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Digital learning media-practices in integrated-science and social-studies under the independent curriculum in elementary schools

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Keywords:	Abstract
digital learning media; independent curriculum; elementary education	This study aims to describe the use of digital learning media in the IPAS subject (a combination of science and social studies) within the implementation of the independent curriculum in elementary schools. This research employs a descriptive qualitative design. The findings show that the use of digital learning media has been implemented effectively, meeting various educational media criteria. The selection of digital learning media follows the ACTION model (Access, Cost, Technology, Interactivity, Organisation, Novelty), although certain aspects like access and technology remain suboptimal. This study is expected to contribute to the development of more effective learning theories for digital media and to enrich knowledge about digital learning media appropriate for early childhood development. This study contributes to digital learning media analysis in elementary education by examining the use of digital media in the IPAS subject within the Independent Curriculum framework using the ACTION model. The findings highlight both effective implementation and persistent challenges in access and technology, offering practical guidance for selecting age-appropriate digital learning media in elementary schools.



INTRODUCTION

Background of the Study

Integrated Science and Social Studies (IPAS) is a subject resulting from the integration of Natural Sciences and Social Sciences into one unified course. IPAS is designed for elementary school students to help them manage the variety of learning content they will encounter at higher levels of education. The learning outcomes for IPAS are implemented starting in Grade 4 and require students to identify the interconnection between natural and social sciences within their communities. Learning materials are designed to enhance the Pancasila Student Profile, particularly the aspect of independence, through topics such as *Indonesiaku Kaya Budaya* (My Indonesia, Rich in Culture). These topics include specific learning outcomes and indicators that serve as instructional guidelines. Given the broader content coverage, educators are expected to use learning media that can effectively accommodate and deliver this more extensive material (Monib et al., [2025](#); Shen, [2024](#)).

Digital learning media are tools that enable the access, operation, and creation of digital data, supporting the delivery of learning content. Azkia et al ([2023](#)) describe digital learning media as a combination of hardware and software used to convey educational messages from teachers to students in the form of knowledge. In today's digital era, students show a high level of interest in digitalisation in education. Hapsari & Budiharto ([2023](#)) support this by stating that digital technology-based learning media are highly favoured by students in today's classrooms. This indicates that engaging digital media can significantly enhance students' motivation and interest, ultimately supporting the learning process. There are many benefits to using digital learning media. Hariyono et al ([2021](#)) also found that digital learning media can significantly improve students' conceptual understanding in elementary schools. This shows that the use of technology in learning not only increases interest but also students' understanding of the material. According to these media, which foster positive interaction and communication among students and between students and learning resources, help teachers deliver content more engagingly, serve as effective mediators for knowledge transfer, and improve teachers' work efficiency.

Selecting the right learning media requires careful analysis. Teachers must consider factors such as students' interests to ensure optimal delivery of the content. The goal of media analysis is to assist educators in choosing the most appropriate tools for their teaching (Susilawati, [2021](#)). Key aspects of effective learning media include the availability of adequate technology, the use of appropriate tools and

applications, and the learning outcomes reported by students. Furthermore, identify six criteria for selecting learning media—known by the acronym ACTION: Access, Cost, Technology, Interactivity, Organisation, and Novelty. When aligned with these criteria, the use of digital learning media can support the achievement of learning objectives more effectively. Sari & Jupriyanto (2023) found that the development of interactive media integrated with learning models can improve learning effectiveness in elementary schools, demonstrating the importance of integrating technology with appropriate pedagogical approaches.

The integration of Science and Social Studies in IPAS is aligned with constructivist and contextual learning theories, which emphasise meaningful learning through real-world and interdisciplinary connections. Recent international studies show that digital learning media in integrated elementary curricula enhance student engagement, conceptual understanding, and collaborative learning when supported by accessible technology and interactive design (Sung et al., 2022). Therefore, systematic analysis of digital learning media is essential to ensure alignment between curriculum goals, pedagogical approaches, and students' developmental characteristics.

The Problem of The Study

According to (Heryani et al., 2022) IPAS is often perceived as a difficult subject due to the broad range of material, and it is typically delivered using lecture-based methods. This often results in suboptimal student learning outcomes. This is supported by research from Vriyanti & Wijaya, (2023), which found that students' low achievement in IPAS is partly due to their lack of basic knowledge in both natural and social sciences. Many students become bored with the learning media used by teachers, which are often limited to plain PowerPoint slides without engaging animations. As a result, students tend to lose interest, talk among themselves, and become unfocused, making the classroom environment less conducive to learning. This leads to a decrease in student engagement and motivation during lessons.

