



The Principal's Role as an Innovator in Advancing School Digitalization through the Implementation of a Digital Library Program at SDN Tambakrejo 01 Semarang

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Abstract: SDN Tambakrejo 01 Semarang, under the leadership of the Principal, is known to have faced serious challenges, such as the impact of flooding that damaged facilities and physical book collections. This innovation not only overcomes logistical challenges but also changes the literacy culture in the school. This study uses a qualitative case study design that aims to describe and interpret the role of the principal as an innovator in developing a digital library program at SDN Tambakrejo 01 Semarang. Starting from this reality, this study aims to explore the role of the principal as an innovator in the development and implementation of school digitalization through a digital library program at SDN Tambakrejo 01 Semarang. The results of this study The Principal of SDN Tambakrejo 01 initiated the Digital Library program after reflecting on two main problems: book damage due to flooding and low student literacy scores (around 50). An innovative solution resulting from joint reflection by teachers and parents was the creation of the Digital Reading Corner (Subadi) application and the One Student One Book (SASI SABU) program, where students create and upload their own digital books. This program is implemented routinely using available resources (Chromebooks) and supported by close collaboration from all parties, successfully increasing student literacy scores from 50 to 87 in one year, and its sustainability is maintained through regular evaluations and annual competitions.

Keywords: Digitalization; Digital library pro; Innovation development

Introduction

The digital era has transformed the educational landscape by demanding institutions to master and utilize information and communication technology (ICT) as part of an unavoidable transformation. As stated by (Zou et al., 2025; McCarthy et al., 2023). ICT has fundamentally changed how learning is delivered, accessed, and managed in schools. At the elementary level, data management challenges such as student records, teacher information, inventory, and financial reporting are becoming increasingly complex every

year. To address these challenges, digital archiving and digital-based school systems have emerged as strategic solutions to improve efficiency, transparency, and accessibility of educational information. However, as (Mhlanga, 2024; Gkrimpizi et al., 2023) argue, digital transformation in education also faces obstacles such as unequal access to technology, data security issues, and misinformation risks that may disrupt the educational integrity. Within this transformation process, the role of the school principal becomes highly significant. The principal serves not only as an administrator but also as an innovative leader who drives change, motivates

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teachers, and fosters a culture of learning that integrates digital literacy. Hairani et al. (2025) and Ruloff et al. (2025), emphasize that the managerial leadership of school principals should be oriented toward digital transformation, resource management, and the empowerment of school stakeholders. Similarly, Okunlola et al. (2025) and Berkovich et al. (2024), found that the principal's leadership in digital library development contributes positively to students' literacy, information access, and digital competencies. Furthermore, Karakose et al. (2021) and Habib (2023) highlight that successful digital transformation requires collaboration among principals, teachers, librarians, and the community. Herlinawati et al. (2024) and Martinez (2022) note that effective leaders must create learning environments aligned with 21st-century skills.

A school library holds a strategic role in fostering reading interest, supporting literacy development, and providing access to knowledge sources (Merga, 2020; Deswalantri et al., 2023). However, Ramadhan et al., (2025) and Budiyanto et al. (2025) revealed that many elementary school libraries remain suboptimal due to limited book collections, inadequate facilities, and the lack of technology integration. Data from the Dinas Arsip dan Perpustakaan Daerah (Arpusda) of Semarang City shows that out of 504 SD/MI libraries, 335 have not yet met the minimum service standards. The deficiencies range from insufficient human resources and limited collections to poorly managed facilities. This condition highlights the urgent need for school-based innovation in library management through digitalization. Digital libraries present a relevant solution to the above challenges. They not only reduce the dependence on printed materials but also increase student engagement and literacy outcomes. Literacy, as Medranda-Morales et al. (2023) and Manousou (2025) defines, goes beyond reading and writing—it involves critical thinking, information evaluation, and decision-making based on data. UNESCO (2020) also emphasizes that literacy is a foundation for lifelong learning and social progress. In Indonesia, literacy development efforts are supported by the Gerakan Literasi Sekolah (GLS) as mandated in Permendikbud No. 23 of 2015 (Holzer et al., 2022; Hu & Qian, 2025). Nevertheless, research indicates that students' literacy achievements remain below expectations, implying that innovative digital strategies are urgently required.

