

# Analysis of Teachers' Digital Pedagogical Competence in Creating Innovative and Creative Learning at Elementary School

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## Abstract

This study aims to analyze teachers' digital pedagogical competence in creating creative and innovative learning at Mutiara Hikmah Al-Qur'an Elementary School. The background of this study is based on the need to improve teachers' competence in integrating digital technology in the 21st-century education era. The study used a qualitative approach with a case study method, where data were collected through observation, interviews, and documentation, which were then analyzed using the Miles and Huberman interactive model. The results showed that teachers at Mutiara Hikmah Elementary School have understood and interpreted the importance of digital pedagogical competence, both through internal training and independent development. Teachers are able to innovate by utilizing various digital technology platforms and implementing creative learning models such as project-based learning and game-based learning, thereby creating a creative, innovative, interactive, and student-centered learning environment. These efforts encourage the improvement of students' creativity, critical thinking, communication, and collaboration skills. Sufficient technological facilities and teachers' initiatives in developing digital pedagogical competencies also contribute to the creation of creative, innovative, and relevant learning that meets the demands of the digital age.

**Keywords:** Competence, creative, digital learning, digital pedagogy, innovative.

## 1. INTRODUCTION

The world is currently entering an era of digitalization, where information technology is developing at an accelerating pace. Various sectors are inevitably connected to digital. The digital era has also brought about a major transformation in the world of education. In this regard, teachers, a key component in educational institutions, are tasked

with a challenging task. They are no longer solely responsible for delivering material in a conventional manner, but also for integrating technology into the learning process (Rahayuningsih & Muhtar, 2022). Based on Law Number 14 of 2005 concerning Teachers and Lecturers, Article 1 states that the main duties of teachers are to educate, teach, guide, direct, train, assess, and evaluate students. In performing their duties, teachers are required to possess four types of competencies, as outlined in the Director General of Teachers and Educational Personnel Regulations of the Ministry of Education, Culture, Research, and Technology No. 2626/B/Hk.04.01/2023 on the Teacher Competency Model, Article 6, which includes pedagogical competencies, personal competencies, social competencies, and professional competencies obtained through professional education. Teachers must be able to master all four competencies in order to achieve educational objectives (Kemendikbudristek, 2023).

Pedagogical competence is one of the competencies teachers must possess, and it must keep pace with current digital developments. According to (Budiana et al., 2021), when teachers face the challenges of the 21st century, they are required to continuously improve their competence and actively seek out the latest information to remain relevant and up-to-date. As agents of change, teachers need to initiate transformation within themselves and then disseminate it to their students so they have adequate technological knowledge and skills (Rahayuningsih & Muhtar, 2022). In today's digital era, teachers are expected to master digital skills and think creatively, as the demands of the times require teachers to innovate and create an engaging and enjoyable learning environment in the classroom. In carrying out their duties, teachers are required to possess digital pedagogical competencies that are capable of supporting today's digitalization. Digital pedagogical competencies encompass the ability of educators to utilize technology in the learning process, which is not only limited to the use of digital tools, but also includes an understanding of how technology can enhance student interaction, collaboration, and engagement. In this context, educators are required to be able to design learning that is not only informative but also must present learning that is engaging and relevant to the needs of students in the digital era. There are several things that teachers can master in this digital era, including IoT (Internet of Things), virtual / AR (augmented reality) in education, and the use of AI (artificial intelligence) as an educational tool to meet student needs and learning in the classroom (Baharizqi et al., 2023).

However, reality shows that many teachers in Indonesia are still unprepared for the presence of technology in learning, even though all aspects of life are now digitalized. This gap indicates the need for systematic efforts to improve the digital pedagogical competence of elementary school teachers to keep pace with the needs of 21st-century learning. The actual situation remains concerning, both in terms of quality, professionalism, and quantity. According to (Sundari et al., 2024), the integration of technology in education is very important for effective education. Teachers play a crucial role in determining the quality of education and its impact on a country's growth. New innovations introduced by teachers can enhance the learning experience, for example through the provision of internet facilities, LCDs and projectors in classrooms, the use of e-modul, and digital library. Data from the Ministry of Education, Culture, Research, and Technology shows that around 45% of teachers have used digital platforms to improve the quality of their teaching (Kemendikbudristek, 2023). However, 55% of teachers are still beginners in utilizing educational technology.

