Analysis of Elementary School Teachers' Readliness to Use Digital Technology for Inclusive Learning

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Abstract
The purpose of this research is to examine how prepared teachers in elementary schools are to use digital technology to support inclusive education. Inclusive education emphasize that every student, including those with special needs, should have equal opportunities within an open and tolerant educational system that values diversity. Teachers have a strategic responsibility to ensure that all students have access to appropriate and adaptive technology for effective learning in the era of digital transformation and the implementation of the Merdeka Curriculum. This study conducts a systematic literature review by examining twenty scholarly articles, research reports, and relevant policy documents from 2020–2025. Four main components become the focus of the analysis: (1) teachers' knowledge about the concepts and potential of digital technology for inclusive education; (2) teachers' view on technology issues in the context of inclusive education; (3) teachers' technical skills to use and adapt digital devices and applications to assist students with special needs; and (4) policy support and institutional infrastructure. The research findings indicate that, although most teachers are aware of the importance of inclusive education and the potential of technology, many school still lack infrastructure and technology skills. In the 3T regions, the problem is exacerbated by limited access to technology and a lack of instruction. Technical skills and resource availability remain significant issues, even though teachers' understanding of the concepts and their perspectives tends to be positive. To provide equaitable, inclusive, and adaptive learning that meets the challenges of the 21st century, teachers need continuous training, support from schools and the education department, and access to disability-friendly technology.

1. Introduction

To implement digital transformation in education, significant changes are required in how teachers plan, monitor, and carry out the learning process. Digital technology has the potential to enhance the quality of education and improve accessibility, especially in inclusive learning (Azizah & Hendriyani, 2024; Wati & Nurhasannah, 2024). In primary education, teachers have a strategic role in ensuring that all students, including those with special needs, receive a fair and meaningful education.

However, it is not easy to use digital technology to ensure inclusive education. Teachers must possess good digital literacy and adequate pedagogical understanding to use technology adaptively and effectively. The success of technology implementation depends on the capacity of teachers (Izazi & Fudhla, 2022; Aini & Nuro, 2023). Meanwhile, various studies show that many educators are still unable to operate devices, modify digital materials to accommodate disabilities, or select appropriate learning platforms (Nisa et al., 2024; Saragih et al., 2024). Currently, digital technology is not only used in specific fields. They can also be used in the learning process. Before giving instructions to students, teachers must study and understand the use of digital technology in the student learning process. Teachers must be ready to face the challenges of educational development to enhance the teaching and learning process by participating in the training provided, understanding it, and conveying that understanding to their students. Teachers must be able to integrate learning objectives with the continuously evolving technology so that creative learning occurs, according to Izazi & Fudhla (2022).

Creative learning is a type of learning that can combine new technology and educational goals. To ensure that all students have access to digital technology and learn it, inclusive education must be implemented. Teachers must not only be prepared for the process of digital technology learning, but they must also be ready for inclusive education. The main objective of inclusive education, according to Azizah and Hendriyani (2024), is to provide education to children with special needs and give them equal opportunities to receive a proper education.

Current policymakers must consider improving the quality of education, especially by implementing digital technology for inclusive learning. According to Lambrecht et al. (2022), inclusive education aims to enable children with special needs to participate in regular classroom lessons. This

means that teachers must collaborate with various learning approaches and use a variety of assessment methods.

Children with special needs require significant support to undergo a learning process similar to their peers. However, some students with special needs face different challenges, and not all teaching approaches can be applied to them. Educational institutions need to modify their curriculum, infrastructure, facilities, and teaching strategies to meet the needs of diverse students if they want to implement inclusive education (Azizah & Hendriyani, 2024).

This condition indicates that there is a difference between educational policies that support digitalization and how schools implement them. Besides educational issues, inadequate school infrastructure also poses a problem, especially in the 3T areas (Nenotek et al., 2023). Therefore, research is important to determine how ready primary school teachers are to use digital technology to support inclusive learning. This study will investigate issues and recommendations for improvement based on recent literature findings.

2. Method

In this study, a qualitative methodology was employed, and a systematic literature review was conducted. Twenty primary sources, including research reports, scientific articles, and policy documents published from 2020 to 2025, provided this data. The software Publish or Perish 7 and academic search engines such as Google Scholar were used to search for literature and databases such as Scopus and DOAJ.

Inclusion and Exclusion criteria: (1) the writings must be in English or Indonesian; (2) must cover topics related to digital technology, inclusive education, or teacher readiness; and (3) must focus on the context of primary education. No literature meeting these criteria was included in the analysis. Data analysis was conducted in the following steps:

1. Initial coding: Identifying the main ideas in each article
2. Categorization: Dividing codes into main themes
3. Validation: Checking if the themes are consistent by rereading
4. Synthesis: Combining results from various sources to create a complete narrative

Teachers' knowledge, attitudes and perceptions, technical skills, and institutional support and policies are the four main focuses of data analysis.