In contrast, today's IPAS learning is expected to evolve in response to the demands of the times. Teachers are encouraged to utilise appropriate digital learning media so that learning content can be delivered more effectively. However, research findings indicate that not all teachers possess the skills to integrate digital learning media into their teaching. Preliminary interviews with Grade IV and V teachers at SD Negeri 1 Sambi revealed that the implementation of digital learning media in IPAS remains suboptimal due to several factors, including: (1) limited teacher ability to

access diverse digital learning media; (2) inadequate availability of supporting technology; (3) internet network disruptions, especially during the rainy season.

Research's State of the Art

Several previous studies are relevant to this research. The study by (Vriyanti & Wijaya, [2023](#)), titled "Effectiveness of Designing Interactive Learning Media for the IPAS Subject," found that the design and development of interactive learning media for IPAS followed appropriate procedures and used a Research and Development (R&D) approach.

Research Gap, Novelty, and Objective

The novelty of this research lies in its focus on an in-depth analysis of digital learning media used in the IPAS subject, specifically conducted at SD Negeri 1 Sambi, Boyolali Regency. Based on the background described earlier, the researchers were interested in conducting a study titled "Analysis of digital learning media in the Integrated Science and Social Studies Subject within the implementation of the independent curriculum in elementary schools." This study aims to examine how digital learning media are implemented in IPAS based on relevant aspects and selection factors. This research is important because selecting appropriate learning media requires analysis that aligns with educators' needs, capabilities, and the benefits the media provide. Therefore, a more in-depth investigation is needed to serve as a reference for teachers in choosing the right interactive learning media.

METHOD

Data and Data Source

This study uses a qualitative approach with a descriptive qualitative research method. According to Manurung ([2022](#)) qualitative research investigates human-related and social problems. Sakiah & Effendi ([2021](#)) explain that descriptive qualitative research aims to describe in depth the events experienced by the research subjects. Data collection in this type of research is emic—meaning it is based on the perspectives of the data sources, not the researcher—so it does not lead to intervention or treatment. Thus, qualitative research is not intended to seek absolute truths but rather to obtain in-depth and actual data to understand specific subjects. In this study, descriptive qualitative research was used to gain a detailed understanding of the use of digital learning media in IPAS for Grades IV and V, as well as the challenges encountered during its implementation.

Type and Design

This study uses qualitative data in the form of soft data, such as verbal expressions, events, and actions performed by the research subjects. The data were obtained through classroom observations in Grades IV and V at SD Negeri 1 Sambi, as well as interviews and questionnaires concerning the use of technology-based digital learning media in IPAS during the implementation of the Independent Curriculum in the 2023/2024 academic year.

Data and Data Sources

Research data based on their sources can be classified into two types: primary data and secondary data. Primary data were collected through direct interviews with Grade IV and V teachers. These interviews aimed to observe the implementation of technology-based learning media in the context of the Independent Curriculum. To strengthen the data, observation sheets and questionnaires were also used. Secondary data are sources that do not provide data directly to the researcher. The use of secondary data refers to information extracted from documents handled by others. In this study, secondary data were obtained from documentation such as reports, records, books, and articles, which were then reprocessed. The documents included evidence of teachers applying technology-based learning in the classroom (Fauzi et al., [2021](#)).

Data Collection Technique

The data in this study were collected through observation of classroom activities using digital learning media, interviews with Grade IV and V teachers and students, interviews with the principal, and questionnaires for Grade IV and V teachers. Ethical considerations were strictly observed, with formal approval obtained from the school administration before data collection, informed consent secured from all participants, and assurances of confidentiality and voluntary participation provided. The combination of multiple data collection techniques strengthens the credibility, trustworthiness, and relevance of the findings, particularly in examining technology-based learning practices within the Independent Curriculum context in elementary education. The data collection techniques employed in this study are presented and described in detail as follows.

