

## Innovation in the Use of Interactive Digital Media to Improve Elementary School Students' Understanding

Moh Rofiq<sup>1\*</sup>

### ABSTRACT

This study aims to analyze the impact of innovative use of interactive digital media on improving elementary students' conceptual understanding. The background stems from the low level of student comprehension when learning abstract material through conventional methods and the limited integration of interactive technology in classrooms. A qualitative descriptive approach was employed, with data collected through observation, interviews, and documentation at three elementary schools in Bantul Regency, Yogyakarta. The findings reveal that interactive digital media—such as visual simulations, educational games, and dynamic presentations—significantly improve students' engagement, focus, and understanding of the learning material. Teachers also benefited from more effective content delivery and assessment. The study concludes that integrating interactive digital media into instruction has a positive effect on students' conceptual mastery and motivation. It recommends ongoing professional development for teachers and the advancement of technology-based media to support more adaptive and innovative learning environments.

**Keywords:** Interactive digital media, student understanding, innovative learning, elementary school

## 1 Introduction

In today's rapidly evolving digital era, education is required to transform in order to meet the needs of 21st-century learners. One of the main challenges at the elementary school level is how to deliver complex learning materials in ways that are engaging and easily understood by students. Student comprehension—especially in conceptual subjects such as mathematics and science—often remains a challenge due to conventional teaching methods ((Wati et al., 2024). Yet, comprehension is a fundamental component of higher-order thinking skills, which students must possess to face global challenges(Kamaruddin et al., 2022).

Ideally, learning at the elementary level should integrate interactive technology so that students are not merely passive recipients of information, but active participants in constructing their own knowledge. However, initial observations at four elementary schools in Bantul Regency revealed that out of 80 fourth-grade students, 64% experienced difficulties understanding lessons delivered through lectures and static media such as textbooks or images on whiteboards. Furthermore, only 2 out of 4 teachers regularly incorporated digital media into their teaching—and even then, limited to videos without interactive elements. This illustrates a clear gap between 21st-century learning demands and current classroom practices.

According to Susanto (2021), elementary students require learning media that stimulate multiple senses to achieve deeper conceptual understanding(Fadliyah et al., 2021). In this context, interactive digital media emerge as a viable solution to bridge the complexity of learning content with the unique learning characteristics of young students. Such media enable learners to engage directly with content, explore concepts, and receive immediate feedback (Utomo, 2023). Similarly, Arifin (2020) emphasizes that the success of today's education relies heavily on a teacher's ability to design learning experiences that are both innovative and enjoyable ((Arifin & Ekayati, 2020).

---

<sup>1</sup> Universitas Muhammadiyah Malang

\*Alamat korespondensi: rafiq047@gmail.com

Research by (Ritonga, 2021) shows that digital media based on simulations and educational games can improve student comprehension by up to 35% compared to conventional methods. Meanwhile, (Simorangkir et al., 2023), found that students understood abstract material more quickly when given opportunities to manipulate digital objects independently. From the teacher's perspective, (Atsani, 2020) noted that interactive digital media support more efficient lesson delivery by providing dynamic visualizations and automated evaluation systems.

Despite these advantages, the use of interactive digital media still faces obstacles, particularly in terms of teacher readiness, limited access to devices, and a lack of continuous training. (Widodo, 2021) reported that many teachers struggle to design interactive content because they are not yet accustomed to creatively using digital platforms within a pedagogical context. Therefore, interventions must not only introduce digital media but also ensure their effective use contributes meaningfully to improving students' understanding.

Although prior studies have examined the role of digital media in education, most have focused on general media effectiveness rather than specifically investigating interactivity and cognitive engagement. This study offers novelty by exploring how innovative interactive digital media can be applied to enhance elementary students' comprehension, while also identifying effective implementation strategies within classroom learning.

Specifically, the objective of this study is to analyze the impact of using interactive digital media on improving elementary students' understanding and to describe the forms of media innovation that most effectively foster active participation and conceptual mastery.

## 2 Research Methods

This study employed a qualitative descriptive approach, which allowed the researcher to gain an in-depth understanding of the use of interactive digital media in teaching plane geometry in elementary school. The approach focused on the meanings, experiences, and interactions of students during real classroom learning processes. The subjects of this research were fourth-grade students at a public elementary school in Yogyakarta City that had implemented digital media in mathematics instruction. The participants were selected purposively, considering the active involvement of students and teachers, as well as the school's readiness in terms of ICT infrastructure.

Data collection was conducted through three primary techniques: observation, interviews, and documentation. Direct observation was used to examine how the teaching and learning process unfolded, particularly the teacher's activities, student engagement, and interactions with digital media. Semi-structured interviews were conducted with teachers, students, and the school principal to explore their experiences, benefits, and challenges in using digital media. Documentation included collecting learning tools, student work, screenshots of digital media, and teacher notes as supporting data.