3. Results and Discussion

A. Teachers' Conceptual Knowledge about Digital Technology and Inclusive Education

According to the results of a literature review. They are aware that every student's right to receive quality education. However, educators still have a limited understanding of the relationship between the use of digital technology and educational inclusion. Some educators are unaware of the potential of using technology to assist students with special needs. Nila et al. (2024) state that many teachers do not understand assistive technologies such as screen readers, text-to-speech, and augmentative communication applications. Due to this lack of knowledge, there is no effort to use technology in everyday learning.

These results are in line with international research showing that a lack of knowledge about the principles of inclusive education and the implementation of technology is a global problem. A deeper understanding of Universal Design for Learning (UDL) and how technology can support it is crucial for teachers.

B. Teacher's Attitude and Perception towards Digital Technology

Age, teaching experience, and exposure to training influence teachers' perceptions of digital technology usage. Some teachers enjoy the use of digital technology and want to learn more about it. They believe that technology can assist teachers and enhance student participation. Nurhayati & Langlang Handayani (2020) found that some teachers remain silent or even refuse to use technology

due to lack of confidence or fear of using it incorrectly. Additionally, the perception that technology can only be used in remote learning also hampers technology use in face-to-face classes. The following factors influence teachers' positive attitudes:

1. Previous experience with well-utilized technology
2. Support from colleagues and school administration
3. Training relevant to teaching needs
4. Belief that technology can improve student learning outcomes.

C. Teachers' Technical Skills

Technical skills are an important part of teacher preparation. Unfortunately, many primary school teachers lack basic digital skills, such as managing learning management systems (LMS), creating multimedia learning materials, or accessing online educational platforms.

Aini and Nuro (2023) state that the training teachers received prior is often general and not specific to inclusive education. Moreover, not all teachers have the ability to adapt materials for use by students with disabilities. For example, they may not have the skill to incorporate audio stories, subtitles, or disability-friendly visual designs. Specific technical skills that teachers must possess include:

1. Use of screen reader and text-to-speech software
2. Creating accessible multimedia content
3. Adapting content for various types of disabilities
4. Using learning platforms that support accessibility features
5. Solving basic technical problems

This indicates that a more contextual and continuous training approach, such as direct mentoring and hands-on methods, is necessary in the context of inclusive learning.

D. Support for Infrastructure and Institutional Policy

Nenotek et al. (2023) emphasize that limited internet connectivity, a lack of technological devices, and a shortage of technical personnel are significant issues in remote areas or 3T areas (foremost, outermost, and disadvantaged). Even schools in urban areas do not always have projectors, laptops, or stable internet connections. Furthermore, school policies that do not prioritize technology also hinder technology use. The central government, education departments, and school principals are crucial in supporting teacher readiness. Necessary supporting factors include: Adequate technology infrastructure (internet, hardware, and software) School policies that support the use of technology Budget allocated for educational technology development Responsive technical support systems Collaboration with supporting technology providers.

E. Conceptual Framework of Teacher Readiness

This study finds that the "Digital-Inclusive Teacher Readiness Model" (DIKSI) is a conceptual framework consisting of four interrelated dimensions:

1. The Cognitive Dimension of knowledge about the principles of inclusive education, understanding of the potential use of digital technology in the learning process, and awareness of the diversity of student needs.
2. A dimension that influences positive beliefs about technology and inclusion that encourages learning digital skills and confidence in using technology.
3. The Psychomotor factor involves the technical ability to operate digital devices, the ability to adapt content to be more accessible, and the ability to solve technical problems.

4. The situational dimension of school culture that supports innovation, availability of resources, and training support for infrastructure and policies.

This DIKSI model can be used as a basis for evaluating and developing programs that enhance teachers' capabilities to apply digital technology in inclusive learning.

3.1. Conclusion

Elementary school teachers in Indonesia are very aware of the potential of digital technology to support inclusive education. However, there is a significant gap between this awareness and their ability to use technology to support inclusive learning, particularly regarding technical skills and understanding of disability-friendly technology. The lack of school infrastructure and policy support are major constraints. The main findings of this research are:

1) Teachers' understanding of inclusive education is quite good, but the integration with digital technology is still limited.

2) Teachers' attitudes are generally positive, but influenced by age, experience, and training exposure.

3) Teachers' technical skills still need to be strengthened, especially in adapting technology for students with special needs.

4) There is a lack of infrastructure and policy support, especially in the 3T areas (lagging, remote, and border regions).

Author Contributions

Resti Hidayat: Conceptualization, funding acquisition, material preparation, data collection, methodology, writing the initial draft, review and editing, supervision, validation.

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