizing digital devices and online learning platforms. To date, digital transformation remains a strategic necessity because the rapid development of technology requires schools to continue digital-based learning innovations, not only as an emergency response but also as part of ongoing efforts to improve the quality of education and prepare a competent generation for the digital age. Education has undergone significant changes in the ever-evolving digital era, particularly with the advent of technology that has influenced various aspects of the learning system. Technology has opened new opportunities for accessing information and conducting more flexible learning processes (Rosmini et al., 2024). One of the innovations currently being implemented in many schools is the use of technological devices such as Chromebooks. Chromebooks, which operate on a web-based operating system, offer ease of access, efficiency, and lower costs compared to other devices (Qosim et al., 2023). The presence of this technology allows students and teachers to connect more effectively with learning materials and digital resources, thereby fostering more interactive and engaging learning experiences (Slamet et al., 2024)

A Chromebook is a computing device based on the Chrome OS operating system, specifically designed for educational environments (Maraliza et al., 2024). It prioritizes the use of web-based applications that leverage cloud computing to store data and run software, thereby reducing the need for large storage and processing power. The main advantages of Chromebooks lie in their ease of use, affordability, and quick startup time, making them an ideal choice for educational institutions—especially in supporting remote learning and digital collaboration. Furthermore, Chromebooks support seamless integration with various educational applications and platforms such as Google Classroom, enabling teachers and students to work more efficiently in digital learning environments (Jauhariningsih, 2023). With their web-centric capabilities, Chromebooks allow for more centralized and efficient resource

management, which is a critical factor in implementing digital transformation in elementary schools. Furthermore, Chromebooks do not support many complex desktop applications, such as graphic design software or advanced programming applications, making them less suitable for demanding computing needs. These compatibility limitations make Chromebooks more suitable for basic activities such as browsing, typing, and bold collaboration, but less flexible for certain professional needs (Kraemer & Dedrick, 2021).

School principals play a key role in directing and implementing digital transformation in schools, both in terms of hardware and digital learning management (Minsih et al., 2019; Harmathilda et al., 2024; Iswahyudi et al., 2023). Principals are not only responsible for ensuring the readiness of infrastructure but also for guiding teachers and staff in adapting to technology. The strategies adopted by principals can determine the success of digital transformation in creating innovative learning environments (Dziya et al., 2024). As educational leaders, principals are also responsible for providing training and support to educators to enhance their digital competencies (Nurrochman, 2023). Therefore, the role of principals is crucial in facilitating this transition and ensuring that technology becomes a tool to support effective teaching and learning processes (Hidayati et al., 2024; Minsih et al., 2025). Principals play a strategic role as digital leaders in facilitating the integration of educational technology. Research by Kasim and Surya (2025) shows that visionary digital leadership and support for teacher professional development significantly encourage the use of technology in school communication and administration. School principals who were proactive in adopting digital technology succeeded in increasing managerial effectiveness, accelerating decisionmaking, and strengthening interactions with stakeholders, including teachers, students, and parents.

As technology advances, school principals face new challenges in leading digital transformation, which requires visionary and adaptive leadership—especially in leveraging technology to support learning. Rosmini et al. (2024) emphasize that technology-based leadership strategies are vital to the success of digital implementation in schools. At SDN 01 Gondangmanis, this effort is reflected in the principal's initiative to facilitate the development of digital skills among teachers and students. Wening & Santosa (2020) add that innovative approaches by school principals can foster more open and collaborative learning environments while enhancing student engagement. Additionally, the use of Chromebooks, according to Nashrullah et al. (2025), enables broader, more equitable, and inclusive access to education. To achieve these outcomes, principals must understand the existing challenges and apply appropriate strategies to overcome barriers in the digital transformation process (Harsono & Prasetyo, 2021)

SDN 01 Gondangmanis, located in Karangpandan, Karanganyar, is one of the elementary schools striving to improve the quality of education through the integration of digital technology. The school has initiated this effort by providing digital devices for students, but full implementation remains hampered by limited teacher training and suboptimal internet connectivity. Therefore, this study seeks to explore the principal's strategies in driving digital transformation through Chromebook implementation, to understand how the school leader manages and addresses existing challenges, and to support more effective and efficient learning processes at the school.

Numerous studies have examined principals' strategies in implementing digital transformation in schools. These studies provide insights into the use of technology in education and the role of principals in leading such changes. Hulwana (2024) found that school principals play a central role in creating learning environments that support technological mastery among educators and school staff. Similarly, Novitasari et al., (2024) highlight how principals can manage digitalization interventions and ensure program sustainability to improve education quality. Alifa et al., (2024) demonstrated how the use of devices like Chromebooks can enhance learning effectiveness at the junior high school level. Their study underscores the importance of appropriate technology use to support teaching and learning processes. At SDN 03 Gondanglegi, Yanti et al. (2023) provide deeper insights into how principals and educators adapt to new curricula that integrate technology. Moscato & Embre (2023) present empirical research on the impact of technology adoption in learning and the leadership role of principals in managing such changes.