One of the primary schools that has successfully implemented such innovation is SDN Tambakrejo 01 Semarang. Geographically located in a flood-prone area, the school faced recurrent damage to printed books. In 2023, the principal introduced the Sudut Baca Digital (SUBADI)—a digital reading corner designed to mitigate environmental risks while promoting flexible access to reading materials. The program evolved into a

comprehensive Digital Library initiative, supported by the SASI SABU (Satu Siswa Satu Buku) project, where each student creates and publishes a digital book using Canva. The digital library features diverse content, including e-books, storybooks, and thematic learning materials, all accessible via Chromebooks, smartphones, and school Wi-Fi. This innovation not only addressed logistical challenges but also transformed the literacy culture within the school. Data from the school's rapor pendidikan indicated a consistent improvement in literacy scores—from 50 in 2023 to 65.35 in 2024 and 88.89 in 2025. Moreover, the principal's leadership style, characterized by creativity, adaptability, and collaboration, led to his recognition as a "Kepala Sekolah Berprestasi Kota Semarang" in 2024 and partnership with the Tanoto Foundation. These achievements exemplify the significance of innovative leadership in ensuring the sustainability of digital transformation in education.

Grounded in these realities, this study aims to explore the role of the school principal as an innovator in the development and implementation of school digitalization through the digital library program at SDN Tambakrejo 01 Semarang. Specifically, it seeks to: describe the principal's role in designing the digital library program; explain how the principal develops and creates the innovation collaboratively; examine how the program is implemented in daily practice; and analyze the strategies used to sustain and expand the digital library initiative. The findings are expected to contribute theoretically to educational management discourse, especially regarding innovative leadership and digital transformation, and practically to the improvement of school literacy practices and digital resource management at the elementary level. State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

Method

Research Design and Method

This research employed a qualitative case study design aimed at describing and interpreting the principal's role as an innovator in developing a digital library program at SDN Tambakrejo 01 Semarang. The qualitative approach was chosen because it allows researchers to capture the authentic experiences and contextual realities of participants in their natural setting, which quantitative methods may not fully represent. The case study design enabled the researcher to conduct an in-depth exploration of the digital transformation process led by the school principal.

Research Site and Participants

The research was conducted at SDN Tambakrejo 01 Semarang, located in the northern coastal area of Semarang City, Central Java, Indonesia. The study took place from June to October 2025. Participants were selected using purposive sampling, based on their direct involvement in the digital library program. A total of 13 participants were involved, consisting of one principal, five teachers, one librarian, and six students. All participants provided informed consent before data collection, and confidentiality was maintained throughout the research process.

Data Collection Techniques

Data were collected through semi-structured interviews, participatory observation, and documentation study: Interviews were conducted with the principal, teachers, librarian, and students to obtain insights about the planning, implementation, and impact of the digital library; Observation focused on the daily use of the digital library platform, classroom literacy activities, and students' engagement in creating digital reading materials; Documentation included school archives, photographs, program reports, and digital library content. Data collection continued until thematic saturation was reached, meaning no new information emerged from subsequent interviews or observations.

Data Analysis

The collected data were analyzed using the interactive model of Miles, Huberman, and Saldaña: which includes three main stages: Data condensation, involving selection, simplification, and organization of raw data; Data display, by arranging information in narrative and matrix form; and drawing and verifying conclusions, through pattern matching and interpretation of emerging themes. To ensure a systematic analysis, data coding was performed manually and refined through iterative review.

Trustworthiness of Data

To ensure the credibility, dependability, transferability, and confirmability of the findings, several validation techniques were employed: Triangulation of data sources and methods (interview, observation, documentation); Member checking, by confirming interview results with participants to ensure accuracy; Peer debriefing with fellow researchers for interpretative consistency. Audit trail, by keeping detailed field notes, interview transcripts, and documentation records.