1. Observation

Observation is a method used to explore how people behave, how things are done, and why certain events occur in nature. The researcher conducted observations to gather realistic insights about the use of digital learning media in IPAS as part of the

Independent Curriculum implementation. This study used an active participant observation method, in which the researcher did not intervene in the learning activities but observed the actual conditions directly at the research site. Observation was used to capture authentic classroom practices related to the use of digital learning media in IPAS within the Independent Curriculum. Through active participant observation without intervention, this technique provided direct evidence of how digital media were implemented in real learning situations, making it highly relevant for analysing actual instructional conditions.

2. Interview

Interviews are a technique used to gather in-depth data from a relatively small number of respondents, particularly when trying to understand the root of a problem. This study employed in-depth interviews, where open-ended questions were posed based on the informants' responses. The researcher conducted direct interviews with Grade IV and V teachers to gather data related to factors influencing the use of digital learning media at SD Negeri 1 Sambi during the 2023/2024 academic year. In-depth interviews were conducted to explore teachers' perspectives and experiences regarding factors influencing the use of digital learning media. This technique supported the research objectives by uncovering underlying reasons, challenges, and considerations in media selection that could not be fully observed during classroom activities.

3. Questionnaire

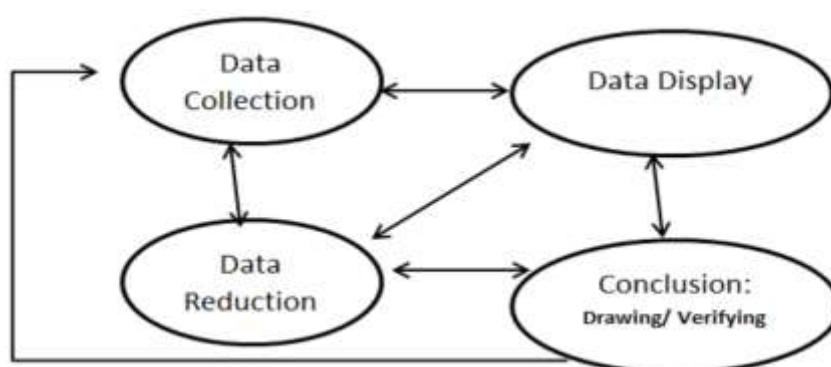
Questionnaires are a method of data collection where respondents are given a written list of questions or statements to answer. These questionnaires are created by the researcher and relate directly to the research problem. In this study, the respondents completed the questionnaires honestly and based on their experience. Sukma & Ulia ([2022](#)), emphasise the importance of combining various data collection methods in educational research to ensure the validity and reliability of findings, especially in the context of technology-based learning in elementary schools. Questionnaires were employed to collect structured and consistent data from teachers related to their experiences and perceptions of digital learning media use. This technique complemented observation and interviews by strengthening data triangulation and enhancing the credibility of the findings in relation to the research objectives.

Data Analysis

Data analysis techniques refer to strategies used to process collected data into valid information. According to Qomaruddin & Sa'diyah (2024), data analysis should occur concurrently with data collection. Raw data collected during the research—such as notes, recordings, and other unprocessed information—must be organised before analysis. This study employed the interactive model of data analysis, which consists of data collection, data reduction, data display, and conclusion drawing. Data reduction involved selecting, coding, and synthesising relevant information to identify patterns, relationships, and emerging themes related to the use of digital learning media. Data display was then used to systematically present the reduced data in matrices and narrative summaries, enabling comparisons across sources and supporting deeper analytical interpretation. Through this iterative process, analytical insights were generated that informed conclusion drawing, rather than merely producing descriptive accounts of the findings. The interactive model is illustrated in Figure 1.

Figure 1

The interactive model of data analysis



RESULTS

This study illustrates the implementation of digital learning media used in the IPAS subject at SD Negeri 1 Sambu. Based on media selection considerations, the application of digital learning media in Grade IV and V classrooms at SD Negeri 1 Sambu has met several key aspects of learning media effectively. The following table presents observation results based on media-related aspects:

Table 1 Observation results – learning media

Descriptor	Achievement Score (%)	Category
Availability of adequate technology to support digital learning media	87.5%	Highly achieved
Use of appropriate tools and applications	100%	Highly achieved
Improved student learning outcomes with the use of digital media	100%	Highly achieved
Average Achievement	95.3%	Highly achieved

The implementation of digital learning media for IPAS in Grades IV and V met three major learning media aspects as outlined: (1) availability of adequate technology, (2) use of appropriate tools and applications, and (3) learning outcomes reported by students. Below is a discussion of each aspect:

The first aspect is the availability of adequate technology. Having the right technology helps both teachers and students understand the learning material comprehensively and avoid misconceptions. Based on these findings, it can be synthesised that adequate and complete technological support contributes significantly to the success of digital learning and improves learning outcomes. At SD Negeri 1 Sambi, available technological tools include laptops, LCD projectors, speakers, Chromebooks, and stable Wi-Fi. Although some of the devices are in less-than-optimal condition, teachers can still conduct lessons effectively. This finding is in line with Andriani et al (2024). When, who stated that the availability of adequate technology, even if not optimal, can still support effective learning if teachers can optimise its use.

