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Exploring teachers' perspectives on digital media utilization for innovative science and social studies learning in elementary schools

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Abstract: This study explores teachers' perspectives on the use of digital media as an innovation in IPAS (Science and Social Studies) learning in elementary schools. The development of digital technology has accelerated the transformation of learning processes; however, its implementation at the elementary school level still faces various challenges, particularly in schools with limited infrastructure. This study employed a descriptive qualitative approach and was conducted at a public elementary school in East Java, Indonesia. Data were collected through semi-structured, in-depth interviews with the school principal and four teachers. Data were analyzed thematically through data reduction, data display, and conclusion drawing. The findings indicate that teachers hold predominantly positive perspectives toward digital media use, viewing it as an effective tool for enhancing student enthusiasm and motivation in Science and Social Studies learning. Teachers have utilized various digital tools, including PowerPoint presentations, instructional videos, Google Classroom, and EduCode. The primary challenges encountered include unstable internet connectivity and limited technological devices. In response, teachers demonstrated adaptive and innovative attitudes through participation in technical training and self-directed learning. These findings carry significant implications for policy development: systematic digital competency programs and equitable technology infrastructure are essential prerequisites for sustainable integration of digital media in elementary Science and Social Studies learning.

Keywords: Digital media, Science and social studies, Teachers perspectives, Elementary school.

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INTRODUCTION

Twenty-first-century developments in information and communication technology have transformed many aspects of life, including education, shifting learning from conventional methods toward approaches that are more interactive, dynamic, and technology-based (Adawiyah et al., 2026; Alisyahbana, 2022). Teachers are therefore required to integrate digital media into learning, particularly in Science and Social Studies, which emphasizes observation, exploration, and understanding of natural and social phenomena. Digital media covers technologies that support learning, such as computer-based presentations, interactive videos, educational applications, and online learning platforms (Azzahra & Prasetyo, 2024; Arsyad, 2017; Hamid et al., 2020; Hasan, 2021). Beyond replacing conventional media, it enhances student motivation, participation, and understanding (Juneda et al., 2025; Handina et al., 2025; Mayer, 2021). and in science and social studies learning it is particularly valuable for visualizing natural processes, simulating experiments, and presenting data contextually.

One of the main problems in science and social studies learning is low student motivation. Many students experience difficulties in understanding Science and Social Studies concepts, which often limits their active participation during classroom learning. As a result, their learning achievement may not reach the expected level. Nevertheless, instructional practices continue to rely heavily on conventional approaches, such as teacher-centered lectures and assignment-based activities, with limited integration of interactive learning media that better align with the demands of contemporary education (Nurhasanah, 2025). In Indonesia, Merdeka Curriculum policy has driven the digitalization of education down to elementary level, though implementation still faces obstacles such as limited infrastructure, uneven teacher digital competence, and regional gaps in technology access (Fatimah & Prasetyono, 2025; Illyah, 2025; Rahayu & Setiawan, 2022; Subroto et al., 2023). Understanding teachers' views and experiences is therefore essential for effective implementation. Integrating technology into educational practice requires teachers to balance technological, pedagogical, and content knowledge. The Technological Pedagogical Content Knowledge (TPACK) framework offers a widely recognized model for combining these areas of expertise to enhance teaching effectiveness and improve student learning experiences (Lathifa et al., 2023).

The numerous advantages of educational technology encourage teachers to incorporate digital tools into classroom instruction. However, the adoption of technology in teaching remains uneven, as not all teachers possess the necessary digital competencies. Previous studies have indicated that some teachers continue to experience difficulties in using technology effectively, particularly in integrating it as both a learning resource and an instructional medium to support the achievement of learning objectives (Siregar et al., 2024). Previous research suggests that teachers generally have positive attitudes toward the use of digital media in education because it facilitates more effective and engaging learning. However, its implementation remains hindered by challenges such as inadequate infrastructure and unstable internet connectivity (Mutmainnah dan Khaerunnisa, 2024). Previous studies have consistently demonstrated the benefits of digital media in elementary education. Digital media has been shown to facilitate the effective delivery of learning materials, increase students' enthusiasm for learning, improve the effectiveness, interactivity, and efficiency of learning evaluation, enhance the quality of classroom instruction, and support the integration of innovative teaching practices in the digital era (Hartati et al., 2025). Previous studies have consistently reported that the integration of digital media enhances students' learning motivation, facilitates the understanding of abstract concepts, promotes scientific literacy, encourages active classroom participation, strengthens critical thinking skills, and improves learning outcomes. These findings