Although previous research has discussed principals' roles in digital transformation and technology implementation in education, there are still gaps that remain underexplored. Most studies focus more on digital literacy among teachers and educational staff or technology usage in secondary schools, while research specifically addressing the principal's strategies in implementing Chromebooks at the elementary level is still limited. Moreover, no study has specifically investigated the challenges and strategies of Chromebook implementation at SDN 01 Gondangmanis. Further exploration is needed to understand how the principal at this school manages digital transformation. Another underexplored area is how principals address resistance from various stakeholders—teachers, students, and parents—when introducing new technologies. Additionally, long-term evaluations of Chromebook use in improving the quality of elementary education, especially its effectiveness in increasing student engagement, are still lacking. The novelty of this study lies in its focus on the principal's strategy for digital transformation through the implementation of Chromebooks.

This study aims to: (1) describe the strategies implemented by the school principal in the digital transformation process through the use of Chromebooks at the school, (2) identify the challenges faced by the principal during the implementation of this technology, and (3) explore the efforts made by the principal to overcome these challenges, particularly in improving teachers' skills in utilizing technology. The significance of this study is to provide insights and practical guidance for principals, teachers, and education policymakers in designing effective and sustainable digital transformation strategies within school environments.

METHODS Types and Design

This study employs a qualitative research design with a phenomenological approach aimed at providing an in-depth description of the principal's strategies in implementing digital transformation through the use of Chromebook devices at SDN 01 Gondangmanis, Karanganyar. This approach was selected as it allows for a contextual and holistic understanding of the phenomenon, particularly in the fields of educational leadership and technology integration. The primary data consists of qualitative information related to leadership strategies, school policies, technology training programs, as well as challenges and solutions encountered in Chromebook implementation. The research subjects include the school principal as the main informant, along with supporting informants such as teachers,

educational staff, and students. Additional data were also obtained from supporting documents, including school work programs, training reports, and digital device usage policies.

Data and Sources

Research data were sourced from key stakeholders at SDN 01 Gondangmanis, comprising the principal, teachers, educational staff, and students involved in the school's digital transformation efforts. The principal provided insights into leadership strategies, decisionmaking processes, and policy implementation. Teachers and staff shared experiences related to the integration of Chromebooks in teaching and learning, while students offered perspectives on the effectiveness and impact of digital learning. Supporting documents, such as school strategic plans, training schedules, and technology usage guidelines, were also analyzed to enrich the data.

Data Collection

Data collection was conducted using three main techniques: in-depth interviews, direct observation, and document analysis. In-depth interviews were carried out with the principal to explore leadership strategies and decision-making in the implementation of digital transformation. Additional interviews with teachers and students aimed to identify their experiences, challenges, and perceptions regarding the use of Chromebooks in daily learning activities. To ensure data accuracy, each interview was audio-recorded with the participants' permission, allowing researchers to perform detailed transcriptions and avoid missing important information. Furthermore, researchers took field notes containing key points, nonverbal expressions, and situational context during the interviews, which can enrich data interpretation. Classroom observations were conducted to examine the actual use of Chromebooks, teacher-student interactions, and the integration of digital tools in instructional practices. Document analysis was also performed on official school records, training reports, and policies to support and validate findings from interviews and observations.

Analysis Techniques

Data were analyzed using thematic analysis techniques, consisting of three stages: data reduction, data presentation, and conclusion drawing based on emerging patterns. In the data reduction stage, relevant information was selected, categorized, and grouped according to key themes related to the principal's strategies and the implementation process. These themes were then presented in narrative form to enable a comprehensive understanding of the phenomenon. Data validity was ensured through source and method triangulation, by comparing and cross-verifying information from interviews, observations, and documents. Additionally, member checking was employed by confirming the findings with the principal to ensure the researcher's interpretations accurately reflected the participants' perspectives. Through this approach, the study aims to provide a thorough understanding of how school leadership manages digital transformation through Chromebook implementation in an elementary school context.

RESULTS AND DISCUSSION

1. Principal's Strategies in Promoting Digital Transformation through the Use of

Chromebooks

The principal of SDN 01 Gondangmanis has developed a series of strategies to leverage technology in the learning process as part of efforts to support digital transformation at the school. One of the key initiatives implemented was the adoption of Chromebooks as the primary device to support digital learning. This strategy not only involved the procurement of devices but also the development of policies that integrate technology into various aspects of teaching and learning. The following are the findings regarding the strategies employed by the principal in carrying out digital transformation.