Research Ethics

This research adhered to ethical standards of educational research. Informed consent was obtained from all participants, and pseudonyms were used to maintain anonymity. Permission to conduct the research was granted by the Semarang City Education Office and the school principal. All procedures were designed to ensure respect, confidentiality, and voluntary participation in accordance with ethical research principles.

Result and Discussion

Digital Library Program Design

The design phase began with a process of reflection and identification of the school's conditions. The principal stated that the school was flooded, resulting in many books being damaged. He emphasized, "Seeing the school's frequent flooding and damaged books, I thought about how to ensure the children could continue reading without worrying about books being damaged." This problem became the initial basis for finding a solution to literacy activities by utilizing advances in digital technology. Furthermore, another ongoing problem at the school was the low literacy skills of students, with scores around 50. Therefore, an innovative program was needed to address this issue. The reflection was conducted using the Joint Reflective Inquiry (IRB) method. Reflections were also conducted by the school and parents. The principal stated, "We conducted a joint reflection with teachers and parents, and then the idea for the digital library and the SASI SABU program emerged." This statement was further reinforced by a teacher who explained, "Mr. Tri (the principal) invited us to a reflection meeting. He said we need to make breakthroughs, not just add books, but change the way children read and write." The emerging ideas were then developed and actualized through digital literacy workshops involving the school community and parents to align perceptions about digital literacy (Hsu & Chen, 2023).

Innovation Development and Creation Program

The agreed-upon plans were then further developed by creating the Digital Reading Corner (Subadi) application. In its implementation, the school also implemented the One Student One Book (SASI SABU) program. The principal stated, "Our innovative step is to create a digital library through the Subadi application and the SASI SABU program. Students create books from pictures or short stories and then upload them to the school's digital library link." This program will encourage students to cultivate a culture of literacy. Students will become more active in writing and reading. Students can also provide feedback on each

other's work and share appreciation. The teacher also emphasized that during the implementation, the children have been able to utilize advances in digital technology (Liu et al., 2024): "The children created their own books using Canva, then uploaded their work to the school's digital library link." The success of the development process is inseparable from the strong collaboration of all parties. The school librarian added, "Mr. Tri always invites discussions, and everyone is involved. Teachers, committee members, and even the children help prepare lists of digital books they want to read." Another supporting factor at the school is the availability of internet access, smartphones, and Chromebooks. The principal stated, "The facilities are already there; they just need to be utilized. Grades 1-3 use Chromebooks, while grades 4-6 use their phones from home." This result demonstrates the school's collaborative leadership style and the principal's ability to optimize existing resources.

Digital Library Program Implementation

The implementation phase of digital literacy activities is carried out routinely in each class. The implementation uses the previously developed Subadi application. The principal stated, "Students from grades 1 to 6 are already using digital applications. Access is easy, just through a link or barcode from the class teacher." To facilitate the activity, teachers act as facilitators. The teacher explained, "We provide barcodes or links to students. The children read digital books and can then create their own books using Canva." The librarian also provided an additional statement that the management system was carried out systematically and structured "Children in grades 1-3 read via Chromebooks, while grades 4-6 use cellphones. Student-written books are compiled by teachers and uploaded to the school platform." Furthermore, to ensure students have good literacy motivation, the principal held a digital literacy competition in certain activities. This was conveyed with "We held a class arrangement competition utilizing digital reading corners. The books produced the most will be competed and active students will be given awards." The results obtained showed an increase in student literacy from a score of 50 to 87 after the program had been running for one year.

Sustainability Strategy and Program Development

In an effort to ensure program sustainability, evaluations and reflections are conducted to monitor the program's progress and outcomes. The principal stated, "We conduct regular evaluations. Each class's book content is reviewed, then discussed in a group meeting to assess progress and any challenges." The school librarian added, "The principal reviews each class' progress monthly or per semester. If there are any

challenges, they are discussed in teacher meetings." This type of evaluation is used to maximize the role of all parties within the school in implementing the digital literacy program. To maintain the program's sustainability, the school provides motivation in the form of competitions and awards. A teacher explained, "Every year there's a competition for the best book and a competition for digital classroom arrangements. The students are enthusiastic about creating work, and the teachers are also motivated." The principal also created an online catalog to make student work more widely accessible. The librarian confirmed the same sentiment, stating, "In the future, a digital catalog will be created so that students' work can be read by more people, including parents at home." These efforts demonstrate the principal's commitment to maintaining the sustainability of the digital literacy program.

