# THE ROLE OF CERTIFIED TEACHERS IN IMPLEMENTING DIGITAL LEARNING TO IMPROVE STUDENTS' NUMERACY SKILLS

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**Abstract**

Improving the literacy and numeracy of elementary school students is a national priority reflected in the Education Report Card as an instrument for evaluating learning quality. This study aims to examine the role of certified teachers in the implementation of learning digitalization and their contribution to literacy and numeracy achievement at Lopang Domba Public Elementary School. The research used a qualitative approach with a case study design through interviews, observations, and documentation studies, and was analyzed interactively with triangulation of sources and techniques. The results showed that certified teachers played a central role in the planning, implementation, and evaluation of digital-based learning by utilizing technology-based platforms and assessments. The use of Education Reports encourages reflection and improvement of learning strategies. The obstacles faced include limited facilities and variations in teachers' digital literacy. It is concluded that teacher certification is an important foundation that needs to be strengthened through competency improvement and institutional support in order to increase literacy and numeracy achievements in a sustainable manner.

## INTRODUCTION

Advances in information and communication technology have brought about fundamental changes in educational practices worldwide, including in Indonesia. The implementation of digital learning is now a vital component of efforts to improve the quality of education in response to the challenges of the 21st century. Digital learning is not merely about the use of digital devices, but also about how such technology is leveraged to enhance students' foundational competencies, particularly in literacy and numeracy—two core competencies that form the foundation of student success at the elementary school (SD) level. (Anggun et al., 2025)

Teachers, as the frontline of learning, play a strategic role in the educational transformation process through digital learning. Certified teachers are expected to possess stronger pedagogical, professional, and digital competencies in designing and implementing effective learning strategies. Certified teachers are officially recognized as having met specific professional competency standards, and thus are expected to serve as agents of change in digital learning practices at the elementary school level. However, the extent to which certified teachers actually utilize the digitalization of learning to drive students' literacy and numeracy achievements still requires in-depth empirical research.

Literacy and numeracy are not merely basic cognitive skills but also key indicators reflecting the quality of effective learning. Research indicates that technology-based learning interventions can facilitate more contextual and interactive learning experiences, as well as enhance student engagement in literacy and numeracy learning processes. Nevertheless, studies also reveal that the success of leveraging digital learning heavily depends on the teachers' own digital literacy skills. (Kumalasari, 2019)

Teachers' digital literacy skills are a primary prerequisite for effectively managing technology-based learning. Teachers with strong digital skills have greater potential to

integrate digital tools and media into their teaching practices, thereby enabling students to develop literacy and numeracy skills in a more meaningful way. Previous research indicates a positive correlation between teachers' digital literacy and a reduction in learning loss among students, meaning that the higher a teacher's digital proficiency, the greater the likelihood that students will maintain and enhance their foundational skills. (Safrizal et al., 2023)

However, on-the-ground realities often reveal barriers to the implementation of digital learning, whether related to infrastructure, teacher readiness, or school support. These barriers can lead to a disparity between the potential of technology and the actual teaching practices occurring in the classroom. Therefore, it is crucial to understand in detail how certified teachers navigate these challenges and to what extent they can optimize digital learning to improve students' literacy and numeracy outcomes.

This qualitative study adopts a more in-depth approach to examine digital learning practices by certified teachers through student educational report cards at SD Negeri Lopang Domba. Educational report cards provide quantitative and qualitative information on students' literacy and numeracy achievements, which can be comprehensively used to measure the impact of digital learning initiatives led by certified teachers.

Several educational studies have shown that interactive and innovative learning strategies, including technology-based ones, are effective in improving students' literacy and numeracy skills. (Rojabiyah et al., 2025) However, research focusing on the contribution of certified teachers in this context remains relatively scarce, particularly at the elementary school level. Yet, understanding these dynamics is crucial as a foundation for teacher professional development policies and the implementation of certification.