Findings from interviews with the principal reveal that one of the initial steps taken to implement digital transformation at the school was providing Chromebooks for both students and teachers. The principal explained, "Chromebooks were chosen because we received a government grant, and these devices are compatible with various web-based educational applications." (I/P/May 7, 2025). This decision was based on the need to facilitate a more effective learning process through technology. In interviews with teachers, they expressed that the presence of Chromebooks significantly eased their access to a wide range of digital learning resources, including lesson materials and exercises delivered through platforms such as Google Classroom. SW, a Grade 5 teacher, added, "With the Chromebooks, it's easier for me to manage the learning process and provide supplementary materials through digital platforms." (I/T/May 7, 2025). Direct observations also indicated that students appeared more enthusiastic when using these devices in learning activities, which encouraged greater participation in classroom discussions and digital collaboration.

In addition to providing devices, the principal also formulated policies to integrate webbased applications—particularly Google Classroom—as the main platform for managing learning activities. In an interview, the principal stated, "The purpose of using Google Classroom is to facilitate the distribution of lesson materials, task submissions, and learning evaluations." (I/P/May 7, 2025). Teachers also acknowledged that the platform helped them deliver lessons in a more structured manner, with materials accessible to students at any time. For instance, teacher SB commented, "Google Classroom makes it easier for us to deliver content and provide direct feedback to students." (I/T/May 7, 2025). Documentation from school activity reports shows that the principal organized specific training sessions for teachers to enhance their skills in using this platform, including how to create lesson materials, manage virtual classrooms, and provide feedback to students.

Figure 1. Improving Teachers' Digital Competence Using Chromebooks, May 2025

The principal recognizes the importance of adequate technological infrastructure to support digital transformation in the school. Based on the results of observations, it was found that the school had upgraded its internet connection to ensure that each device could connect

smoothly. Nevertheless, the principal acknowledged that a primary challenge remained: the stability of the internet connection, particularly in classrooms located farther from the school's central access point. In an interview, the principal stated, *"We are currently exploring a partnership with an internet service provider to improve the quality of connection throughout the entire school area, so that every classroom can have stable access."* (I/P/May 7, 2025). This reflects a continuous effort to enhance infrastructure in support of smooth technology-based learning. Furthermore, according to school policy documentation, the principal also ensured that sufficient electrical network facilities were available in every classroom to support more interactive learning using digital devices.

Another strategy implemented by the principal was to encourage student engagement in digital learning through the use of Chromebooks. Based on interviews with students, they expressed that using these devices made learning more enjoyable and engaging. Students KN and AZ shared, *"With Chromebooks, learning is more fun, and I can search for more information on the internet."* (I/ST/May 7, 2025). The principal explained that Chromebooks enable students to learn more independently, access various materials online, and collaborate with their peers on technology-based learning projects. Teacher WL added, *"We want students to be more active and independent in their learning, using technology to enrich their learning experiences."* (I/T/May 7, 2025). Classroom observations also showed that students were more proactive in completing assignments and frequently sought additional references beyond the materials provided by the teacher. This indicates that the use of Chromebooks not only introduces technology into the classroom but also enhances students' motivation to learn more independently and creatively.

Figure 2. Implementation of Learning with Chromebooks, May 2025

The principal also emphasized the importance of evaluating and monitoring the use of technology in the learning process. Based on interview findings, the principal stated, "We routinely evaluate the use of Chromebooks, from both the student and teacher perspectives, to ensure that this technology is truly effective in supporting learning." (I/P/May 7, 2025). Documentation from school activity reports indicates that the principal holds monthly meetings with teachers to discuss the effectiveness of using these devices in teaching. These meetings serve as an important forum to address encountered challenges and find collective solutions. In addition, through observations, the principal and the school supervisory team directly monitor classrooms to see how teachers integrate Chromebooks into their instructional practices. As teacher SK noted, "Direct monitoring by the principal and the team really helps us better understand how to use Chromebooks more effectively." (I/T/May 7, 2025). This practice aims to ensure that the devices are used to their fullest potential, contribute positively to learning quality, and allow early detection of any issues requiring further attention.

The principal also emphasized the importance of evaluation and monitoring in the use of technology for learning. Based on interview results, the principal stated, "We regularly evaluate the use of Chromebooks, from both students and teachers, to ensure that this technology is truly effective in supporting learning." (I/P/May 7, 2025). Documentation from school activity reports shows that the principal holds monthly meetings with teachers to discuss the effectiveness of using these devices in the learning process. These meetings serve as a key forum for addressing challenges and collaboratively seeking solutions.

In addition, through classroom observations, the principal and the school supervisory team conduct direct monitoring to observe how teachers integrate Chromebooks into their instructional practices. As noted by teacher SK, "Direct monitoring by the principal and team is very helpful for us to better understand how to use Chromebooks more optimally." (I/T/May 7, 2025). These efforts aim to ensure that the devices are being used to their fullest potential and positively impact learning quality, while also identifying any issues in their use that may require further attention.

