



21st Century Teachers' Problems: Teachers' Difficulties In Implementing Technology In The Learning Process

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Abstract

Technological developments in the digital era have brought significant changes to the world of education. 21st-century teachers are required to integrate technology into the learning process to create interactive and relevant learning. However, many teachers still face obstacles in implementing technology, such as limited digital skills, lack of institutional support, and limited facilities and time. This study aims to examine the factors causing teachers' difficulties in implementing technology and possible solutions. Interviews with an elementary school teacher revealed that limited facilities and the habit of conventional methods are the main obstacles. Therefore, ongoing training, adequate infrastructure, and support from all parties are needed to improve teacher competency in facing the challenges of 21st-century learning.

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INTRODUCTION

The rapid development of technology has had a significant impact on various aspects of human life, including education. Technology has become a crucial part of the learning process, not only as an aid but also as a medium capable of improving the quality and effectiveness of teaching and learning. In today's digital age, the presence of technology increasingly facilitates teachers and students' access to information, communication, and collaboration in a more flexible and efficient manner (Oliveira et al., 2021; Timotheou et al., 2023).

Technology plays a strategic role in the learning context, helping to create a more engaging, interactive, and relevant learning environment. The use of hardware such as computers and projectors, as well as software such as learning apps and online platforms, allows teachers to deliver material in a more varied manner and tailored to students' learning styles. This demonstrates the critical importance of technology mastery by educators for optimally achieving learning objectives (Barnes, 2020; Shavkidinova et al., 2023).

However, not all teachers are able to implement technology optimally in teaching and learning activities. Many teachers still experience difficulties, whether due

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to limited technological skills, lack of institutional support, or limited time due to a busy curriculum (Carroll et al., 2021). Based on an interview the author conducted with a teacher at an elementary school, it was found that limited facilities and a lack of training were the main obstacles to implementing technology in learning. Although teachers understand the importance of technology, the lack of resources such as projectors and internet access at school is a major obstacle (Serrano et al., 2019).

21st-century teachers are required to possess various competencies, including communication, collaboration, critical and creative thinking, and problem-solving skills (Astuti et al., 2019). Furthermore, an understanding of student characteristics and mastery of information technology are crucial factors for teachers to effectively fulfill their professional roles. Without these competencies, teachers will struggle to adapt to the needs and challenges of today's education system (Wekerle et al., 2022).

Therefore, it is important to further examine the challenges and obstacles teachers face in implementing technology and how to overcome them. This will help design more relevant teacher professional development strategies and encourage the creation of a more adaptive, innovative, and modern education system (Akram et al., 2022).

METHOD

This research uses a descriptive qualitative approach, with the primary methods being literature review and field interviews (Engkizar et al., 2025). The literature review was conducted by searching various relevant academic sources related to educational technology and 21st-century teacher competencies (Utami et al., 2023). Meanwhile, field data was obtained through a direct interview with an Islamic Religious Education (PAI) teacher at SDN 18 Anduring, Padang City. This interview aimed to obtain a concrete picture of teachers' difficulties in integrating technology into learning and the solutions offered. The analysis technique was carried out by reviewing the interview results and connecting them with theories in the literature review (Engkizar et al., 2023).

RESULT AND DISCUSSION

The Role of Technology in Learning

In terms of language, technology comes from Greek, namely *Technologia* which is interpreted as systematic treatment or the systematic use of something, where *astechne* as the basis of the word technology means skill, science or expertise, skill, and knowledge. Meanwhile, *logia* means word, study, or body of knowledge. Therefore, technology can be defined as the knowledge of making something (Muhazir & Retnawati, 2020). Technology, in the narrow sense, refers to objects used to facilitate human activities. More broadly, technology can be defined as the development of hardware and software based on science, keeping pace with the times and meeting current user needs (Mahdum et al., 2019).