Furthermore, teachers' digital literacy is not merely a technical ability to use devices or applications, but also encompasses pedagogical skills in designing digital learning experiences that support the integration of 21st-century competencies. As demonstrated by previous research, digital literacy can enhance teachers' pedagogical competencies, which in turn impacts the effectiveness of learning. (Susilowati & Haryono, 2025)

Given the complexity of the role of certified teachers in the context of learning digitalization and students' literacy and numeracy achievements, this study focuses on addressing in-depth empirical needs through qualitative research. This approach allows the researcher to explore pedagogical practices, teachers' experiences, challenges, and interpretations of student achievement based on education report card data. Thus, this study is expected to provide academic contributions and practical recommendations for teacher professional development, curriculum development, and the formulation of digital-based education policies in elementary schools.

## METHOD

This study employs a qualitative approach using a case study design, as it aims to gain an in-depth understanding of the role of certified teachers in implementing the digitization of learning, as well as their contribution to improving students' literacy and numeracy outcomes. The qualitative approach was chosen because this study does not focus on statistically measuring cause-and-effect relationships, but rather on the meaning, processes, and context of digital learning practices carried out by certified teachers in elementary school settings.

The research location is SD Negeri Lopang Domba, which was selected through purposive sampling based on the consideration that the school already has certified teachers and utilizes the Education Report Card data as the basis for evaluating learning quality, particularly regarding literacy and numeracy indicators. Additionally, the school has begun implementing digital learning in teaching and learning activities, making it relevant to the research focus.

The research subjects consist of certified teachers teaching at SD Negeri Lopang Domba, the school principal, and students as supporting data sources. Subject selection was conducted using purposive sampling, which involves selecting informants considered to have the deepest understanding and direct involvement in the implementation of digital learning and the management of students' literacy and numeracy achievements. Certified teachers serve as the primary informants because they are positioned as key actors in the planning and implementation of digital-based learning.

Data collection techniques in this study include in-depth interviews, observations, and document analysis. Interviews were conducted using a semi-structured approach to explore the understanding, experiences, strategies, and challenges faced by certified teachers in implementing digital learning. Observations were conducted to directly observe digital learning practices in the classroom, teacher-student interactions, and the use of digital media and platforms in the learning process. Meanwhile, the document analysis involved reviewing Educational Reports, teaching materials, digital modules, and other relevant supporting documents.

Education Report data served as a secondary data source to reinforce qualitative findings regarding students' literacy and numeracy achievements. This data was not analyzed using inferential statistics but was used as contextual interpretive material to identify trends in student learning outcomes before and after the implementation of digital learning by certified teachers. Thus, the Education Report serves as supporting data that enriches the qualitative analysis.

The data analysis technique in this study employs the interactive analysis model by Miles, Huberman, and Saldaña, which comprises three main stages: data reduction, data presentation, and drawing conclusions. Data reduction involves sorting and focusing on data relevant to the research problem formulation. Data presentation is done in the form of descriptive narratives and thematic matrices to facilitate understanding of the relationships among findings. Furthermore, conclusions are drawn gradually and continuously verified throughout the research process.

To ensure data validity, this study employs triangulation techniques, including both source triangulation and methodological triangulation. Source triangulation involves comparing data obtained from teachers, school principals, and educational report documents. Methodological triangulation involves comparing results from interviews, observations, and documentation.

Additionally, the researcher conducted member checks with key informants to ensure that data interpretations align with the informants' experiences and perspectives. With this methodological design, this study is expected to provide a comprehensive and in-depth understanding of the role of certified teachers in the implementation of learning digitization, as well as their contribution to improving literacy and numeracy outcomes among elementary school students based on the Education Report Card.

## RESULT AND DISCUSSION

Lopang Domba Public Elementary School is one of the public elementary schools that has implemented a data-driven policy to improve learning quality through the use of the Education Report Card. The school has a number of certified teachers and is gradually beginning to integrate digital technology into the learning process. The digitization of learning at this school is realized through the use of ICT devices, digital learning media, and the utilization of simple online and offline learning platforms tailored to students' needs.