Figure 3. Evaluation Activity on Chromebook Usage, May 2025

To support a deeper understanding of the principal's strategy in implementing digital transformation through Chromebook usage, the following table summarizes several strategic steps taken. The table is compiled based on interview data, direct observations, and documentation gathered throughout the research.

Table 1. Principal's Strategies for Implementing Digital Transformation through Chromebooks

No	Strategy	Description
1	Provision of Chromebooks	The principal provided Chromebooks to both students and teachers to facilitate digital-based learning and improve access to educational materials. The principal's action was not simply the provision of devices, but rather a visionary managerial strategy to ensure that teachers and students had equal access to digital resources.
2	Integration of WebBased Applications and Google Classroom	Utilization of Google Classroom to manage lessons, assignments, and evaluations. Teachers were trained to use the application effectively. The use of Google Classroom as a central learning management center demonstrates a paradigm shift from traditional learning to a more digital, structured, and welldocumented system.

3	Development of Supporting Infrastructure	Improving the internet quality throughout the school and ensuring that sufficient electrical infrastructure is available in every classroom. This step not only enabled the smooth utilization of Chromebooks and digital applications but also demonstrated the school's commitment to building a modern educational ecosystem.
4	Encouraging Student Engagement in Digital Learning	Motivating students to actively use Chromebooks in learning by providing access to engaging and collaborative digital learning content. This effort to motivate students demonstrates that digital transformation is not simply focused on technical aspects or devices, but rather on how technology is creatively used to support learning processes that are humanistic, relevant, and contextualized to their real lives.
5	Evaluation and Monitoring of Technology Usage	Conducting routine evaluations of Chromebook use for both teachers and students through monthly meetings and classroom observations. Regular evaluations are not only a means of control but also an institutional learning mechanism that fosters a reflective culture and continuous professional development for teachers, as well as increased student engagement.

Based on the table above, it can be concluded that the principal has implemented a number of key strategies to support digital transformation through the use of Chromebooks. These strategies include the provision of devices to students and teachers, integration of web-based applications like Google Classroom, and the development of adequate supporting infrastructure. Moreover, the principal actively promotes student engagement through interactive digital learning and regularly conducts evaluations to monitor the effectiveness of technology integration.

One of the principal's most significant actions was the provision of Chromebooks and the integration of web-based applications such as Google Classroom. This step aligns with the view of Dziya et al. (2024), who emphasize the importance of digital leadership in fostering educational innovation in elementary schools. The use of Chromebooks to support digital learning at SDN 01 Gondangmanis is also consistent with findings by Alifa et al., (2024), who noted that these devices can be effective tools for supporting learning at the junior secondary school level. Furthermore, Tjiptady & Juniarso (2023) highlight that post-pandemic digital learning transformation requires thoughtful design and integration of technology in classroom practices, particularly within the framework of the 2013 Curriculum in multicultural elementary schools. This reinforces the importance of providing both infrastructure and pedagogical support to ensure the success of technology integration..

2. Challenges Faced by the Principal in Digital Transformation through Chromebook Implementation

The digital transformation at SDN 01 Gondangmanis through the use of Chromebooks has brought about positive changes in the learning process. However, its implementation has not been without various challenges. The principal is faced with several obstacles that must be addressed to ensure optimal use of technology. The following are the research findings

regarding the challenges encountered by the principal in implementing digital transformation at the school.

Interviews with the principal of SDN 01 Gondangmanis revealed that one of the main challenges in implementing digital transformation through Chromebooks is the limited access to stable internet throughout the school. The principal explained:"Although some classrooms are already equipped with internet connections, there are still areas in the school that experience significant connectivity issues. This greatly affects the smooth running of digitalbased learning." (I/P/May 7, 2025) This impacts the continuity of digital learning, as students and teachers cannot access educational materials or platforms smoothly. As teacher DY stated: "We often can't access Google Classroom due to network problems." (I/T/May 7, 2025) Field observations also showed that students KN and AZ struggled to access Google Classroom or other materials due to poor internet connectivity. Activity reports documented that the principal is seeking external partnerships to improve the school's internet connectivity.

Another challenge faced by the principal is resistance from some teachers who are not yet accustomed to using technology in teaching. In interviews, teachers SB and SK expressed difficulties adapting to new devices like Chromebooks and a lack of confidence in managing technology-based learning. Teacher SB noted: "I felt unsure when using the Chromebook for the first time in class." (I/T/May 7, 2025) The principal stated that much of this resistance stems from fears of technical unfamiliarity and discomfort in using digital tools for instruction. However, teacher WL emphasized that through intensive training and mentoring, most teachers have begun to overcome these barriers. School policy documents indicate that regular training sessions have been conducted to enhance teachers' digital competencies.