Technology, in the context of education, refers to all forms of digital tools and resources used to support the teaching and learning process. This includes hardware such as computers, projectors, and smartphones, as well as software such as learning apps, online platforms, and interactive media (Wulandari, 2021). The goal is to improve the quality of learning, facilitate the delivery of material, and encourage the involvement and independence of each student in learning (Agustini et al., 2019). Technology plays various strategic roles in supporting the learning process, especially in today's digital era. The use of technology not only assists teachers in delivering material but also provides a more active, engaging, and relevant learning experience

for students. The role of technology in learning is to facilitate the formation of collaborative relationships and the construction of meaning in a more understandable context (Kaminskienė et al., 2022).

Here are some important roles of technology in learning: building collaborative communication networks between teachers, lecturers, students, and learning resources. Some online applications that can be used for telecommuting include Skype, Yahoo Messenger, Facebook, Zoom, and Google Meet, among others. These applications provide a variety of complex, realistic, and secure problem-solving environments. This can help students not only enjoy exploring but also learn, understand, and understand what they are learning (Salsabila, 2021). Through technology, learning resources become more diverse, evaluation processes are more practical, and collaboration between teachers and students can be better established. Therefore, the use of technology in learning is no longer an option, but rather a necessity that must be optimized to improve the quality of education in the digital era (Agustini et al., 2019).

Characteristics of 21st Century Teachers

The presence of technology in various aspects of life today makes 21st-century teachers required to have skills and attitudes that are in accordance with the needs of the times (Sudarsana et al., 2019). For this reason, it is important to understand what characteristics a teacher must have in the 21st century to be able to carry out their role optimally. The following are the characteristics that a 21st-century teacher must have: a) Communication skills Every educator must have strong skills to form a professional personality, especially when he teaches, then the material delivered must be clear and easy for students to understand, b) Able to work together (Collaboration). In the 21st century which brings a significant impact of change to the world of education, collaboration is a skill that is currently needed by an educator. The 21st century demands lecturers/teachers to welcome interactive learning models with various information and technology.

c) Critical, creative, and innovative. Critical thinking skills are fundamental skills in the 21st century that educators must possess. Critical thinking skills necessitate the ability to access, analyze, and synthesize information, and make logical decisions based on the information obtained and processed according to one's abilities. d) Problem solving. In the world of education, various problems will certainly arise, both from students and educators themselves. A problem that occurs in the world of education can be resolved if an educator has problem-solving skills so that all problems that arise can find a solution.

e) Ability to understand student characteristics. Students have diverse personalities. This naturally creates problems when they encounter situations where they must learn new things, so teachers play a crucial role in understanding the characteristics of their students, especially in the classroom. f) Possessing an imaginative mindset. Imaginative (conceptual) and practical thinking in explaining things to students are essential skills for professional teachers. Every educator must possess strong skills to develop a professional personality, one of which is the ability to deliver material with a well-developed and mature mindset.

g) Skilled in mastering information technology. Educators in the 21st century are those who can master Information and Communication Technology (ICT). They are required to be able to operationalize various learning media to improve the quality and learning outcomes of students. Teachers must understand all technological developments (Adeoye & Jimoh, 2023; Gumiandari, 2021). 21st-century teachers are required not only to master learning materials but also to be able to adapt to changing

times, especially in terms of the use of technology and innovative learning approaches. With these characteristics, teachers can effectively carry out their role in shaping a competent, adaptive generation that is ready to face future challenges (Dilekçi & Karatay, 2023).

Factors Causing Teachers' Difficulties in Implementing Technology

Many teachers in the modern era still face challenges in optimally implementing technology in the learning process. These difficulties don't just arise from nowhere, but rather are the result of various interrelated factors. The following are factors contributing to teachers' difficulties in implementing technology in learning. First, Teacher technology skills and literacy. A teacher must possess two essential skills in today's digital age (Maimun & Bahtiar, 2024; Varas et al., 2023): technology skills and digital literacy. A teacher's ability to operate and utilize various technologies, such as computers, laptops, smartphones, presentation software, multimedia, and online learning platforms, is called technology skills. This ability enables teachers to develop more interactive, engaging, and effective learning methods for their students (Bernacki et al., 2020). Digitally literate and technologically proficient teachers can help students learn in more innovative ways, help them collaborate and communicate better, and provide valuable learning experiences (Kim et al., 2019). Furthermore, they have the ability to help students acquire the digital skills necessary for future success. Therefore, improving teachers' technology skills and digital literacy is crucial to improving the quality of education in the digital age (Akram et al., 2021).