Research findings indicate that Lopang Domba State Elementary School has made initial efforts toward learning digitization, although access to devices and networks remains uneven. Digital learning practices at this school emerged as a response to the demands of 21st-century pedagogy, where certified teachers serve as the primary pioneers in developing technology-

based learning activities. All certified teachers acknowledge that the digitization of learning is now an integral part of instructional strategies to stimulate student engagement and foster higher levels of literacy and numeracy skills.

Generally, teachers use various digital media such as instructional videos, interactive presentations, digital worksheets, and simple online platforms for literacy and numeracy materials. This aligns with research findings stating that the integration of technology into learning can increase student engagement and access to more varied and contextual materials. For example, educational literature indicates that creative technology-based learning innovations can foster literacy and numeracy skills in elementary schools (Anggun et al., 2025)

However, the integration of technology at Lopang Domba State Elementary School remains gradual and adaptive to the local context. Some teachers still face challenges in using technology in an integrated manner with appropriate pedagogical strategies. This finding is consistent with research indicating that teachers' digital literacy skills in elementary schools need to be improved to ensure more effective implementation of digital learning (Hutagalung & Purbani, 2021)

Digital Literacy of Certified Teachers in Teaching Practice

Findings from interviews and classroom observations reveal that teachers' digital literacy at SD Negeri Lopang Domba varies in level. Certified teachers demonstrate basic proficiency in using digital media, but in some aspects of digital pedagogical integration, further development is still needed. Some teachers are able to create their own digital learning materials using simple tools, while others rely more heavily on existing digital resources.

Previous research has also found that digital literacy is a critical competency for teachers in the digital age; however, teachers' actual capabilities are often not yet optimal and require professional development tailored to the learning context (Nugraeni & Suyatno, 2023). Additionally, a mapping of teachers' digital literacy conducted in Indonesia indicates that teachers generally possess a "fairly good" level of digital literacy, particularly in technological and digital ethics aspects, yet there remain shortcomings in cognitive dimensions such as information evaluation and digital content analysis. (Zulaikha, 2025)

In the context of Lopang Domba Public Elementary School, certified teachers are already capable of using digital tools to deliver content, but they have not consistently optimized the use of digital data, online interactions, or digital-based learning assessments. This indicates a gap between technical skills and digital pedagogical competencies that requires further competency development interventions.

Implementation of Learning Digitalization and Its Impact on Literacy

In the context of literacy, the digitalization of learning provides teachers with opportunities to design more engaging and varied reading, writing, and text comprehension activities. Certified teachers utilize visual, audio, and digital text media to enrich students' literacy experiences. Classroom observations indicate that students are more interested and active when materials are presented using interactive digital media.

Education Report Card results indicate an improvement in literacy achievement across several basic literacy indicators, such as reading comprehension, text interpretation, and the ability to construct simple sentences. The role of certified teachers in designing digital literacy activities is significant, as they are able to develop learning strategies that rely not only on textbooks but also on relevant digital content.

These results are consistent with research showing that the integration of technology into learning activities can enhance students' literacy skills, provided it is mediated by appropriate pedagogical support (Anggun et al., 2025). Teachers' digital literacy also plays a vital role in students' ability to access credible digital information, connect reading with contextual activities, and actively participate in classroom discussions enriched by digital resources.

The Contribution of Certified Teachers to Improving Numeracy Through Digitalization

Findings from the analysis of the Education Report data indicate a trend of improved numeracy achievement in several basic numeracy competencies—such as arithmetic operations, understanding of number concepts, and simple problem-solving—following the implementation of digitalized learning by certified teachers. Teachers utilize numeracy practice apps, videos explaining mathematical concepts, and visual media to help students understand abstract concepts in a more concrete way.

The use of digital media offers advantages in conveying numerical concepts that are often difficult to grasp when presented conventionally. Observation data indicates that students appear more enthusiastic and confident when solving numeracy problems using interactive digital media. This aligns with studies showing that innovative technology-based learning approaches can effectively enhance student engagement and access to numeracy materials. (Anggun et al., 2025)

The role of certified teachers extends beyond selecting digital tools to adapting learning strategies that are responsive to students' needs. Teachers use report card results as feedback to redesign numeracy learning activities more effectively, for example, by increasing practice exercises tailored to students' competency levels.