Today's students are Generation Alpha, born in the digital age. They are already very familiar with the internet and proficient in using their electronic devices. The popularity of social media and digital games, which has penetrated various groups, has naturally made them accustomed to technology. However, there are still a number of teachers who are unable to utilize technology and information properly and wisely. For example, some teachers lack skills in using computers or digital devices, caused by various factors, one of which is limited facilities and infrastructure, which makes them unfamiliar with using these devices. On the other hand, there are also teachers who can use computers but have not yet mastered the optimal use of learning applications. Therefore, it is important for teachers to continue to expand their knowledge, for example by attending training related to digital learning media or participating in webinars frequently held by the Ministry of Education and Culture (Fauzi & Didi Suryadi, 2020).

Teachers' digital pedagogical competencies are increasingly important to meet the demands of 21st-century learning, which requires the use of technology as a learning medium. Although literature reviews show an increase in these competencies, as found by (Rahayuningsih & Muhtar, 2022), who identified obstacles in teachers' motivation and perspectives in applying digital pedagogical competencies, their actual application in the classroom is still rarely discussed in depth. Therefore, there remains a need for research that directly observes the implementation of digital pedagogical competencies among elementary school teachers, particularly in schools with adequate technological facilities. Based on a preliminary study conducted by the researcher, literature data was found indicating that Mutiara Hikmah Al-Qur'an Elementary School has been accredited A and is capable and has quite sophisticated technology such as facilities in the form of computers and adequate internet network. This is evident from one of the school's goals which is to produce a Qur'anic generation with digital insight so that they are ready to face the challenges of the times with innovation and creativity. Not only that, a preliminary study conducted by the researcher through interviews related to the conditions there showed that this school has indeed utilized technological developments, one of which is the coding extracurricular that students can participate in. However, the researcher wants to examine and analyze how the digital pedagogical competence of teachers at Mutiara Hikmah Elementary School in creating creative, innovative and enjoyable learning with the support of facilities that are already so capable. This research is expected to be useful for education practitioners so that they can implement a more creative, innovative and enjoyable digital learning process according to the needs of the times.

## **2. LITERATURE REVIEW**

### **2.1 Digital Pedagogy**

Pedagogy is a science that fundamentally examines the essence of humanity and education in order to develop human beings through educational processes that encompass educational activities, namely how teachers teach, guide, and direct students so that their behavior changes from ignorance to knowledge. (Purba et al., 2021). In the digital era, the relationship between pedagogy and TPACK (Technological Pedagogical Content Knowledge) is crucial because it combines technology, pedagogy, and learning content to create an effective teaching and learning process that is in line with the characteristics of students who are close to technology. This approach emphasizes the synergy of technology with learning strategies and understanding of the material so that

learning becomes interesting, interactive, and meaningful. TPACK integration helps teachers design learning using technology innovatively. TPACK should be mastered by teachers in 21st-century learning (Gumala et al., 2023; Hanik et al., 2022).

Digital pedagogy is a crucial approach for teachers in the modern era to master to enhance their competency in creating effective 21st-century learning. This approach not only requires technological skills but also emphasizes the teacher's role as a facilitator, able to guide students in developing critical thinking skills, developing affective aspects, and fostering a dynamic, student-centered learning environment. Thus, the use of technology in learning not only builds knowledge but also fosters social intelligence such as critical thinking, curiosity, empathy, and the ability to find solutions to the various realities students face (Purfitasari et al., 2019; Rahayuningsih & Muhtar, 2022).

## **2.2 Creative and Innovative Learning**

According to Muqodas, creativity is the ability to develop unique ideas in different and unusual ways while producing distinctive solutions to problems. It is a highly adaptive ability to think and take important actions. (Sari et al., 2024). Meanwhile, Mehta and Dine in (Siadari et al., 2024) defines creativity as more than just receiving knowledge, but also involves the ability to act or produce something. Based on this definition, it can be concluded that creativity includes the ability to absorb knowledge and create something new, unique, and imaginative. Hidayat also believes that creative learning is learning that provides space for students to develop initiative, independence, and initiative in accordance with their talents, interests, and physical and psychological development. Therefore, creative learning requires students to be able to understand, integrate, and combine ideas, as well as solve problems in depth through a strong conceptual understanding (Siadari et al., 2024) From a teacher's perspective, creative learning is reflected in the application of various methods and the development of learning media that facilitate student understanding. This ability must be developed by considering each student's individual needs and referring to the desired learning objectives (Siadari et al., 2024; Young, 2018)