suggest that digital media enrich learning experiences through multimodal representations, enabling students to better comprehend complex scientific concepts while addressing the challenges associated with the abstract nature of science learning in elementary education (Wulandari, 2026).

Teachers' perspectives play an important role in understanding how digital media are perceived and valued within the teaching and learning process, as these perceptions often influence classroom practices (Papantonis & Pernilla, 2024). Beyond teachers' perspectives, examining how digital media are implemented in instructional activities provides insight into the extent to which technology is integrated into everyday teaching practices (Aliyyah et al., 2025). Equally important is identifying the challenges that teachers encounter, as these factors may affect the successful adoption and sustainability of digital media in elementary classrooms (Pappa et al., 2024). Although previous studies have widely examined the benefits and effectiveness of digital media in education, limited research has explored these three dimensions in an integrated manner, particularly in Science and Social Studies learning at elementary schools with limited educational resources. Therefore, this study aims to explore teachers' perspectives on digital media utilization, examine its implementation in Science and Social Studies learning, and identify the challenges encountered during its use. By integrating these three dimensions, this study provides a more comprehensive understanding of digital media utilization in elementary education and offers practical insights for supporting its effective implementation.

This study contributes to the existing literature by providing a more comprehensive understanding of digital media utilization in Science and Social Studies learning at the elementary school level. Unlike previous studies that have primarily focused on the benefits or effectiveness of digital media, this research examines teachers' perspectives, the implementation of digital media in classroom practice, the challenges encountered during its use, and the strategies employed to address those challenges. By integrating these dimensions, the study offers a more holistic understanding of digital media utilization in elementary education. Accordingly, this study seeks to answer the following research questions: (1) How do elementary school teachers perceive the use of digital media in Science and Social Studies learning? (2) How is digital media implemented in Science and Social Studies learning? (3) What challenges do teachers encounter when utilizing digital media in Science and Social Studies learning? and (4) What strategies do teachers employ to overcome these challenges and support the effective use of digital media in the classroom?.

Based on the identified research gap, this study aims to explore teachers' perspectives on the utilization of digital media in Science and Social Studies learning at the elementary school level. Specifically, it examines how digital media are implemented in classroom practice, identifies the challenges encountered by teachers, and investigates the strategies they employ to address these challenges. By integrating these dimensions, this study provides a more comprehensive understanding of digital media utilization in elementary education and offers practical insights to support the effective integration of digital media in teaching and learning.

METHODS

Research Design

This study employed a descriptive qualitative research design to gain an in-depth understanding of teachers' perspectives and experiences regarding the utilization of digital media in Science and Social Studies learning. A descriptive qualitative approach was considered appropriate because it enables researchers to explore and interpret phenomena comprehensively within their natural context, emphasizing participants' viewpoints and lived experiences rather than numerical measurement. Through this

approach, the study sought to capture the complexity of teachers' perceptions, experiences, challenges, and innovations in integrating digital media into classroom learning. This design provides rich and contextualized data that contribute to a deeper understanding of the phenomenon under investigation (Creswell, 2014).

Participant

The study was conducted at a public elementary school in East Java, Indonesia, in April 2026. The participants consisted of one school principal (SP) and four teachers (T1–T4), who were selected using purposive sampling. This sampling technique was employed to ensure that the participants possessed relevant knowledge and experience related to the phenomenon under investigation. The selection criteria included individuals who were directly involved in teaching IPAS and had experience in utilizing digital media to support classroom learning. Their professional roles and practical experiences enabled them to provide comprehensive insights into teachers' perspectives, experiences, challenges, and innovations in the use of digital media in science and social studies learning.