Challenges and Adaptation Strategies for Teachers in Digitalization Implementation

Despite initial successes, digital learning practices at Lopang Domba Public Elementary School face several significant challenges. First is the limited availability of hardware and uneven internet access, which hinder the consistent use of digital learning resources. Second, variations in teachers' digital literacy lead to differences in the quality of digital learning activities across classes.

These research findings align with studies highlighting the need to enhance teachers' digital literacy through continuous training and mentoring, particularly to improve the quality of digital-based learning management (Aminuddin et al., 2024). Teachers also reported challenges in effectively integrating digital assessments into the Education Report Card, particularly regarding the mapping of numeracy achievements.

To address these challenges, certified teachers at Lopang Domba Public Elementary School took the initiative to engage in internal collaboration, share digital resources among colleagues, and adopt a blended learning strategy—combining digital materials with traditional face-to-face instruction. This strategy ensures students continue to receive digital learning experiences even when technical conditions are not yet ideal. Source: adapted from the findings of the 2025 Education Report

| Fokus Temuan | Deskripsi |
|---|---|
| Praktik Digitalisasi | Pemanfaatan perangkat TIK, video pembelajaran, LKPD digital, dan platform daring/luring sederhana. |
| Peran Guru Bersertifikasi | Menjadi pionir integrasi teknologi dan perancang strategi pembelajaran berbasis data (Rapor Pendidikan). |
| Literasi Digital Guru | Kemampuan teknis dasar cukup baik, namun integrasi pedagogis digital belum optimal. |
| Dampak pada Literasi | Peningkatan pemahaman bacaan, interpretasi teks, dan penyusunan kalimat sederhana. |
| Dampak pada Numerasi | Peningkatan operasi hitung, konsep angka, dan pemecahan masalah sederhana. |
| Tantangan & Strategi | Keterbatasan perangkat dan internet |

| | |
|---|---|
| | diatasi melalui kolaborasi guru dan blended learning. |

**Tabel 1. Ringkasan Hasil Penelitian**

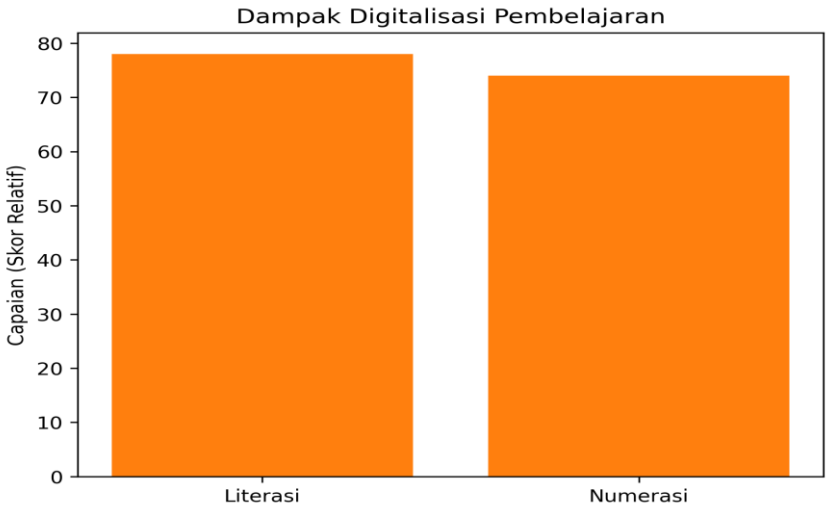


**Figure 1. The Impact of Digitalization on Literacy and Numeracy Implications of the Findings**

## RESULT AND DISCUSSION

The findings of this study reveal a complex yet significant relationship between teacher certification, the digitalization of teaching practices, and students' literacy and numeracy achievements. Teacher certification has equipped the study participants with basic pedagogical competencies that facilitate their adoption of technology in teaching. However, teachers' digital literacy still requires specific reinforcement in the digital pedagogical dimension to maximize the benefits of technology in the learning process.