The second aspect is the use of appropriate tools and applications. Teachers are the cornerstone of education and play a central role in achieving successful learning. Therefore, it is essential that teachers are familiar with and continuously explore digital tools to integrate them into learning. Teachers' digital fluency enhances classroom quality. At SD Negeri 1 Sambi, teachers deliver content using digital learning media aligned with students' interests. This is consistent with Wardani (2024), who noted that using appropriate applications has a significant impact on student learning progress. Hence, selecting the right learning media is an essential step for teachers to create engaging and accessible learning experiences for students.

At SD Negeri 1 Sambi, teachers utilise various technologies such as YouTube, PowerPoint slides, educational games like ProProfs, and WhatsApp. The positive aspects of each are as follows:

- a) YouTube: This is the most frequently used medium because it provides both educational and entertainment content. Thohir & Tamara (2022) found YouTube to be an effective learning tool, especially in remote learning contexts. Demonstrated the effectiveness of YouTube in improving Grade IV students' science achievement in an experiment comparing post-test scores between an experimental group (using YouTube) and a control group (not using YouTube). Similarly, Nurhayati & Handayani (2023) found that YouTube animations significantly improved motivation and outcomes in Grade II students at SD Barunawati II.

These findings suggest that YouTube is an effective learning medium in elementary schools. Its engaging videos appeal to students and increase their motivation, which in turn improves learning outcomes.

- b) PowerPoint Slides: These slides help deliver content clearly and engagingly. PowerPoint-based media were effective in enhancing science learning outcomes in MI YASPI3 Poncol and MI YASPI7 Summersari. Thohir & Tamara also found that PowerPoint helps students absorb material more easily, boosts learning interest, and improves performance. Thohir & Tamara (2022) stated that PowerPoint is an interactive medium suitable for elementary-level learning, with minimal conceptual errors and up-to-date material.

These findings indicate that PowerPoint is an effective and interactive learning medium. It is well-suited for delivering high-quality learning materials. Using PowerPoint allows for the creation of active and effective learning experiences. In addition to helping teachers present material more compellingly, it also assists students in receiving information in a unique and easily understandable format.

Research findings show that the media selection factors—comprising access, cost, technology, interactivity, organisation, and novelty—have been effectively fulfilled. The following table presents the results of observations based on these factors:

Table 2 Observation results – media selection

Descriptor	Achievement Score (%)	Category
Access	75%	Achieved
Cost	100%	Highly achieved
Technology	75%	Achieved
Interactivity	100%	Highly achieved

Organization	100%	Highly achieved
Novelty	100%	Highly achieved
Average score	91.6%	Highly achieved

The use of digital learning media in IPAS for Grades IV and V at SD Negeri 1 Sambi has met the principles and considerations for media selection effectively. Although some factors, such as students' access and the availability of supporting technology, are not yet optimal, the overall implementation aligns with the ACTION framework, which includes *Access, Cost, Technology, Interactivity, Organisation, and Novelty*.

a) Access

Ease of access is a key consideration in choosing learning media. Teachers' ability to select media that are easily accessible to themselves and to students determines the success of learning activities. Teachers must be skilled in selecting media that match students' abilities and needs to optimise the learning process. Resti et al (2024) found that unequal access among students can lead to learning gaps. In this context, access must be considered carefully when selecting digital media. Improved accessibility can enhance both the quality of learning and student engagement.

b) Cost

Cost is another important factor. (Dina et al., 2025) emphasised the need for efficiency and effectiveness in cost considerations. Therefore, the value of a digital tool should align with its impact. Many accessible, high-quality digital learning media are available free of charge, such as Canva, YouTube, Quizizz, and ProProfs. At SD Negeri 1 Sambi, teachers primarily use free tools (e.g., YouTube, Google Forms, PowerPoint, ProProfs), though hardware like laptops, smartphones, and LCD projectors are relatively expensive. Nevertheless, the effectiveness gained from using digital media outweighs the costs compared to traditional methods.