Material

The study employed a semi-structured interview guide as the primary research instrument. The interview guide was developed based on the research objectives and relevant literature to explore teachers' perspectives on the utilization of digital media in IPAS learning. The instrument consisted of four main indicators, as presented in Table 1.

Table 1. *Research Instrument*

Instrument	Indicators	Description
Semi-structured interview guide	**1. Teachers' views on the utilization of digital media in science and social studies learning** • Teachers' understanding of digital media in learning • Perceived benefits of digital media for science and social studies learning **2. Teachers' experiences in utilizing digital media** • Types of digital media used • Frequency of use in classroom instruction • Experiences during implementation **3. Challenges in utilizing digital media** • Internal challenges (e.g., digital competence, time management) • External challenges (e.g., infrastructure, internet access, school facilities) **4. Teachers' innovations in utilizing digital media** • Strategies for integrating digital media into learning • Efforts to overcome challenges • Development or adaptation of digital learning resources	A semi-structured interview guide consisting of open-ended questions developed based on the research objectives and relevant literature. The instrument was designed to obtain in-depth information regarding teachers' perspectives, experiences, challenges, and innovations in utilizing digital media in IPAS learning.

The semi-structured interview format enabled the researcher to ask predetermined questions while allowing flexibility to explore participants' responses in greater depth.

This approach facilitated the collection of rich and comprehensive data regarding teachers' perspectives and experiences in utilizing digital media during IPAS learning.

Procedure

The research procedure began by obtaining permission from the school to conduct the study and identifying participants who met the predetermined inclusion criteria. After informed consent was obtained, a semi-structured interview guide was used to conduct individual face-to-face interviews with one headmaster and four teachers. Each interview explored participants' views, experiences, challenges, and innovations regarding the utilization of digital media in science and social studies learning. With the participants' permission, all interviews were audio-recorded to ensure the accuracy and completeness of the data. The recorded interviews were subsequently transcribed verbatim, and the transcripts were reviewed carefully to ensure consistency before proceeding to the data analysis stage.

Data Analysis

Data were analyzed using the interactive analysis model proposed by Miles and Huberman, which involves three interconnected processes: data condensation, data display, and conclusion drawing and verification. The analysis began with the verbatim transcription of the interview recordings, followed by the systematic organization of the data to facilitate the coding and interpretation processes (Ruhimat & Samlawi, 2021). The transcripts were then read repeatedly to gain a comprehensive understanding of the data before conducting the coding process to identify meaningful information relevant to the research objectives. The resulting codes were subsequently categorized into four themes based on the research focus: (1) teachers' views on the utilization of digital media in science and social studies learning, (2) teachers' experiences in utilizing digital media, (3) challenges encountered in utilizing digital media, and (4) teachers' efforts and innovations in integrating digital media into science and social studies learning. To ensure the trustworthiness of the findings, source triangulation was employed by comparing information obtained from the headmaster and teachers to identify consistent patterns and enhance the credibility of the data. Furthermore, all participants' identities were anonymized using codes (SP, T1–T4) to maintain confidentiality throughout the research process.

RESULTS

To ensure participants' confidentiality, each informant was assigned an identification code throughout the study. The code SP refers to the school principal, while T1, T2, T3, and T4 refer to Teacher 1, Teacher 2, Teacher 3, and Teacher 4, respectively. These codes are used consistently in the interview excerpts presented in the Results section.

Teachers' Views on the Utilization of Digital Media in IPAS Learning

Positive Views

Teachers predominantly held positive views of digital media in IPAS learning, reflected in their acknowledgment that it genuinely increases students' enthusiasm and motivation:

"With digital media, I am greatly helped in presenting IPAS material to students. They become more enthusiastic and eager to take part in classroom learning. The use of digital media as a learning innovation is very important, not only because of the times but also for the future." (T1).



