

The Use of Interactive Digital Media on Elementary School Students' Learning Outcomes

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Abstract: Learning in elementary schools still faces limitations in media and the dominance of conventional methods, so it is less than optimal in fostering student motivation and understanding. This study aims to describe the effectiveness of interactive digital media in improving the quality of learning at SD Negeri 21 Pontianak Barat. The study used a descriptive approach with purposive sampling of fifth-grade students. Data were collected through observation, interviews, and documentation, then analyzed descriptively quantitatively and qualitatively. The results show that interactive digital media increases student motivation, participation, conceptual understanding, and interaction during learning. Teachers also found it easier to explain abstract material. These findings confirm that interactive digital media is an effective and relevant strategy to support learning and the development of 21st-century skills in elementary schools.

Keywords: interactive digital media, learning, elementary school, 21st century skills

Introduction

The development of digital technology in the 21st century has brought significant changes to the learning process in elementary schools. Interactive digital media enables teachers to create more creative, adaptive, and enjoyable learning experiences, thus supporting the development of 21st-century skills such as critical thinking, creativity, communication, and collaboration (Rosmana et al., 2024; Muhammad Yusuf et al., 2023; Pratama & Firmansyah, 2023).

Several studies have shown that interactive digital media can increase student interest and engagement in learning by providing visualizations, animations, and interactive activities that make the material easier to understand (Episar & Irfan, 2022; Mardati, 2021; Kusuma et al., 2022). The use of applications such as Geogebra, Augmented Reality, and HOTS-based games has also been shown to be effective in increasing creativity, digital literacy, and higher-order thinking skills in elementary school students (Anggraini et al., 2021; Delima et al., 2023; Fajari & Meilisa, 2022).

However, various studies report that learning in elementary schools is still dominated by conventional methods and limited media use, resulting in less active student participation (Khoirin, 2023; Rahayuningsih et al., 2022). Furthermore, limited teacher competency in utilizing technology, technical constraints, and a lack of supporting facilities also hamper the optimal use of interactive digital media (Andriani et al., 2024; Hulu, 2023; Gina Nur Puadah et al., 2023). This indicates a gap between the enormous potential of interactive digital media and its still-limited implementation in the classroom.

Previous research has focused on developing specific media—for example, instructional videos, digital comics, the Nearpod platform, and Android-based media—to improve specific skills such as numeracy literacy, creativity, or learning outcomes in specific subjects (Sari et al., 2023; Pramesti et al., 2023; Myori et al., 2019). However, there is limited research that comprehensively describes how interactive digital media is applied in real-life classroom learning, particularly aspects of motivation, activeness, conceptual understanding, social interaction, and teacher perceptions as learning implementers. This research gap underpins the importance of this study.

Based on these needs, this study focuses on describing the effectiveness of interactive digital media in the learning context at SD Negeri 21 Pontianak Barat. The study focuses on the contribution of digital media to student motivation, learning activities, conceptual understanding, social interactions, and teacher reflection on the use of digital media. The results of this study are expected to provide empirical evidence that further strengthens digital technology-based learning practices in elementary schools and is relevant to the demands of 21st-century skills development.

Method

This research uses a descriptive approach, which aims to systematically and factually describe phenomena as they exist without any manipulation or manipulation of variables. This approach aligns with the research objective of capturing the effectiveness of using interactive digital media in learning.

The research subjects were fifth-grade students of SD Negeri 21 West Pontianak. The sample was selected using purposive sampling, a technique based on relevance to the research objectives. Class teachers were involved as informants to provide additional perspectives on the learning process. Data were collected through three techniques: observation to assess student motivation, activity, conceptual understanding, and interaction; semi-structured interviews to obtain teachers' perspectives on digital media use; and documentation, in the form of photos of activities, student assignments, and archives of digital media used. The selection of this combination of techniques follows the principle of triangulation to increase data credibility (Sugiyono, 2021).