According to Grof in (Siadari et al., 2024) Innovation is not simply adapting new technology or testing new methods, but rather the purposeful arrangement of programs to support change and create more effective approaches. Innovation can foster creativity and increase productivity sustainably. In the context of innovative learning, Asmanistated that innovative learning is a process of making sense of the realities of life being studied. The application of technology in learning innovation has been proven to have a positive impact, one of which is by encouraging student creativity and creating a more enjoyable learning atmosphere (Siadari et al., 2024).

## **3. RESEARCH METHODOLOGY**

This section describes the systematic process used to collect and analyze relevant data on teachers' digital pedagogical competencies at Al-quran Mutiara Hikmah Elementary School. This study uses a qualitative approach with a case study method. A qualitative research design was chosen based on the characteristics of the study, which aims to explore and understand the phenomenon of teachers' digital pedagogical competencies in a natural and complex context. The qualitative approach provides flexibility to capture the rich and deep meaning from the participants' perspectives on the

implementation of technology in learning (Susilawati et al., 2025). Several other processes were carried out to ensure data validity. The main objective is to highlight how teachers' digital pedagogical competencies contribute to the creation of creative and innovative learning experiences.

### **3.1. Research Design**

This study uses a qualitative approach with a case study method. In qualitative research, the main instrument is human beings, namely the researcher himself (Sugiyono, 2024). The case study approach is a qualitative strategy that allows researchers to conduct in-depth analysis of an activity, event, activity, or process involving one or more individuals in detail. Therefore, a case study can also be understood as a process of examining and trying to understand a case comprehensively to obtain research results (Assyakurrohim et al., 2022; Creswell, 2018).

This study adopts a single case study design with the unit of analysis being teachers at SDA Mutiara Hikmah. A single case study is appropriate when the case represents a unique situation or provides specific insights into the phenomenon being studied. SDA Mutiara Hikmah was chosen as a single case because this school has systematically implemented digital technology and has a structured teacher competency development program (Arabis, 2025; Tilman et al., 2025).

### **3.2. Participants of the Study**

The research location was at SD Al-Qur'an Mutiara Hikmah in Bekasi Regency. The informants in this study were teachers at SDA Mutiara Hikmah who were selected using purposive sampling with the following criteria: (1) having at least 3 years of teaching experience, (2) actively using technology in learning, and (3) willing to participate in the study. The number of participants was determined based on the principle of theoretical saturation, where data collection was stopped when no new significant information was found (Tilman et al., 2025).

### **3.3. Instruments**

In this study, the data collection technique used was triangulation. Researchers utilized various different data collection methods to obtain information from the same source. These methods included observation, in-depth interviews, and document study (Sugiyono, 2024). The instrument needed in this study is an interview instrument, document instrument, and observation document that designed to determine teachers' digital pedagogical competencies in creating creative and innovative learning.

### **3.4. Data Analysis Techniques**

The data analysis technique used in this study is in accordance with Miles and Huberman's interactive analysis model. Activities in data analysis include data collection, data reduction, data presentation, and drawing conclusions (Miles et al., 2020).

## **4. RESULTS**

Based on the research findings, the researchers found that teachers at SDA (Al-Qur'an Elementary School) Mutiara Hikmah demonstrated a deep understanding of the concept and importance of digital pedagogical competence in supporting the learning process in the digital age. Teachers stated that digital pedagogical competence is not only about the ability to use



technology, but also includes how technology can be effectively integrated into the planning and implementation of learning to create a creative, innovative, and enjoyable learning environment. Efforts to improve this competence are carried out through various trainings organized by the school, such as training on the use of digital platforms, digital literacy, and the development of technology-based learning media. In addition, many teachers independently explore digital learning resources and references to develop learning materials that are relevant and interesting for students.