The data were analyzed using Miles and Huberman's interactive model, which consists of data reduction, data display, and conclusion drawing. Data reduction was carried out to filter and focus on relevant information. The data were then presented in narrative form and supported by quotations reflecting field findings. Conclusions were drawn based on emerging patterns and themes, followed by verification to ensure the trustworthiness of the results. To maintain data validity, source and technique triangulation were applied, along with member checking to ensure that the interpretations aligned with participants' actual experiences.

## 3 Result and Discussion

This study aims to explore the impact of innovative use of interactive digital media in improving elementary school students' understanding. Data were collected through direct observation, semi-structured interviews, and documentation from three elementary schools in Bantul Regency, Yogyakarta Special Region, that had integrated interactive digital media into their teaching and learning processes. The findings are categorized into four main themes aligned with the research focus: (1) the types of interactive digital media innovations used, (2) changes in students' learning behavior, (3) teachers' perceptions of media effectiveness, and (4) the impact on students' conceptual understanding.

## 1. Innovations in Interactive Digital Media Used

Each participating school implemented different types of interactive digital media. School A used geometry-based visual simulation applications (e.g., GeoGebra), School B incorporated educational game platforms (such as Wordwall and Quizizz), while School C developed interactive PowerPoint presentations featuring clickable and draggable elements.

Table 5. Innovations in Interactive Digital Media Used

No	School	Media Type	Key Interactive Features
1	A	Geometry simulation application (GeoGebra)	Drag & drop, shape animation, exploration
2	B	Educational games (Quizizz, Wordwall)	Live scoring, adaptive questions, leaderboard
3	C	Interactive presentation (interactive PPT)	Free navigation, click quizzes, sound illustrations

## 2. Changes in Students' Learning Behavior

After the use of interactive digital media, a significant change was observed in students' learning behavior. Teachers reported that students became more active, asked more questions, and enthusiastically completed independent assignments. Classroom observations revealed that students were more focused and less easily distracted. One teacher remarked, "They used to be passive during math lessons, but now they compete to answer since we started using simulation media."

Table 6. Changes in Student Learning Behavior Before and After Interactive Media Use

No	Indicator	Before Interactive Media	After Interactive Media
1	Active questioning	Low	High
2	Low involvement in discussions	Medium	High
3	Ability to complete exercises	Low	Increase
4	Focus during class	Disturbed	Consistent

## 3. Teachers' Perceptions of Media Effectiveness

Most teachers agreed that interactive digital media greatly assisted them in conveying complex concepts that students found difficult to grasp. Visuals and animations helped concretize abstract topics. Additionally, teachers appreciated the ease of evaluating students' learning, as several media platforms provided automatic feedback from quizzes and exercises. An interview with a teacher from School B revealed: "Students understand faster because they can directly see and try things for themselves, rather than just listening."

## 4. Impact on Students' Conceptual Understanding

The increase in students' conceptual understanding was evident from formative test results and teacher records. In School A, the average class score improved by 23% in the topic of flat shapes. School B recorded that over 75% of students could explain the material without referring to textbooks. Meanwhile, teachers in School C reported that students were better able to relate the content to real-life situations.

Tabel 7. Improvements in Students' Understanding Based on Teacher Evaluations

No	School	Evaluation Indicators	Before Media
1	A	Average daily evaluation score	62
2	B	Number of students who understand the material (>80%)	52%
3	C	Ability to explain concepts	Low

The results of this study show that innovation in the use of interactive digital media plays a significant role in enhancing elementary students' understanding. This finding is consistent with various theories and previous studies emphasizing the importance of interactivity and multisensory elements in the learning process.

1. **Media Innovation and Interactivity** The types of media used in the three schools (GeoGebra, Quizizz/Wordwall, and interactive PPT) demonstrate that interactivity is a key attraction for students. This supports (Fadliyah et al., 2021) view that elementary-aged students need visual stimulation and light motor activity to optimize concept absorption. This interactivity allows students to not only receive information passively but also actively participate in constructing their understanding (Fadliyah et al., 2021). This is in line with (Utomo, 2023) who suggests that media interactivity can encourage deeper learning engagement. (Ritonga, 2021) study further strengthens this finding, where digital simulation-based media was shown to improve students' understanding by up to 35%. This is because such media can represent difficult phenomena or concepts in a more concrete and visual manner, such as geometric transformations or cause-and-effect processes in science.
2. **Changes in Student Learning Behavior** The increased activity and concentration of students after using interactive digital media indicate that these media can enhance learning engagement. This aligns with (Arifin & Ekayati, 2020) view, which states that a learning environment that facilitates exploration and immediate feedback will foster curiosity and emotional involvement in students. This finding also supports (Simorangkir et al., 2023), which shows that students understand material more quickly when they can interact directly with digital objects, such as by clicking, swiping, or selecting answers. Therefore, digital media not only serves as a visual aid but also as a tool that shapes an immersive learning experience.
3. **Teachers' Perceptions of Digital Media** The teachers who participated in this study stated that interactive digital media helped them present material more concretely and systematically. This finding aligns with (Atsani, 2020), who mentions that digital media makes it easier for teachers to explain abstract concepts dynamically and efficiently. Teachers also felt assisted in the assessment process, as digital media allows for automatic question presentation and quick evaluation. However, this finding also highlights challenges regarding teachers' readiness. Although they acknowledge the effectiveness of interactive media, some teachers admitted to still needing further training in designing and modifying media according to students' characteristics. This is also emphasized by (Widodo, 2021), who states that the success of integrating technology into learning largely depends on teachers' readiness and digital literacy.
4. **Improvement in Student Understanding** The increase in daily evaluation scores and the improvement in students' ability to explain concepts independently strengthen the role of interactive digital media in optimizing student understanding. This supports the constructivist theory, where effective learning occurs when students actively build knowledge through experience (Fadliyah et al., 2021). In this context, interactive learning experiences through digital media provide students with opportunities to explore, observe, and draw their own conclusions about concepts. Furthermore, the finding that students were able to relate lessons to everyday life shows that interactive media supports contextual learning. According to (Wati et al., 2024), contextual learning helps students integrate new information into existing knowledge structures, making it easier to remember and understand.