The research instrument consisted of an observation sheet based on a 1–4 scale rubric and interview guidelines. The use of the rubric refers to the principles of learning evaluation, which emphasize clarity of indicators and consistency of observations (Sugiyono, 2021). Data analysis was conducted in two stages. First, quantitative descriptive analysis was used to interpret observation scores into qualitative categories. Second, qualitative descriptive analysis was conducted following the stages of organizing, coding, categorizing, and interpreting as described by Bengtsson (2020). These stages enabled researchers to identify patterns of findings and draw

systematic conclusions regarding the effectiveness of interactive digital media in learning.

Table 2.1 Assessment rubric

Rated aspect	Score (1–4)	Temporary Statement/Answer
Motivation to learn	4	Students appear very enthusiastic about participating in learning with digital media, full of enthusiasm, and focused on the material.
Student activities	4	Most students actively ask, answer, and discuss with friends and teachers.
Conceptual understanding	3	Most students understand the material well, although there are still some who need additional guidance.
Social interaction	3	Students can work together in small groups, helping each other when using digital media.
Learning outcomes	4	The average test scores increased after the use of interactive digital media, most students achieved the KKM.

1 = Very Bad, 2 = Bad, 3 = Good, 4 = Very Good.

Results

Table 3.1 Summary of Research Results

Rated aspect	Average Score	Category
Motivation to learn	3.8	Very good
Student activities	3.7	Very good
Conceptual understanding	3.1	Good
Social interaction	3.2	Good
Learning outcomes	78.3	Completed ($\geq$ KKM)

The implementation of interactive digital media has had a positive impact on students. In addition to excellent motivation and engagement, the majority of students also demonstrated improved learning outcomes, with an average score of 78.3, with 83.3% meeting the Minimum Competency (KKM). This demonstrates the effectiveness of interactive digital media in improving learning outcomes, as well as student attitudes and skills.

Observations show that students are more active, enthusiastic, and involved in discussions when learning uses interactive videos, numeracy applications, and educational games.

Table 3.2 Observation Results

NO	Observed Aspects	Indicator	Rating Scale (1–4)	Description/Answer
1	Motivation to learn	Students appear enthusiastic about participating in the learning	4	Students seemed very enthusiastic about using digital media.
2	Student activities	Ask, answer, or discuss	4	Students actively discuss and answer teacher's questions.
3	Conceptual understanding	Able to explain the material again	3	Most students understand the concept well.
4	Social interaction	Collaborating when using digital media	3	Students can work together in small groups.
5	Learning outcomes	Complete the task according to the instructions	4	Repetition scores increased after digital media use.

Teachers also stated that digital media helps explain abstract concepts, increases motivation, and encourages student activeness during the learning process.

Table 3.2 Documentation of Learning Outcomes

NO	Document Type	Form of Evidence	Description/Answer
1	Exam scores/assignment results	Student grade recap	Average scores increased after digital media used.
2	Photos of learning activities	Student/teacher photos	Students look active and enthusiastic during learning.
3	Device/media archive	Application screenshot	Interactive digital media in the form of educational games and videos.
4	Teacher's notes	RPP and teacher reflection	Teachers record more effective learning with digital media.

Based on documentation of learning outcomes, it appears that students' average grades increased after using digital media in their learning. Activity photos show that students appeared more active and enthusiastic during the learning process. Archived application *screenshots* demonstrate the use of interactive digital media, such as

games and educational videos, which supported students' understanding of the material. Furthermore, teacher notes in lesson plans and reflections indicate that learning was more effective through digital media integration.

Discussion

The results of the study indicate that the use of interactive digital media has a positive impact on students' motivation, activeness, conceptual understanding, and social interaction. This finding is consistent with the results of research (Rosmana et al., 2024; Setyorini et al., 2024), which stated that digital media helps increase student interest and participation through more engaging visual presentations and interactive activities. Researchers observed that students were more responsive when material was presented in the form of videos, educational games, or numeracy applications, which is in line with Novitasari's (2019) findings regarding the effectiveness of interactive multimedia in strengthening conceptual understanding.