In terms of applying digital pedagogical competencies, teachers are able to design Lesson Plans (RPP) that integrate various digital technologies to improve the effectiveness of material delivery. Teachers utilize various interactive media such as online quiz applications, educational videos, and educational games that not only increase student motivation but also support their active involvement in the learning process. The evaluation of the success of technology integration is carried out periodically through observation of student participation and analysis of learning outcomes, so that teachers can adjust their learning strategies responsively. Teachers also describe how they create a creative, innovative, and enjoyable digital-based learning environment by implementing various project-based learning models and educational games. This is evident in the use of applications such as Kahoot, Quizizz, and Canva to support attractive and interactive teaching and learning activities. Collaboration between teachers, the IT team, and the principal plays a crucial role in supporting this digital learning innovation, with adequate technological facilities, time allocated for competency development, and school policies that support the implementation of digital-based learning.

From the school management perspective, support for the development of teachers' digital pedagogical competencies is reflected through regular training programs, workshops, and mentoring sessions. The principal emphasizes the importance of these competencies as an integral part of achieving 21st-century learning goals and evaluates teachers based on their mastery and application of digital pedagogy through various instruments, including classroom observations and portfolio-based performance assessments. Constructive feedback is consistently provided to teachers to encourage continuous improvement.

## 5. DISCUSSION

The transformation of education in this digital era demands that teachers possess adequate digital pedagogical competencies to integrate information and communication technology into the learning process (Andi Sadriani et al., 2023). This capability extends beyond the use of digital devices to encompass mastery of adaptive, innovative, and relevant learning strategies tailored to the needs of students in the digital age. Teachers are expected to utilize various digital platforms and applications to effectively design, implement, and evaluate learning, thereby creating a creative, interactive, and enjoyable learning environment. Therefore, possessing digital pedagogical competencies is a primary requirement for teachers in response to technological developments and the demands of education in the digital era, which is an effort to improve the quality of digital-based learning in elementary schools.

Teacher perception at SDA (Al-Qur'an Elementary School) Mutiara Hikmah shows a conceptual understanding that is in line with the TPACK (Technological Pedagogical Content Knowledge) framework, where the effectiveness of digital learning requires synergy between technology, pedagogy, and content knowledge (Schmidt et al., 2009). In

line with research Purfitasari et al. which explains that digital pedagogy is not only about teachers' skills in using technology, but also about how teachers can utilize continuously evolving technology to create a student-centered learning environment in an innovative, creative, effective, and enjoyable way. By utilizing technology, creating a dynamic and inquiry-based learning environment can develop students' critical thinking skills, curiosity, empathy, and problem-solving abilities in line with current developments (Rahayuningsih & Muhtar, 2022).

Digital project-based learning, such as game-based learning, provides space for students to develop creativity, critical thinking, communication, and collaboration skills, which are highly needed in today's digital era (Riyadi Hs & Sufyan, 2024). Teachers with strong digital pedagogical competencies are able to create an active, collaborative learning environment and motivate students to participate optimally. They do not use teacher-centered learning methods that only teach/convey conventional materials, but by focusing learning on students by engaging them in group discussions, digital projects, and game-based learning activities that utilize technology. This aligns with previous research findings that emphasize the importance of teacher creativity and innovation in designing learning that adapts to student needs and current developments (Sitompul, 2022).

When designing learning and developing creative, innovative, and enjoyable digital-based learning media, teachers pay attention to several aspects. Typically, teachers approach students first to find out what they need, based on their specific needs, grade, social emotional conditions, learning styles and other aspects that influence learning. Based on the research results. Educators must consider two main elements when designing lessons. First, prepare by designing learning activities. This task includes understanding the situation, characteristics, learning styles, and talents of children, as well as the educator's professional competency. Second, activities in learning planning, including curriculum development and the preparation of Lesson Plans (RPP) in the implementation of learning activities (Ergawati et al., 2023). However, in designing and developing interactive digital media, teachers face challenges such as the varying abilities and learning styles of students in one class, making it difficult to use a uniform learning model. Another challenge, teachers reported, is that creating digital content is very time-consuming and lacks sufficient time due to the school's numerous activities. Therefore, teachers struggle to find time to create digital learning media. However, teachers are aware of this and are taking time off to design and develop digital learning media for their students.

