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Implementation of STEAM Multimedia to Enhance IPAS Learning Outcomes in Grade Four

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Abstract

This study aims to analyze the application of Science, Technology, Engineering, Arts, and Mathematics (STEAM)-based multimedia integrated with deep learning in improving student learning outcomes in elementary schools. The background of this study is based on the needs of adaptation of digital technology in the learning process. The research method used is a Classroom Action Research (CAR) design that seeks to solve or answer current problems. The research subjects consisted of 22 fourth-grade elementary school students at Muhammadiyah Kutoarjo Elementary School. The data collection techniques used were tests, observation, and documentation. Meanwhile, the data analysis in this study used averages. The results of the study concluded that (1) Students have high learning motivation and curiosity about the learning material. (2) There was an increase in science learning outcomes with the implementation of multimedia-based learning media for fourth-grade students at Muhammadiyah Kutoarjo Elementary School. This is evident from the student learning outcome data: in cycle I, the average score was 74.1, a 41% increase, categorized as sufficient, and in cycle II, the average score was 81.8, a 72% increase, categorized as good. (2) The school-determined completion standard for Natural Sciences (IPA) is 75.

Keywords

Multimedia, STEAM, Learning Outcomes, IPAS

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INTRODUCTION

The implementation of the Merdeka Curriculum has brought changes to the learning process, including the integration of Science and Social Studies into Natural and Social Sciences (IPAS). IPAS learning is designed to develop students interest and curiosity, encourage active participation, develop inquiry skills, and help students understand themselves and their environment through meaningful learning experiences (Angga, 2024). Therefore, the implementation of IPAS requires learning activities that not only convey concepts but also provide opportunities for students to actively engage with the learning material.

One factor that can support active and meaningful IPAS learning is the use of appropriate learning media. Learning media function as tools for delivering information and instructional messages to students. The use of technology-based media can support student participation by providing opportunities for students to observe, listen, think, and interact with learning materials (Inawan & Ulfa, 2022). In this context, multimedia learning media can provide visual and interactive elements that make learning more engaging and can support students understanding of the material (Setyaningsih, 2023).

However, the availability of learning media does not always correspond to the learning needs of students in the classroom. Based on classroom observations conducted by the researcher in Grade Four at SD Muhammadiyah Kutoarjo, the IPAS learning process was predominantly teacher-centered. Students mostly listened to the teacher's explanations and completed assigned tasks, resulting in limited active participation. Approximately 55% of students experienced difficulties in achieving satisfactory learning outcomes, while the school's Minimum Mastery Criterion (KKM) was set at 75. The learning process also relied primarily on textbooks as the main learning resource, which contributed to students becoming bored and less engaged in learning. These conditions indicate a need for additional learning media that can make IPAS learning more engaging and encourage students to participate actively.

One alternative that can be used to develop more attractive learning media is Canva. Canva is an online design platform that provides various templates and features that can be used to create presentation slides, learning videos, infographics, and other visual learning materials (Khoiron, 2021). The use of Canva allows teachers to present learning materials through attractive visual designs, which can make information easier for students to understand and potentially increase their engagement in learning (Syahrir et al., 2023). Thus, Canva can be utilized as a supporting tool for

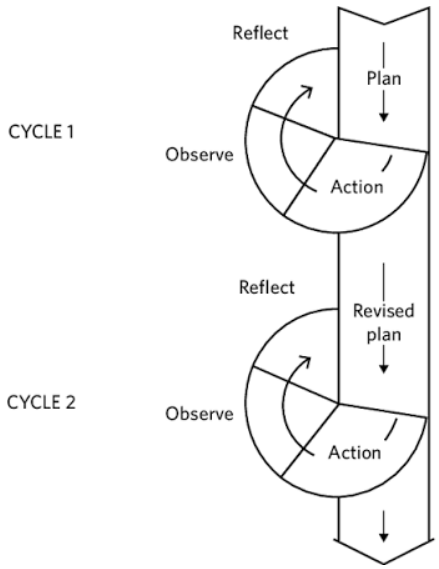
developing multimedia learning media that is more suited to students learning needs.

Based on these conditions, there is a need for learning media that can support a more active, engaging, and student-centered IPAS learning process in Grade Four at SD Muhammadiyah Kutoarjo. The limited use of varied learning media and students difficulties in achieving the expected learning outcomes provide a basis for developing multimedia learning media using Canva. Therefore, this research focuses on the development of Canva-based multimedia learning media for IPAS learning in Grade Four at SD Muhammadiyah Kutoarjo.

METHOD

This study employed Classroom Action Research (CAR). The purpose of Classroom Action Research is to identify problems that occur in the classroom and provide appropriate solutions to address them (Azizah, Anisatul, 2021).The classroom action research is based on the spiral model proposed by Kemmis and McTaggart (Lutfiah & Wiarsih, 2025), which comprises four stages: (1) planning, (2) action, (3) observing, and (4) reflection.