Discussion

Research findings revealed that the principal plays a crucial role in the integration of digital technology into school literacy practices. The principal serves as a motivator and driving force behind the implementation of the Digital Library (Subadi) and One Student One Book (SASI SABU) programs. The principal is able to transform encountered problems into innovative solutions and opportunities for digital transformation (Jiao et al., 2025; (Martínez-Peláez et al., 2023). This aligns with previous research, which confirms that innovative leadership is characterized by the principal's ability to transform challenges into innovation (Çimen et al., 2023). Innovation in school learning activities has a positive impact on the learning culture (Aboobaker & Ka, 2021; Naz & Murad, 2017). This perspective refers to the concept of "leading in a culture of change," which explains that leaders must adapt and be creative in facing the dynamics of change in their environment.

The implementation of the digital library program has quantitatively significantly improved student literacy outcomes over the past year. This improvement aligns with research finding that digital libraries can enhance students' reading motivation and critical thinking skills added that (Alanoglu et al., 2025) the integration of digital literacy in schools can maximize the use of technology to construct students' understanding independently. This clearly demonstrates that the principal of SDN Tambakrejo 01 is capable of introducing innovations that can be used as pedagogical strategies to improve students' literacy culture. The success of a digital literacy program is also influenced by a participatory work culture within the school (Çelik & Baturay, 2024; Ika Sari et al., 2024). The principal collectively organizes all parties within the school to directly engage in digital literacy practices. This aligns with statements emphasizing the importance

of all-stakeholder involvement in developing a school literacy culture (Belton et al., 2022). Similar statements also emphasize that effective school leadership depends on the principal's ability to collaborate and communicate openly (Cheng et al., 2025; Lin, 2022).

Bilbokaite et al. (2024) also state that collaboration between multiple parties within a school is a key factor in strengthening digital competency and creating a globally-minded learning environment. Efforts to maintain a digital literacy culture, carried out through various activities, demonstrate that a program must be continuously adaptive, able to adapt to changing conditions (Chen, 2025; Shatila et al., 2025). This aligns with statements stating that digital transformation in education requires regular adaptation and evaluation from all parties (Kayanja et al., 2025; Valdés et al., 2021). Regular evaluation and reflection are a form of sustainable school innovation (Silva-Jean & Kneipp, 2024). The findings of this study can generally address the issue of many school libraries not optimally developing and utilizing technology (Yusuf et al., 2025). However, our study also has several limitations. This study involved only one school, so the results cannot be fully generalized. Quantitative data is also needed to obtain more concrete and measurable results. Therefore, further research is recommended to involve more schools and focus on quantitative or combined quantitative and qualitative research methods.

Conclusion

This study concludes that the success of school digitalization at SDN Tambakrejo 01 Semarang is strongly determined by the principal's innovative leadership. The principal demonstrated the ability to identify contextual challenges, formulate a strategic vision, and translate it into practical digital programs that strengthened school literacy. The implementation of the digital library through the Sudut Baca Digital and SASI SABU initiatives not only resolved limitations in conventional library facilities but also fostered higher student engagement in reading and digital content creation. The improvement in literacy scores over three academic periods shows that well planned and collaborative innovation can produce sustainable educational transformation. The findings emphasize that the principal's role as a motivator, facilitator, and visionary leader is essential in building a digital based learning ecosystem. Therefore, digitalization efforts in schools require supportive leadership characteristics along with strong involvement from teachers, students, and stakeholders to ensure long term program continuity and broader educational impact.

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Author Contributions

Conceptualization; methodology.; validation; formal analysis; L. M.; investigation; resources; data curation; writing – original draft preparation; N. K.; writing – review and editing; visualization: L. A. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The researchers funded this research independently.

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