Figure 1. *Interview with T1*

Another informant shared a similar experience:

"When I present IPAS material using digital media through the LCD or PID, the children become enthusiastic because the lesson becomes more interesting. Their curiosity grows because of the unusual appearance of the digital media, so they are more enthusiastic about participating in classroom learning." (T3)



Figure 2. T3 *Using Digital Media*

The findings revealed that teachers held positive perspectives on the use of digital media in Science and Social Studies learning. Participants perceived digital media as an effective instructional tool that enhanced the quality of teaching by presenting learning materials in a more engaging and interactive manner. They also reported that digital media increased students' learning motivation, encouraged active classroom participation, and facilitated the delivery of instructional content. Despite several implementation challenges, teachers expressed a strong commitment to continuing the integration of digital media into their classroom practices.

Negative Views

Although not dominant, some teachers voiced concern that students' enthusiasm for digital media is superficial rather than reflecting genuine understanding:

"Honestly, when I present IPAS material with digital media via the LCD, the children don't learn it's more like watching a movie. Their enthusiasm is superficial; they are only excited about seeing moving images and bright colors, not because they understand the material. In the end, the class becomes noisy and uncontrolled." (T1)

The interview findings suggest that teachers recognized the importance of using appropriate instructional strategies when integrating digital media into Science and Social Studies learning. Participants emphasized that digital media should not only provide attractive visualizations but also support students' understanding of learning content. They also acknowledged that the effective use of digital media requires adequate digital competencies and pedagogical skills to ensure meaningful learning experiences.

Neutral Views

Some teachers held views that were neither fully positive nor negative, acknowledging digital media's benefits while recognizing real field limitations, and adopting a pragmatic stance of using it only when conditions allow:

"When I use the LCD or PID in class, the children do look more enthusiastic, but only to that extent. Their enthusiasm is natural because there's a new display they don't usually see on the whiteboard, but it doesn't guarantee that they understand the IPAS material better.

This digital media is just 'packaging'; I use it when the facilities are available so the class isn't too boring, but if not, it's fine too." (T3)

Some teachers expressed a more neutral perspective toward the use of digital media in Science and Social Studies learning. They acknowledged the potential benefits of digital media but indicated that its use remained dependent on the availability of supporting facilities and technological resources. As a result, digital media had not yet been fully integrated into their classroom practices and was used only under certain conditions.

Teachers' Experience in Using Digital Media in IPAS Learning

Teachers at have gained varied experience using digital media, most commonly PowerPoint presentations, instructional videos, and platforms such as Google Classroom and EduCode:

"Through several digital learning media that I use, such as PowerPoint, instructional videos, and application links like EduCode and Google Classroom, I am greatly helped in delivering IPAS material to students." (T2)



Figure 3. *T2 Using Digital Media*

This experience also fostered teachers' professional growth, pushing them toward greater creativity:

"With digital media today, I feel more creative and innovative in presenting IPAS learning material. Students are also more enthusiastic about participating in learning because of the appealing display of digital learning media, so they don't feel bored during classroom learning." (T4)

The interviews revealed that teachers utilized various types of digital media to support Science and Social Studies learning. The most frequently used media included digital presentation tools, such as PowerPoint and Google Slides, which were displayed through LCD projectors or interactive presentation devices during classroom instruction. Teachers also used instructional videos to explain concepts that were difficult to observe directly, particularly natural phenomena and scientific processes. In addition, Google Classroom was employed to distribute learning materials, assignments, and announcements, while EduCode was introduced to familiarize students with basic programming concepts and promote digital literacy. Overall, participants reported that the use of these digital media made classroom activities more engaging, facilitated the delivery of learning materials, and increased students' participation in the learning process.

Obstacles in the Utilization of Digital Media

Internal Obstacles

Internal obstacles arise from within teachers or students. Digital competence varies among teachers; older teachers in particular find newer devices and applications difficult to operate. The principal confirmed this:

"Indeed, not all teachers here can immediately use digital devices; some still need guidance, especially for new applications. But we always encourage them to keep learning." (SP)



Figure 4. *Interview with SP*

Psychological readiness is another key internal factor: teachers not yet mentally prepared tend to delay or minimize digital media use even when facilities exist, though motivation shifts once they see direct effects on students:

"At first I felt shocked and burdened by digital devices. However, my motivation rose when I saw children who were usually sleepy suddenly become very enthusiastic when I played an IPAS instructional video. That happiness of the students is what motivates me to keep learning, even if I have to start from zero." (T3)

Limited preparation time is also a real obstacle, given the effort needed to design quality media alongside heavy administrative workloads:

"Sometimes I have ideas for creating more interesting digital media, but the time is not always available because of the many administrative matters that need to be completed." (T4)

External Obstacles

External obstacles include infrastructure and other factors beyond the individual. Unstable internet is the most common technical challenge:

"Sometimes IPAS learning is hindered by unstable internet networks. To address this, the school installed two WiFi networks so that the internet can be accessed evenly." (T1)



Figure 5. *T1 Using a Chromebook*

Limited device numbers are also significant: the school has only two LCD units, one government-provided PID, and 15 Chromebooks insufficient for equal access across all classes:

"We are indeed still short of devices; only two LCDs, one PID. There's no computer laboratory yet either, so the devices are still kept in the office for security. This sometimes makes it difficult for teachers who want to use them on short notice." (SP)



Figure 6. *SP Using the PID*

Students' geographic and socioeconomic conditions further limit digital media use outside school hours, since access and signal quality vary at home:

"At school we can provide WiFi, but once the children go home, some of them live in blank-spot areas or where the signal is intermittent. These geographic conditions make us think twice before assigning digital-based homework." (HM)

The interview findings revealed that inadequate infrastructure was one of the main challenges affecting the use of digital media in Science and Social Studies learning. Teachers reported that limited technological facilities and unstable internet connectivity restricted their ability to integrate digital media consistently into classroom instruction. These constraints reduced opportunities to maximize the potential of digital media and influenced the effectiveness of its implementation in daily teaching practices.

Teachers' Efforts and Innovations in Utilizing Digital Media for IPAS Learning

Despite these challenges, the teachers reported making various efforts to continue integrating digital media into Science and Social Studies learning. One of the main strategies identified was participation in government-organized technical training programs (*bimbingan teknis* or *bimtek*), which helped improve their digital competencies and supported the effective use of digital media in classroom instruction.

"So that I can keep up with developments in digital media, I usually take part in bimtek from the region. There is also usually knowledge-sharing among several sub-districts, so we teachers can share with one another." (T2)



Figure 7. *Teachers Attending Technical Guidance*

To address the challenges associated with digital media utilization, teachers employed several practical strategies. Participants reported engaging in peer-sharing activities to exchange knowledge and experiences regarding the use of digital media, thereby supporting the dissemination of digital competencies among colleagues. In addition, teachers pursued self-directed learning through online resources to enhance their knowledge of educational technologies and develop more engaging and relevant Science and Social Studies learning materials. They also adapted digital media to suit the school's conditions, such as downloading instructional materials in advance and using offline digital resources when internet connectivity was limited. Another strategy identified was participation in government-organized technical training programs (*bimbingan teknis* or *bimtek*). Teachers explained that these programs enabled them to strengthen their digital competencies, become familiar with various educational

technologies, and develop practical skills for integrating digital media into classroom instruction. They further reported that the knowledge and experience gained from these training activities increased their confidence in selecting and implementing appropriate digital media to support teaching and learning.

DISCUSSION

The findings of this study indicate that teachers generally perceive digital media positively because it enhances students' motivation and engagement in science and social studies learning. However, the effectiveness of digital media implementation is strongly influenced by teachers' digital competence and the availability of adequate technological infrastructure. These findings suggest that improving teachers' pedagogical and digital competencies should become a priority in supporting the effective integration of digital media in elementary science and social studies learning. In addition, the study shows that teachers demonstrate adaptive attitudes by participating in technical training, engaging in self-directed learning, and collaborating with colleagues to overcome existing challenges. This implies that continuous professional development and collaborative learning communities are essential for strengthening teachers' capacity to integrate digital media sustainably. Furthermore, schools and educational policymakers should provide adequate infrastructure and ongoing support to ensure more equitable and effective digital learning implementation in elementary schools.