Another issue is the lack of adequate training for teachers to fully utilize the technology. The principal acknowledged that although training has been provided, the time and content have been limited. Teacher DY expressed the need for further support in using web-based learning applications and integrating technology into teaching strategies: "The training sometimes doesn't go deep enough; I need more time to master these devices." (I/T/May 7, 2025) Interviews revealed that several teachers felt existing training programs were insufficient, making it difficult to use Chromebooks effectively in the classroom. Observations confirmed that while some teachers used Chromebooks, others still lacked confidence in operating the devices and related applications. Documentation shows that the school has plans to extend and deepen teacher training.

Resistance also came from some students and parents. Students NK and AZ expressed a preference for traditional face-to-face learning and felt burdened by tasks requiring the use of Chromebooks. The principal explained that student resistance stemmed from a lack of technological skills and a preference for conventional methods: "We realize that some students prefer the old ways, so we have to be patient in helping them adapt." (I/P/May 7, 2025) Moreover, some parents expressed concern about excessive digital device usage, particularly its impact on their children's health. School policy documentation notes that the principal has conducted information sessions with parents to explain the benefits of educational technology and how its use can be managed in a healthy and balanced way.

Figure 4. Parent Outreach on Digital-Based Learning, May 2025

Another challenge the principal faced was time constraints in implementing technology. The principal noted that the integration process requires a significant amount of time, both for teacher training and student orientation. In addition, implementing technological changes involves a mindset shift and new ways of working for educational staff. As teacher SK stated: "We still need time to get used to technology-based learning." (I/T/May 7, 2025) Field observations showed that both teachers and students still needed time to adapt to the new learning approaches. According to school program documentation, the principal plans to organize more flexible schedules for training and technology implementation to make the process more effective.

Another challenge faced by the principal is time constraints in implementing technology. The principal explained that the technology integration process requires a considerable amount of time, both for teacher training and for introducing the technology to students. Additionally, implementation involves changes in mindset and work practices among educational staff, which also require time for adaptation. As teacher SK stated: "We still need time to get used to technology-based learning." (I/T/May 7, 2025) Field observations revealed that several teachers and students still need time to adapt to this new approach to learning. Documentation from the school's work program indicated that the principal plans to organize a more flexible schedule for training and technology implementation, so the process can be carried out more effectively.

The following table summarizes the results of interviews with the principal, teachers, and students, along with direct field observations and documentation. This table illustrates the main challenges faced in implementing digital transformation through the use of Chromebooks at SDN 01 Gondangmanis:

Table 2. Challenges Faced by the Principal in Digital Transformation through Chromebooks

No	Challenge	Description
1	Limited Access to Stable Internet	Limited stable internet connectivity in several areas of the school disrupts access to materials and the use of web-based learning applications.

No	Challenge	Description
2	Teacher Resistance to Using Technology	Some teachers struggle to adapt to Chromebooks and other digital applications and lack confidence in managing techbased learning.

3	Insufficient Training for Teachers	Limited training in using technology and digital tools makes teachers feel unprepared to optimize Chromebook use for learning.
4	Resistance from Students and Parents	Students and parents tend to prefer traditional learning and are concerned about excessive use of digital devices.
5	Time Constraints in Technology Implementation	The implementation process requires considerable time for teacher training and for students to adapt to digital-based learning methods.

From the table above, it can be concluded that the main challenges in implementing digital transformation through Chromebooks at the school involve several factors: limited access to stable internet, resistance from both teachers and students, and inadequate teacher training. Parental resistance to the use of technology also poses a significant challenge, particularly regarding concerns over the negative impacts of digital device usage. Furthermore, the principal faces time-related constraints in preparing infrastructure and facilitating adaptation among teachers and students.

The principal at SDN 01 Gondangmanis faces several obstacles, including limited internet access and teacher resistance due to unfamiliarity with technology. These challenges are similar to those described by Wening & Santosa (2020), who state that school leaders must adopt adaptive leadership strategies when dealing with major changes such as technology implementation in the Digital 4.0 era. To address these challenges, the principal has initiated continuous training programs for teachers, aligning with recommendations by Rosmini et al. (2024) regarding the importance of developing digital competencies among educators. This approach also resonates with the findings of Ramadhani & Zulela (2020), who emphasize that pedagogical professionalism is essential for teachers to effectively adapt to changes in learning approaches brought by the digital era..

3. Principal's Efforts in Overcoming the Challenges of Digital Transformation through Chromebooks

The principal of SDN 01 Gondangmanis has continuously strived to overcome obstacles in implementing digital transformation through the use of Chromebooks. These efforts include various strategic steps—ranging from infrastructure improvements and teacher training to enhancements in other technical aspects. The principal has focused on addressing emerging issues to ensure that the use of technology in learning runs smoothly and effectively. The following are the research findings regarding the efforts made by the principal to address challenges during the school's digital transformation process.