From a research perspective, digital literacy serves as a bridge between teachers' technical skills and effective teaching practices. Previous studies confirm that improvements in both digital literacy and digital pedagogy competencies are closely linked to enhanced learning quality.

Furthermore, literacy and numeracy are not merely students' cognitive abilities but foundational competencies that must be developed simultaneously. Technology integration enables more adaptive and multisensory delivery of content, which in turn enhances student understanding. In this context, certified teachers capable of creatively leveraging digitalization are a key factor.

This study has interrelated theoretical, practical, and policy implications for efforts to improve the quality of learning in elementary schools. Theoretically, the findings of this study expand our understanding of the relationship between teacher certification, the digitalization of learning, and students' literacy and numeracy achievements.

The research findings confirm that teacher certification provides an important foundation of pedagogical competencies; however, the successful implementation of technology in learning remains highly dependent on teachers' strong and pedagogically oriented mastery of digital literacy.

Practically, the findings of this study indicate the need for schools to provide continuous professional development programs specifically focused on enhancing pedagogical digital literacy for certified teachers, accompanied by the provision of adequate facilities and infrastructure to support digital learning.

Meanwhile, from a policy perspective, these research findings can serve as a basis for formulating policies at both the regional and national levels, particularly in planning teacher training programs and allocating educational resources more strategically to support the sustainable implementation of learning digitalization in elementary schools. Overall, this study demonstrates that certified teachers at Lopang Domba Public Elementary School play a central role in the implementation of digital learning, which has an impact on improving students' literacy and numeracy achievements. The research results are consistent with academic literature emphasizing the importance of teachers' digital literacy and technology-based learning innovations in the context of elementary education.

## CONCLUSION

Based on the results of the research and discussion regarding the Role of Certified Teachers in Implementing Digital Learning to Improve Literacy and Numeracy Outcomes of Elementary School Students Based on Educational Reports at SD Negeri Lopang Domba, it can be concluded that certified teachers play a strategic and significant role in implementing digital learning in elementary schools. Teacher certification has proven to provide an adequate foundation of pedagogical and professional competencies for teachers to integrate digital technology into the learning process in a more focused and responsible manner.

This study indicates that the implementation of digital learning by certified teachers is not limited to the use of digital devices or media but also encompasses lesson planning, the selection of pedagogical strategies, and the management of the learning process, all oriented toward improving the quality of learning. Certified teachers are able to utilize digital technology as a means to create more interactive, contextual, and learner-centered learning experiences, particularly in the development of literacy and numeracy competencies.

Learners' literacy and numeracy achievements at Lopang Domba State Elementary School show a trend of improvement following the implementation of digital learning mediated by certified teachers. The use of digital media in reading activities, text comprehension, and visual and interactive numeracy learning contributes to increased student engagement, motivation, and understanding. This is reinforced by data from the Education Report Card, which teachers utilize as a basis for continuous reflection and improvement of learning.

Furthermore, this study found that the Education Report plays a crucial role as a data-driven evaluation tool supporting certified teachers' reflective practices. Teachers do not merely use the report as a record of learning outcomes but also as a source of information to identify learning strengths and weaknesses and design more effective digital learning strategies. Thus, the integration of digital learning and the utilization of educational data is a key factor in improving the quality of literacy and numeracy education.

Nevertheless, this study also revealed challenges in implementing learning digitization, such as infrastructure limitations, variations in teachers' digital literacy, and limited technology access for some students. However, certified teachers demonstrated adaptive capabilities in overcoming these challenges through blended learning strategies, teacher collaboration, and adjusting teaching methods according to school conditions. Overall, this study confirms that the success of learning digitization in improving students' literacy and numeracy achievements is significantly influenced by the active role of certified teachers as designers, implementers, and reflectors of learning. Teacher certification serves as a crucial foundation; however, it must be supported by the strengthening of pedagogical digital literacy, institutional support, and sustainable educational policies so that learning digitization can have an optimal impact on improving the quality of education in elementary schools.

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