The findings of the previous study demonstrated that all 100 teacher respondents agreed that digital media are essential for science and social studies learning in elementary schools. The participants also highlighted several advantages of digital media, emphasizing their ability to enhance students' engagement, facilitate the delivery of learning materials, and support more interactive classroom instruction. These findings reinforce the results of the present study, in which teachers consistently expressed positive perspectives toward the use of digital media, recognizing its important role in creating more engaging, effective, and meaningful Science and Social Studies learning experiences (Ayudia & Prasetya, n.d., 2023).

Positive perceptions alone are insufficient to ensure high-quality Science and Social Studies learning through digital media without adequate pedagogical support. Beyond developing technical digital skills, teachers also require strong pedagogical competence to select, design, and evaluate digital media that effectively facilitate meaningful learning and strengthen students' conceptual understanding (Nurhasanah, 2025). The infrastructure challenges identified in this study further highlight the persistent digital divide in education. These findings suggest that efforts to promote technology integration should extend beyond the provision of digital devices and consider differences in geographical location, school context, and socioeconomic conditions. Adequate access to digital devices, reliable internet connectivity, and appropriate technological facilities are fundamental prerequisites for the effective and sustainable integration of digital media in Science and Social Studies learning (UNESCO, 2023; Puspitasari, 2021; Molenda, 2023).

The findings also demonstrate that teachers employed various strategies to strengthen their capacity to integrate digital media, including participation in technical training programs, self-directed learning, and peer knowledge sharing. These efforts highlight the importance of collaborative professional learning in supporting teachers' digital competence and encouraging the adoption of innovative teaching practices (Istiqomah & Murwaningsih, 2025). Therefore, establishing structured professional learning communities may provide an effective mechanism for facilitating the exchange of experiences, disseminating good practices, and promoting the sustainable integration of digital media into Science and Social Studies learning.

Digital media also supports differentiated learning by letting teachers adjust material, activity, and presentation to student needs and characteristics; interactive video and animation effectively help students of varying ability better understand science and

social studies learning concepts, indicating digital technology can enable more inclusive, student-centered learning (Jannah, 2020). The findings further imply the importance of developing critical thinking, creativity, and 21st-century skills: HOTS-based E-LKPD improves critical thinking as students analyze, solve problems, and reflect rather than merely receive information pointing future science and social studies learning toward inquiry, problem-solving, projects, and digital exploration (Nurdini et al., 2025) .

Strengthening digital literacy among in-service and pre-service teachers is another implication; research on gamification-based science and social studies learning design shows digital literacy is foundational to innovative, effective learning, requiring teachers to not just use but pedagogically design meaningful technology-integrated experiences underscoring the need for training, TPACK-strengthening, and digital-creativity development (Siregar et al., 2024). Beyond pedagogy, findings carry policy implications: digital-based science and social studies learning requires infrastructure devices, internet access, platforms, and adequate digital resources without which utilization stays suboptimal and risks widening gaps between schools, making it necessary for schools and government to strengthen the digital learning ecosystem through facilities, teacher training, and accessible digital resources (Ruhimat & Samlawi, 2021).

The findings of this study indicate that teachers actively sought to improve their digital competencies and adopt a variety of digital media to support Science and Social Studies learning. This finding is consistent with (Adawiyah et al., 2026), who argue that teachers in the digital era need to continuously develop their technological and innovative capabilities to create adaptive, creative, and learner-centered educational practices. The participants' efforts to utilize instructional videos, interactive presentations, digital platforms, and other technology-based learning resources demonstrate their commitment to enhancing classroom instruction despite existing challenges. Previous studies have similarly reported that the integration of visual and audiovisual media, interactive presentations, simulations, and differentiated digital learning can increase students' engagement, active participation, and conceptual understanding by making abstract concepts more concrete and accommodating diverse learning needs (Rahmat et al., 2023). These findings suggest that teachers' willingness to explore diverse digital media represents an important step toward creating more meaningful and effective Science and Social Studies learning experiences.