One of the principal's main efforts in addressing the limited internet access challenge is by improving the school's network infrastructure. Based on an interview with the principal, he stated, "We have partnered with several internet service providers to strengthen the network within the school, especially in areas with unstable internet connections." (I/PR/May 7, 2025) Field observations show that several classrooms are now equipped with stronger and more stable Wi-Fi access. This has enabled both students and teachers to access digital learning platforms more smoothly. Additionally, school policy documents show plans to procure supporting network equipment, such as additional routers, to expand internet coverage throughout the school.

To overcome resistance from teachers who feel challenged in utilizing technology, the principal has implemented ongoing training and mentoring programs. In an interview, the principal explained, "Besides holding regular training sessions with external facilitators, we also involve more tech-savvy teachers to mentor their peers." (I/PR/May 7, 2025) Classroom observations reveal that some teachers have become more confident in using Chromebooks and other digital tools after participating in these programs. One teacher, Mrs. DY, shared: "After attending the training, I feel more comfortable using Chromebooks to teach and manage the class digitally." (I/PR/May 7, 2025) Documentation of school activities confirms that the principal has arranged a monthly training schedule to ensure teachers continue to build their skills in managing digital-based learning.

The principal is also aware of the importance of addressing resistance from students and parents regarding the use of technology in education. Based on an interview, the principal stated: "To reduce parents' concerns, we have conducted outreach on the benefits of technology in education through regular parent meetings." These sessions aim to explain how Chromebooks enrich students' learning experiences and help them access learning materials more easily. Observations show that some parents have become more supportive of technology use in school after receiving direct explanations. Furthermore, students have been encouraged to actively use technology, with the goal of increasing their engagement in digital learning. Student AZ expressed: "I find it easier to access materials and feel more engaged in learning after using Chromebooks." (I/ST/May 7, 2025)

To address time constraints in implementing technology, the principal has designed a more flexible schedule for training and Chromebook use in class. He stated:
"Training schedules are now adjusted to fit teachers' free time so they don't feel burdened by extra activities outside teaching hours." (I/PR/May 7, 2025) Observations indicate that this flexible schedule allows more teachers to participate in training and implement technology more comfortably. Documentation of the school work program also shows that the principal has planned intensive training sessions during holidays or weekends, allowing technology implementation to proceed more effectively without disrupting regular learning activities. "We continuously monitor the effectiveness of device usage and look for solutions to problems that arise, such as technical issues or difficulties using applications." (I/PR/May 7, 2025) Activity reports show that students are also involved in the evaluation process, where they are asked to provide feedback on their experience using Chromebooks for learning. Student NK shared: "I feel Chromebooks help me better understand lessons because I can search for additional materials on my own." (I/ST/May 7, 2025)

Table 3. Principal's Efforts in Overcoming Challenges in Implementing Digital Transformation through Chromebooks

No	Effort	Description
1	Improving the school's Internet Connectivity	The principal collaborates with internet providers to strengthen network, especially in classrooms with poor Infrastructure and connections. This underscores the commitment to the principle of equitable access to education, where technology is not just for

No	Effort	Description
		some, but becomes an inclusive tool for the entire school community.
2	Ongoing Training and Mentoring for Teachers	Regular training is conducted with external facilitators, and experienced teachers provide peer mentoring to improve tech skills. The involvement of external facilitators brings fresh perspectives and technological updates, while peer mentoring strengthens a culture of mutual learning within the school.
3	Strengthening Communication with Parents and Students	Outreach sessions are held to inform parents and students about the benefits of technology and to address concerns over its negative impacts. This emphasized that digital transformation should be viewed as a collaborative process, not simply an internal school policy, ultimately strengthening trust, building a healthy digital culture, and ensuring the sustainability of innovation in schools.
4	Designing Flexible Schedules for Technology Implementation	Training schedules are adjusted to fit teachers' availability, avoiding disruption to their regular teaching routines. By providing flexibility, the school not only values teachers' professionalism but also ensures that the digital competency development process is ongoing and doesn't create undue stress.
5	Regular Evaluation and Monitoring	The principal holds regular evaluations and meetings with teachers and students to assess Chromebook usage and its impact on learning. This demonstrates participatory leadership, where teachers and students are engaged as active participants in the digital transformation process, not simply as objects of policy.

The principal has implemented a number of strategic efforts to address challenges in the digital transformation process using Chromebooks. These key efforts include enhancing network infrastructure to ensure better connectivity, and providing continuous teacher training to build their confidence in using digital tools. The principal also strengthened communication with parents and students to improve understanding and support for technology use in learning. By designing a flexible training schedule, the principal has enabled teachers to participate without affecting their teaching hours. Regular evaluation and monitoring ensure the sustainability and success of the implementation. These efforts reflect the principal's commitment to creating a technology-based learning environment that adapts to the demands of the digital age.