In terms of engagement, the results of this study corroborate the findings of Azizah and Widiyati (2023) and Maulana et al. (2023), who emphasized that digital technology can encourage student creativity and participation during the learning process. Students not only followed teacher instructions but also engaged in media exploration, discussions, and collaborative assignments. The researchers believe this increased engagement stems from digital media providing students with the opportunity to interact directly with content, significantly increasing their curiosity and engagement.

In terms of conceptual understanding, this study supports the findings of (Delima et al., 2023; Mardati., 2021; Sari et al., 2023), which show that digital visualization makes it easier for students to understand abstract concepts through animations, simulations, and other visual representations. Teachers stated that digital media facilitates the explanation of concepts that were previously difficult for students to understand when presented conventionally. The use of media has also been shown to help cognitive development according to Piaget's theory as demonstrated by Fransiska et al. (2024). Researchers observed that students more easily recall material when accompanied by media that visualizes certain processes or concepts.

In terms of social interaction, this study aligns with findings (Baharudin, 2023; Calora et al., 2023; Mubarok et al., 2023) that show that digital media facilitates collaboration in small groups and improves students' ability to communicate and help their peers. The researchers argue that this increased interaction is not only due to the presence of digital media, but also because digital activities encourage students to help each other operate devices, understand application instructions, and discuss material.

Regarding learning outcomes, the improvement in learning completion achieved by students is in line with research by Pramesti et al. (2023) and Pratama & Hasanah (2024) which shows that digital media improves student competency achievement

because the material is presented in a structured and easy-to-understand manner. The Minimum Completion Criteria (KKM) used in this study are determined by educational units (schools) based on Permendikbud No. 21 of 2016, taking into account the complexity of the material, student characteristics, and school support capacity. Achieving KKM shows that interactive digital media is able to help achieve the standards set by the school.

However, this study also found obstacles in implementing digital media, such as limited teacher competency, network constraints, and device availability. These obstacles are similar to the findings of (Suryati et al., 2023; Hulu, 2023; Dewi et al., 2023; Ginting et al., 2023). Researchers assess that the success of digital media implementation is highly dependent on teacher readiness and school technical support. Therefore, teacher collaboration and ongoing training, as recommended by (Kurniawan, 2020; Ulfa et al., 2024; Syifa & Julia, 2023), are crucial to ensuring the effectiveness of digital media use in elementary schools.

Furthermore, studies such as (Utami & Atmojo, 2021; Pamungkas et al., 2022; Sitompul, 2022; Durroh & Nadlir, 2023) emphasize the importance of integrating digital media with the curriculum, particularly the Independent Curriculum, which emphasizes digital literacy. The findings of this study reinforce this view, as interactive digital media has proven relevant to competency-based learning and the strengthening of 21st-century skills, as also demonstrated by Safitri et al. (2025). Based on the researchers' analysis, digital media not only facilitates understanding of the material but also provides meaningful learning experiences and increases students' confidence in using technology.

Conclusion

This study shows that the use of interactive digital media significantly improves the quality of learning at SD Negeri 21 Pontianak Barat. Digital media has been shown to increase student motivation and engagement through engaging visual displays, interactive activities, and opportunities for students to participate more actively in the learning process. Furthermore, digital media also helps strengthen conceptual understanding, particularly in abstract material, as visualizations and simulations make the learning process more concrete and understandable.

Students' social interactions improved through group collaboration, both in using digital devices and in understanding learning materials. Teachers also found it easier to deliver materials, manage classes, and facilitate more varied learning activities. The improvement in students' competency achievement against school-set standards demonstrates the high relevance of interactive digital media to learning needs in the digital age.

Overall, this study confirms that the integration of interactive digital media is an effective pedagogical strategy with the potential to improve the quality of learning while supporting the development of 21st-century skills. Implementation of digital media

requires increased teacher competency, provision of supporting facilities, and ongoing mentoring to ensure optimal and sustainable use in elementary schools.

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