Teachers have also begun applying Artificial Intelligence to develop IPAS media creating animated videos, infographics, presentation designs, and interactive quizzes via tools such as Canva and Powtoon helping them produce more creative, engaging, efficient media. Research found AI use increased teachers' creativity in designing IPAS learning better suited to digital-era students.

The findings of this study indicate that teachers continuously enhanced their digital competence through participation in technical training programs, workshops, professional learning communities, and the sharing of good practices with colleagues. These efforts not only strengthened teachers' confidence in using digital media but also supported the development of their Technological Pedagogical Content Knowledge (TPACK) (Mensah & Vo, 2026). This finding is consistent with previous research highlighting teacher competence as a key factor in the successful integration of information and communication technology (ICT) into classroom instruction. Teachers with strong technological, pedagogical, and content knowledge are better equipped to design innovative, interactive, and student-centered Science and Social Studies learning experiences (Istiqomah & Murwaningsih, 2025).

Overall, these findings demonstrate that the integration of digital media into Science and Social Studies learning has important implications for instructional design, teacher professional competence, differentiated instruction, the development of 21st-century skills, and educational policy. The findings suggest that effective digital media integration requires not only technological resources but also continuous professional development and supportive institutional policies. Collectively, these efforts can contribute to more

innovative, interactive, contextual, and technology-enhanced learning experiences, ultimately improving the quality of elementary education.

CONCLUSION

This study explored teachers' perspectives on the utilization of digital media as an innovation in Science and Social Studies learning at a public elementary school in East Java, Indonesia. The findings indicate that teachers generally hold positive perceptions of digital media, recognizing its potential to enhance students' motivation, engagement, and overall learning experiences. Teachers reported using a variety of digital media, including presentation software, instructional videos, learning management systems, and interactive digital platforms to support classroom instruction. However, the integration of digital media remains constrained by challenges such as unstable internet connectivity and limited technological infrastructure. To address these challenges, teachers adopted various strategies, including participation in technical training programs, self-directed learning, and collaborative knowledge sharing with colleagues to strengthen their digital teaching competencies and sustain the integration of digital media into Science and Social Studies learning.

This study also contributes to the growing body of literature on digital media integration in elementary education by providing a comprehensive understanding of teachers' perspectives, experiences, challenges, and strategies for integrating digital media within a single qualitative inquiry. Unlike previous studies that primarily examined the effectiveness or benefits of digital media, this study offers a more holistic perspective by examining how teachers perceive, implement, and respond to the opportunities and challenges of digital media integration in Science and Social Studies learning. The findings further support the Technology Acceptance Model (TAM), suggesting that teachers' perceived usefulness and perceived ease of use play an important role in shaping their willingness to adopt and integrate digital media into classroom practice. From a practical perspective, the findings highlight the importance of collaborative efforts among teachers, school leaders, and policymakers in fostering a sustainable digital learning ecosystem. Continuous professional development, strengthened digital competence, adequate technological infrastructure, and supportive educational policies are essential for promoting the effective and sustainable integration of digital media in Science and Social Studies learning at the elementary school level.

This study has several limitations that should be considered when interpreting the findings. First, the study was conducted in a single public elementary school with a relatively small number of participants, consisting of one school principal and four teachers. Consequently, the findings reflect a specific educational context and may not represent the diverse conditions of elementary schools with different geographical locations, technological resources, and institutional characteristics. In addition, the study relied primarily on interview data and did not include classroom observations or students' perspectives, which may have provided a more comprehensive understanding of how digital media are implemented in everyday teaching and learning practices.

Future research is encouraged to involve a larger and more diverse sample of schools and participants from different regions to provide a broader understanding of digital media integration in elementary education. Employing quantitative or mixed-methods approaches would also enable researchers to examine the relationships among teachers' digital competence, technology acceptance, instructional practices, and students' learning outcomes. Furthermore, future studies could incorporate classroom observations and students' perspectives to obtain a more comprehensive picture of digital media implementation. Investigating the effectiveness of emerging digital technologies, such as artificial intelligence, augmented reality, and adaptive learning platforms, as well as evaluating long-term professional development programs, would provide valuable

evidence for supporting sustainable digital transformation in elementary Science and Social Studies education.

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