The principal also maintained intensive communication with parents and students to alleviate concerns about the use of technology in education. This approach aligns with Nashrullah et al., (2025), who emphasized that effective school-parent communication plays a critical role in the success of educational technology implementation. Through outreach and training, the principal sought to increase parental understanding of the benefits of digital tools, in line with the recommendations by Yanti et al. (2023) in supporting school digitalization programs. The findings indicate that despite some challenges, the principal's efforts in

implementing digital technology at SDN 01 Gondangmanis have yielded positive results. The provision of Chromebooks and integration of web-based applications like Google Classroom have enhanced student engagement and helped teachers deliver material more efficiently and systematically. Additionally, continuous teacher training has positively impacted their digital skills, enabling them to manage technology-based learning with greater confidence. Communication efforts with parents have also successfully reduced concerns about technology, leading to stronger support for the digital transformation program. Consistent with studies by Nashrullah et al., (2025) and Yanti et al. (2023), this demonstrates that successful technology implementation in schools depends greatly on strong collaboration among principals**,** teachers, parents, and students.

CONCLUSION

The principal of SDN 01 Gondangmanis has implemented a comprehensive digital transformation strategy through the provision of Chromebooks, Google Classroom integration, and ongoing training for teachers. These steps reflect digital leadership practices that emphasize the principal's role as an agent of change in technology-based learning. Challenges such as limited internet access, initial resistance from teachers and students, and uneven technological skills were addressed through infrastructure improvements, ongoing training programs, and intensive outreach to parents and students. Regular evaluations were also conducted to monitor the effectiveness of the implementation. The strategy has had a positive impact on increasing student engagement, strengthening teacher competencies, and creating a more adaptive and innovative learning environment. These findings provide an important contribution to the development of elementary school leadership models in the digital era, particularly in fostering a sustainable technology-based learning culture.

REFERENCES

Alifa, Z. I., Sufyadi, S., & Utama, A. H. (2024). Pemanfaatan Chromebook sebagai Penunjang Pembelajaran bagi Siswa di SMPN 1 Banjarmasin. *EDUTECH, 23*(2).

Dziya, S., Kholifah, S. R., Putri, E., Nurmaya, F., Hervanda, F. S., Argadinata, H., & Kunci, K. (2024). Kepemimpinan Digital : Upaya Peningkatan Inovasi Pendidik di Sekolah Dasar. *Proceedings Series of Educational Studies*, *(6)*, 83-94.

Harmathilda, H., Yuli, Y., Hakim, A. R., & Supriyadi, C. (2024). Transformasi Pendidikan Pesantren di Era Modern : Antara Tradisi Dan Inovasi. *Karimiyah*, *4*(1), 33–50. https://doi.org/10.59623/karimiyah.v4i1.51

Harsono, H., & Prasetyo, I. (2021). Kompetensi Komunikasi Kepala Sekolah dalam Meningkatkan Kinerja Guru SMK Kartika V-I Balikpapan. *Jurnal Manajerial Bisnis*, *4*(3), 174–189.

Hidayati, Y. M., Safitri, S. I., Arifin, A. J., & Rahmawati, S. (2024). Exploring Students ' Responses : The Feasibility of Pizza Slice Math Learning Media. *Jurnal Pedagogi Dan Pembelajaran*, *7*(3), 542–549.

Iswahyudi, M. S., Irianto, I., Salong, A., Nurhasanah, N., Leuwol, F. S., Januaripin, M., & Harefa, E. (2023). *Kebijakan dan Inovasi Pendidikan: Arah Pendidikan di Masa Depan*. PT. Sonpedia Publishing Indonesia.

Jauhariningsih, R. (2023). Pengaruh Model Pembelajaran Flipped Classroom dengan Google Classroom Terhadap Motivasi dan Hasil Belajar Siswa SMA Negeri 5 Makassar. *Jurnal*

Oase Nusantara, *2*(1), 41–52.

Kasim, M., & Surya, P. (2025). Dampak Kepemimpinan Digital Kepala Sekolah Terhadap İntegrasi Teknologi Guru di Sekolah Dasar. *Jurnal Pendidikan dan Kebudayaan*, 10(1), 1–18

Kraemer, K. L., & Dedrick, J. (2021). The Global Diffusion of Chromebooks İn Education: Opportunities and Challenges. *Journal of Information Technology for Education*, 20(3), 155–170.