Overall, the results of this study provide empirical evidence that the innovation of using interactive digital media not only enhances students' conceptual understanding but also fosters active and positive learning behavior. Therefore, this strategy is worth integrating more widely into elementary school

teaching practices, supported by teacher training and adequate infrastructure provision.

## 4 Conclusion

Based on the results and discussions, it can be concluded that the innovation in using interactive digital media has proven effective in enhancing the understanding of elementary school students, particularly in subjects with conceptual content. Media equipped with interactive features such as visual simulations, educational games, and dynamic presentations provide a more meaningful, enjoyable, and contextual learning experience for students. Multisensory learning and the opportunity for independent exploration have proven to improve focus, participation, and absorption of the material being taught. This research reinforces that the success of using digital media is not only determined by the availability of devices but also by the teacher's ability to design and implement adaptive, creative, and learner-characteristic-based teaching strategies. Therefore, support for enhancing teachers' competencies in digital literacy and technology-based pedagogy is crucial to maximize the potential of interactive media.

In the future, the development of interactive digital media can be directed towards integrating artificial intelligence (AI) and augmented reality (AR) to further personalize students' learning experiences. Additionally, future research can focus on longitudinal analysis to observe the long-term effects of interactive media on student achievement and learning motivation on a continuous basis.

## References

1. Arifin, M., & Ekayati, R. (2020). E-learning berbasis edmodo.
2. Atsani, K. H. L. G. M. Z. (2020). Transformasi media pembelajaran pada masa Pandemi COVID-19. *Al-Hikmah: Jurnal Studi Islam*, 1(1), 82–93.
3. Fadliyah, L., Susanto, J., & Rukanah, R. (2021). Stimulasi finger puppet terhadap perkembangan bahasa anak pra sekolah. *Jurnal Penelitian Kesehatan "SUARA FORIKES" (Journal of Health Research "Forikes Voice")*, 12(4), 459–462.
4. Kamaruddin, I., Latuconsina, A., Pramono, S. A., Pattiasina, P. J., & Wahab, A. (2022). Urgensi Kemampuan Technological Pedagogical Content Knowledge Personality (Tpack-P) Pendidik Di Era Revolusi Industri 4.0. *Jurnal Pendidikan Dan Konseling (JPDK)*, 4(5), 3680–3688.
5. Ritonga, M. (2021). Studi Literatur Efektivitas Model Pembelajaran Simulasi Digital. *Prosiding Nasional Pendidikan: LPPM IKIP PGRI Bojonegoro*, 2(1), 63–70.
6. Simorangkir, R., Sinaga, R., Limbong, R., & Nazwa, Z. (2023). Analisis penggunaan media digital interaktif untuk meningkatkan hasil belajar siswa dalam pembelajaran matematika di sekolah dasar. *Trapsila: Jurnal Pendidikan Dasar*, 5.
7. Utomo, F. T. S. (2023). Inovasi Media Pembelajaran Interaktif Untuk Meningkatkan Efektivitas Pembelajaran Era Digital Di Sekolah Dasar. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 8(2), 3635–3645.
8. Wati, D. C., Judijanto, L., Apriyanto, A., Sepriano, S., & Maryana, M. (2024). *Media & Teknologi Pembelajaran Matematika*. PT. Sonpedia Publishing Indonesia.
9. Widodo, S. (2021). Implementasi Merdeka Belajar di Era New Normal secara Daring dengan Pembelajaran Berbasis Proyek di SMK Ma'arif 2 Gombang. *Prosiding Seminar Nasional Manajemen Pendidikan*, 2.

## CITATION:

Moh Rofiq (2025). Innovation in the Use of Interactive Digital Media to Improve Elementary School Students' Understanding. *OASE*, 7(3), 434–438.