c) Technology

The availability and usability of technology are essential for media effectiveness. A comprehensive technological infrastructure positively influences interactive learning experiences. At SD Negeri 1 Sambi, supporting technology includes laptops, LCD projectors, Chromebooks, and a reliable Wi-Fi connection. While the quantity is limited, teachers manage by sharing resources as needed.

d) Interactivity

Digital media should support two-way communication between teachers and

students. Permana (2021) emphasized that learning is inherently a communicative process, requiring suitable media to ensure meaningful engagement. Based on these perspectives, it can be concluded that interactivity can be effectively established when learning is delivered engagingly with the support of interactive learning media. This has been achieved in both teacher–student and student–student interactions. Communication between teachers and students is evident from students’ ability to respond to questions posed by the teacher, as well as their initiative in asking questions about content they do not yet understand. Moreover, successful student-to-student communication is demonstrated during group discussions—such as when using ProProfs learning media—where students from different groups actively compete and collaborate in discussing answers to the provided crossword puzzles within their teams. Mahliatussikah et al. (2022), emphasize that the implementation of information technology-based learning must be supported by a student-centred learning approach so that students can actively participate in the learning process and increase interactivity in the classroom.

e) Organisation

Organisational support is vital for the sustainability of digital learning. Arijumati (2021) identified leadership, teacher collaboration, student involvement, and parental support as key contributors. The support provided may take the form of encouragement as well as the provision of facilities that enable the use of technology-based learning media in elementary schools. It can thus be concluded that the organisational factor refers to the support offered by the school as an institution to ensure the sustainability of digital learning.

Support from the school can be expressed both verbally and through concrete actions. Verbal support may include encouraging words, while actionable support includes facilitating discussion forums where teachers can exchange ideas and collaborate in creating digital media-based learning. It also involves efforts to provide supporting technologies such as laptops, LCD projectors, Chromebooks, and similar devices. Additionally, the school supports teachers’ professional development by encouraging their participation in webinars, seminars, or training programs held both within and outside the school environment.

f) Novelty

Novelty refers to the need to align media use with current conditions. At present, the use of digital learning media has become a necessity in the digital era of

education. This aligns with the view of Maulid (2024) that teachers should adapt by continuously exploring new platforms to create learning experiences that reflect the latest technological developments. This suggests that novelty is a key consideration in selecting learning media based on urgency or specific situational needs.

In this regard, Grade IV and V teachers have integrated digital technology into their teaching, creating a more modern learning environment that aligns with the needs and characteristics of students who are already very familiar with technology in their daily lives. These teachers use modern, technology-based learning media such as YouTube, PowerPoint slides, ProProfs brain games, and Google Forms. These tools have proven to be quite efficient for use in elementary school learning.

DISCUSSION

1. Learning media

The use of digital learning media in the IPAS subject for Grades IV and V has fulfilled key aspects of learning media, including the availability of adequate technology, the use of appropriate tools and applications, and improved student learning outcomes. Availability of adequate technology:

In digital learning at SD Negeri 1 Sami, supporting technology is sufficiently available. The school provides laptops, internet access, a stable Wi-Fi network, LCD projectors, and Chromebooks in adequate numbers.

In the aspect of appropriate applications, in both Grades IV and V, teachers have implemented applications that align with student needs. Students are generally more engaged in learning when it involves a combination of elements such as games, animated videos, music, images, or illustrations that help visualize concepts. Teachers in both grades have made use of various engaging digital learning media, including YouTube animated videos, educational games on ProProfs Brain Game, and creatively designed PowerPoint slides.

In the second aspect, student learning outcomes, in terms of reporting student performance in IPAS lessons that used digital learning media, results from both Grade IV and V showed that such media had a positive impact. Teachers found digital tools helpful for delivering engaging lessons more efficiently and flexibly. For students, these interactive and interesting learning media increased their enthusiasm and resulted in stronger academic performance.

2. Media selection

The use of digital learning media in IPAS for Grades IV and V at SD Negeri 1 Sambu has met the principles and considerations for media selection effectively. Although some factors, such as students' access and the availability of supporting technology, are not yet optimal, the overall implementation aligns with the ACTION framework, which includes *Access, Cost, Technology, Interactivity, Organisation, and Novelty*.