Maraliza, H., Fitri, D., Sukarno, F. A., Anggraini, M. S., & Gustama, S. N. (2024). Sosialisasi Pengenalan Chromebook untuk Digitalisasi Kegiatan Belajar Mengajar pada SDN 03 Kasui Pasar. *Jurnal Pengabdian Sosial*, *1*(7), 456–460. https://doi.org/10.59837/2dkd7258

Minsih, Laila, A., Agustina, L., & Siswanto, H. (2025). Development of Augmented Reality Learning Media to Increase Elementary School Students' Scientific Literacy Ability. *In AIP Conference Proceedings*, Vol. 3142, No. 1, 020018. https://doi.org/https://doi.org/10.1063/5.0262586

Minsih, M., Rusnilawati, R., & Mujahid, I. (2019). Kepemimpinan Kepala Sekolah dalam Membangun Sekolah Berkualitas di Sekolah Dasar. *Profesi Pendidikan Dasar*, *1*(1), 29–40. https://doi.org/10.23917/ppd.v1i1.8467

Moscato, J., & Embre, C. (2023). Strategi Pendidikan Dasar untuk Menghadapi Tantangan Era Kurikulum Digital dengan Studi Empiris. *Jurnal MENTARI: Pendidikan Dan Teknologi Informasi*, *2*(1), 43–53.

Nabila, S., & Farihin, A. (2023). ICT sebagai Alat Bantu Pembelajaran di SMPIT Hidayatul Mubtadi-IEN. *AL-QIYADI: Jurnal Manajemen Pendidikan Islam*, *November*, 86–93.

Nashrullah, M., Rahman, S., Majid, A., Hariyati, N., & Purwoko, B. (2025). Implementasi Transformasi Digital di SD Antawirya Islamic Javanese School melalui Kepemimpinan Transformasional. *Jurnal Pendidikan Dan Pembelajaran Indonesia (JPPI)*, *5*, 206–217.

Novitasari, R. A., Marmoah, S., & Budiharto, T. (2024). Pelaksanaan Intervensi Digitalisasi Sekolah pada Program Sekolah Penggerak di Sekolah Dasar. *Didaktika Dwija Indria*, *449*, 451–456.

Nurrochman, T. (2023). Jurnal Tarbiyah dan Ilmu Keguruan Borneo Peran Kepemimpinan Pembelajaran Kepala Sekolah melalui Transformasi Digital Pasca Pandemi di Sekolah Dasar. *Jurnal Tarbiyah Dan Ilmu Keguruan Borneo*, *4*, 299–310.

Qosim, Purwanti, I., Indira, I., Sulistyowati, R., Isfadia, H., & Santoso, S. (2023). Pengenalan Dasar Chromebook sebagai Digitalisasi Pembelajaran. *Jurnal Ahmad Dahlan Mengabdi*, *2*(1), 6–10. https://doi.org/10.58906/abadi.v2i1.87

Ramadhani, S. P., & Zulela, M. S. (2020). Profesional Pedagogy Guru terhadap Perubahan. *Jurnal Elementaria Edukasia*, *3*(2), 384–397.

Rosmini, H., Ningsih, N., Murni, M., Adiyono, A., Stit, I., Rusyd, T., Grogot, K., & Timur, I. (2024). Transformasi Kepemimpinan Kepala Sekolah pada Era Digital: Strategi Administrasi Pendidikan Berbasis Teknologi di Sekolah Menengah Pertama. *Konstruktivisme : Jurnal Pendidikan Dan Pembelajaran*, *16*(1), 165–180. https://doi.org/10.35457/konstruk.v16i1.3451

Slamet, Rahmawati, F. P., & Gufron, A. (2024). Peran Kurikulum Merdeka dalam Pengembangan Literasi Digital dan Karakter Peserta Didik. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *09*, 737–751.

Tjiptady, B. C., & Juniarso, T. (2023). Transformasi Desain Pembelajaran Pasca Pandemi Covid19 berbasis pembelajaran Digital Kurikulum 2013 : Studi Kasus Sekolah Dasar Multikultural. *Jurnal Elementaria Edukasia*, *6*(2), 283–292. https://doi.org/10.31949/jee.v6i2.5218

Wening, M. H., & Santosa, A. B. (2020). Strategi Kepemimpinan Kepala Sekolah dalam Menghadapi Era Digital 4.0. *Jurnal Manajemen, Kepemimpinan, Dan Supervisi Pendidikan*, *5*(1), 56–64.

Yanti, Y. E., Cholifah, T. N., Rustantono, H., Rasyid, H., Ammany, T. N., Fidayanti, L. N., ... & Damaiyanti, F. (2023). (2023). Pendampingan Literasi Numerasi dan Adaptasi Teknologi sebagai Upaya dalam Mendukung Penerapan Kurikulum Merdeka di SDN 03 Gondanglegi. *Jurnal Edukasi Pengabdian Masyarakat*, *2(4)*, 238–245.