Second, Institutional support and resources. Institutional support and resources are key factors influencing teachers' difficulties in implementing technology in learning. Educational institutions that provide strong support for the use of technology in learning create a conducive environment for teachers to develop their skills (Tican & Deniz, 2019). When educational institutions do not provide adequate resources or do not prioritize the development of teachers' technological competencies, teachers face difficulties in adopting technology-based learning strategies. Lack of access to adequate hardware or limited internet connections can be barriers for teachers in implementing technology in learning (Bower, 2019).

Third, Time constraints and a tight curriculum. Another factor hindering teachers from implementing technology in their learning is a tight curriculum and time constraints. To complete their educational tasks, teachers often face tremendous time pressure (Josué et al., 2023). They must cover a large amount of curriculum material in a limited time, which can hinder the use of technology in their learning. With limited time, teachers may find it difficult to implement technology effectively in their learning. A tight curriculum also makes it difficult for teachers to use technology (Ester Marga Retta, 2024).

Solutions to Difficulties in Implementing Technology

There are several ways to overcome the difficulties of implementing technology in learning, namely: a) Teachers and students must have access to digital technology and the internet in the classroom, school, and educational institutions. This means that schools must have adequate infrastructure related to information and communication technology, such as the availability of computers/laptops, internet networks, computer laboratories, multimedia equipment such as CDs, DVDs, and infocus. b) There must be quality, meaningful materials and cultural support available for teachers and students. These materials can be in the form of interactive learning materials assisted by computers/laptops, such as CDs, DVDs and infocus in interactive learning.

c) Teachers must have the knowledge and skills to use digital tools and resources in teaching and learning activities in order to achieve the Minimum Completion Criteria Standards (KKM). d) There must be sufficient budget or funds to provide, develop and maintain the Information and Communication Technology infrastructure. h) There must be a willingness and support from all parties, in this case the principal, teachers, and students to implement learning supported by technology, communication and information. Overcoming teacher difficulties in implementing technology in learning requires collaborative efforts from various parties, including teachers, schools, and the government. The solutions offered are not only technical, but must also touch on aspects of motivation, competence, and work culture. Teachers will be more prepared and confident in utilizing technology, so that the learning process can take place more effectively, innovatively, and in accordance with the demands of the times (Mei et al., 2019; Pinto & Leite, 2020; Shahid et al., 2019).

CONSLUSSION

These difficulties are caused by a lack of technological skills, minimal institutional support, limited facilities, and limited time due to a dense curriculum. Although the use of technology has proven crucial in improving the effectiveness and quality of learning, the reality is that not all teachers are able to implement it optimally.

Teachers' preparedness to face the demands of 21st-century learning still needs improvement, particularly in digital literacy and mastery of technology-based learning media. Therefore, a collective and sustained effort from the government, schools, and the community is needed to create an educational ecosystem that supports the application of technology in learning. Strategic steps such as regular training, the provision of adequate technological resources, and adaptive curriculum updates are urgently needed to address this challenge.

Suggestions for further research include conducting broader studies involving more respondents from different educational levels and regions to gain a more comprehensive picture of teacher readiness in using technology. Furthermore, it is important to explore effective training approaches for teachers to improve their technological competency. Implications include recommending that educational institutions be more proactive in providing teachers with digital tools and fostering an innovative culture that supports digital transformation within the school environment. Strengthening collaboration between teachers, principals, and other stakeholders is crucial to ensuring the successful implementation of technology in learning.

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