The first aspect is Access. At the elementary school level, not all students are given the opportunity to independently access digital learning media; most only engage with learning materials presented by the teacher using digital tools. Based on observations, interviews, and questionnaires conducted at SD Negeri 1 Sambu, it was found that both Grade IV and Grade V teachers are capable of accessing digital learning media effectively. However, Grade IV students have not yet had the opportunity to access digital learning media independently, whereas Grade V students have had some experience accessing such media on several occasions. Even so, not all Grade V students are able to operate the digital learning media proficiently. This is influenced by factors such as a lack of familiarity or limited practice, both at school and at home.

The second aspect is Cost. When considering the selection of appropriate learning media, one of the key aspects that must be taken into account is the cost factor. Many accessible, high-quality digital learning media are available free of charge, such as Canva, YouTube, Quizizz, and ProProfs. In this case, teachers at SD Negeri 1 Sambu make use of free digital learning media such as YouTube, Google Forms, PowerPoint slides, and ProProfs. However, they noted that the paid components—often quite costly—are the supporting technologies, such as laptops, smartphones, LCD projectors, and similar devices. Nevertheless, the effectiveness gained from using digital media outweighs the costs compared to traditional methods.

The third aspect is Technology. The availability of technological tools and the ease of their use are important considerations in selecting effective learning media. Based on the research findings, the school is equipped with complete technological support for digital learning media, including laptops, LCD projectors, Chromebooks, and a reliable Wi-Fi network. However, due to the limited number of devices, teachers must take turns using them.

The next aspect is Interactivity. This refers to the ability of media to facilitate two-way communication between teachers and students. This criterion has been

fulfilled, both in interactions between teachers and students and among students themselves. Effective communication between teachers and students is evident from students' ability to answer questions posed by the teacher, as well as their initiative in asking questions about material they have not yet understood during lessons. In addition, successful communication among students is demonstrated during group discussions—for example, during the use of ProProfs learning media, students from different groups actively compete and collaborate in discussing answers to the provided crossword puzzles within their respective groups.

The fifth aspect is organisation. In the use of digital learning media at school, teachers require support, one of which comes from the school itself. This support can take the form of both verbal encouragement and concrete actions. Verbal support may include motivational words or expressions of encouragement. Meanwhile, tangible support may include providing discussion forums where teachers can exchange ideas and collaborate in designing learning activities using digital media, as well as efforts to provide technological tools that support digital learning media, such as laptops, LCD projectors, Chromebooks, and similar equipment. Additionally, the school supports teachers' professional development by encouraging their participation in webinars, seminars, or training programs held both within and outside the school environment.

The last aspect is Novelty. In the current context, the use of digital learning media has become a necessity in education. The learning media used serve as alternative tools that help teachers create modern and technology-driven instruction. In this case, the media employed by teachers include platforms such as YouTube, PowerPoint slides, ProProfs Brain Game, and Google Forms. These media have proven to be quite efficient for use in elementary school learning.

CONCLUSION

The findings indicate that the use of digital learning media in IPAS learning at Grades IV and V of SD Negeri 1 Sambi generally meets the required learning media aspects and selection criteria. Adequate technology is partially fulfilled through the availability of laptops, Chromebooks, LCD projectors, and supporting devices, while teachers demonstrate the ability to select appropriate and engaging digital media such as YouTube, ProProfs, WhatsApp, and PowerPoint. The use of these media supports instructional efficiency and increases student engagement, contributing positively to learning outcomes. Based on the ACTION framework, the selection of

digital learning media has been implemented effectively overall; however, limitations remain in the access and technology aspects, as students have not yet independently accessed digital media, and the quantity and condition of technological facilities are still limited. This study contributes to the analysis of digital learning media in IPAS by demonstrating that, overall, the use and selection of digital media in Grades IV and V align with key learning media aspects and the ACTION framework within the Independent Curriculum context. The findings imply that appropriate digital media selection can enhance teacher instructional efficiency and student engagement in integrated IPAS learning, although limitations in student access and technological availability remain challenges for optimal implementation. Future research is recommended to explore strategies for improving independent student access to digital media, expanding technological infrastructure, and examining the long-term impact of digital learning media on IPAS learning outcomes in diverse elementary school contexts.

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