Then in the implementation of innovative, creative and fun digital-based learning in the classroom, teachers usually use various *game website*. Interactive educational tools like Kahoot, Quizizz, Wordwall, and others support learning. Teachers also utilize the Canva app to design interactive worksheets to make them more engaging. The use of digital technology makes it easier for teachers to manage classes, provide real-time feedback, and monitor student learning progress more effectively. Digital-based learning is highly relevant to today's Generation Alpha, as they are also known as digital natives, whose lives have been digital since birth (Ronny Gunawan et al., 2024). However, in its implementation, teachers face several challenges, especially for lower grades. Because digital learning can be implemented, it usually requires the use of gadgets, but for lower grades, not all students are allowed to bring gadgets by their parents. Therefore, teachers can only utilize technological tools provided by the school, such as laptops, projectors, and

others. Furthermore, teachers also face challenges in managing technology usage time, overcoming student distractions caused by the use of digital devices, and maintaining the security and privacy of student data. Teachers evaluate the success of digital-based learning through observations of student participation and comparisons of pre- and post-learning outcomes. The positive impact of implementing innovative, creative, and enjoyable digital-based learning is felt not only by teachers but also by students. Teachers stated that there was an increase in student motivation and interest in learning, the development of critical and creative thinking skills, and an increase in student independence and confidence in using technology.

Teachers must have a high level of awareness to always want to develop themselves (Faridi & Lutfi, 2023). In this context Teachers in digital pedagogy must continually enhance their knowledge of digital literacy, digital learning design, digital media development, and other areas. This can be achieved through in-depth exploration of new references, integrating technology into the curriculum, and participating in digital training and training on designing creative, innovative, and enjoyable digital-based learning models in the classroom. Therefore, policy support from the government and schools is crucial in providing adequate digital infrastructure, training, and resources to enable teachers to continuously develop their digital pedagogical competencies.

Based on the description of the research results, teachers at Mutiara Hikmah Elementary School already have the competencies (Rahayuningsih & Muhtar, 2022). Adequate digital pedagogy meets the needs of the digital era. Furthermore, teachers have also applied their digital pedagogical skills in the classroom to create a creative, innovative, and enjoyable learning environment. This includes the ability to operate and utilize technology, search for and evaluate digital resources, and design learning and develop digital-based media. Through digital learning, teachers create creative and innovative digital-based classes that are certainly enjoyable for students. This increases students' knowledge, motivation, and interest in learning. This research confirms that teachers' digital pedagogical competence is a key factor in creating creative, innovative, and enjoyable learning in elementary schools. Teachers who are able to integrate technology into their learning not only improve the quality of the teaching and learning process but also prepare students for the future to face the challenges of the 21st century. However, challenges in terms of facilities, digital literacy, and training still need to be addressed through policy support and government collaboration. Strengthening digital pedagogical competence must be a top priority in teacher professional development to realize education that is relevant to current developments and the needs of the global community.

## 6. CONCLUSION

The findings of this study confirm that the digital pedagogical competence of teachers at the Mutiara Hikmah Al-Qur'an Elementary School is sufficient to meet the demands of educational transformation in the digital era. Teachers' understanding of this competence is based on the Technological Pedagogical Content Knowledge (TPACK) framework, ensuring that digital device integration is not merely a matter of using tools but rather a strategy to enrich students' learning experiences. Teachers actively participate in structured training programs, such as the use of Gemini AI, Canva, digital literacy, and learning media development. They also demonstrate independent



development initiatives through exploration of social media and official Ministry of Education resources. As a result, teachers are equipped to design innovative, creative, and enjoyable digital-based learning activities, as well as project models such as game-based learning. Consequently, classes become more active, collaborative, and responsive to the characteristics of Generation Alpha, accompanied by increased student participation and learning outcomes. This success is reflected in increased motivation, critical thinking skills, creativity, and student independence, while teachers are able to monitor learning progress through real-time feedback.

Thus, strengthening digital pedagogical competencies must be established as a strategic priority in teacher professional development, as it has proven to be a key factor in improving the quality of learning in elementary schools and preparing the younger generation to face the challenges of the 21st century. Consistent and participatory policy implementation will ensure that the digital transformation of education is inclusive, effective, and sustainable, and will encourage a creative, innovative, and enjoyable learning environment at all levels of elementary education.

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