Figure 1. Kemmis & McTaggart's Spiral Model



The research was conducted in two cycles, each consisting of four stages: planning, implementation, observation, and reflection. Each cycle was designed to analyze the impact of the actions implemented during the learning process, with the aim of gradually improving the learning process. The research was conducted during the second semester of the 2025–2026 academic year at SD Muhammadiyah Kutoarjo. The study consisted of two cycles, with each cycle comprising two meetings. Cycle I was conducted in two meetings. The first meeting was held on Friday, August 1,

2025, from 10:00 to 11:30 a.m. WIB, while the second meeting was held on Saturday, August 2, 2025, from 7:35 to 9:45 a.m. WIB. Cycle II also consisted of two meetings. The first meeting was held on Tuesday, August 5, 2025, from 12:35 to 1:45 p.m. WIB, while the second meeting was held on Friday, August 8, 2025. The subjects of this study were the teacher and 22 students of Class IVA at SD Muhammadiyah Kutoarjo, consisting of 13 male students and 9 female students. The objects of the study were students learning motivation and learning outcomes in IPAS subject, particularly the topic of plant body parts. This process is repeated until the desired improvement in student learning outcomes is achieved. An action was considered successful if it achieved the Minimum Competency Criterion (KKM) of 75.

FINDINGS AND DISCUSSION

Findings

Implementation of Cycle I

Before the implementation of the IPAS lessons, the researcher prepared the lesson module, students worksheets (Lembar Kerja Peserta Didik [LKPD]), and a learning achievement test consisting of ten multiple-choice questions along with the corresponding answer key.

The first meeting of Cycle I was conducted on Friday, August 1, 2025, focusing on the topic of plant parts, specifically roots. During this lesson, students were introduced to the different types and functions of roots. In addition, they completed a hands-on project by constructing a root model using yarn and drinking straws, which were attached to paper with adhesive. This activity was designed to reinforce students understanding of the structure and function of roots through active learning.

The second meeting was held on Saturday, August 2, 2025, with the topic of stems. During this session, students learned about the different types and functions of plant stems. They also conducted a simple experiment to demonstrate the stem's role in transporting water and nutrients to the leaves. The experiment involved placing Chinese cabbage leaves in water mixed with food coloring. After a period of observation, the leaves gradually changed color, illustrating how the stem transports water to other parts of the plant.

At the implementation stage, students completed a pre-test independently at the beginning of each lesson to assess their prior knowledge before receiving instruction. After the learning activities were completed, they were given a post-test to evaluate their learning outcomes. The graph

below presents the pre-test and post-test scores obtained by each student.

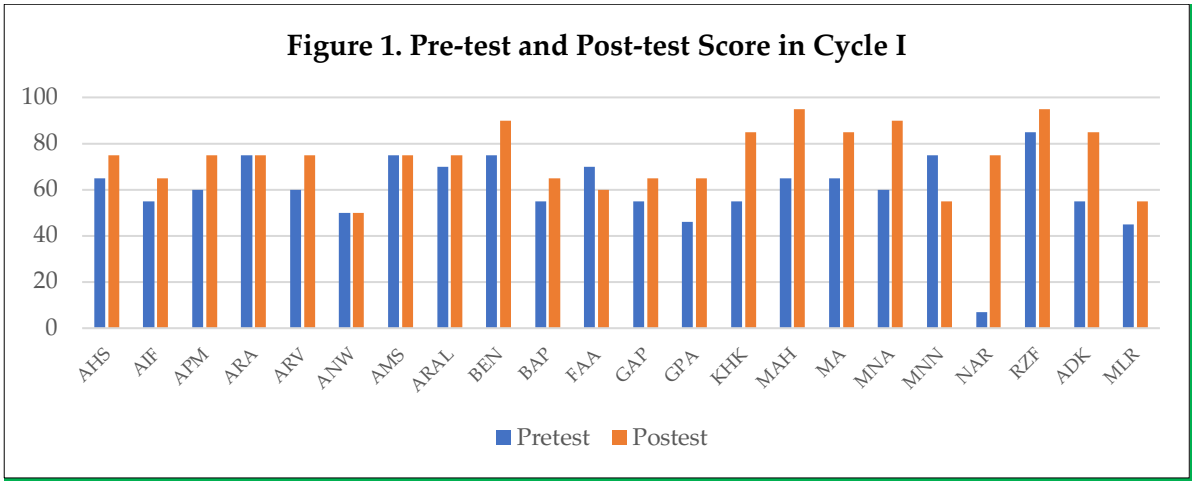


Figure 1. Pre-test and Post-test Score in Cycle I

The graph above shows that both the pre-test and post-test scores improved consistently, indicating that students became more focused, actively participated in the learning process, and demonstrated enhanced critical thinking skills during classroom instruction. These findings suggest that the instructional intervention contributed positively to students learning performance.

Furthermore, students IPAS learning outcomes in each cycle were classified according to the predetermined Minimum Mastery Criterion (KKM) of 75 for the IPAS subject. Based on this criterion, students achievement levels were categorized into two groups: mastery and non-mastery, as presented in the following table.

Table 1. Learning Achievement Test Results

Score	Category	Cycle I Pre-test		Cycle I Post-test	
		Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
0–74	Not Mastered	17	77%	8	36%
75–100	Mastered	5	23%	14	64%
	Total	**22**	**100%**	**22**	**100%**

As shown in Table 1, during Cycle I, the pre-test results indicated that 5 students achieved the Minimum Mastery Criterion (KKM), while 17 students did not meet the required standard. Following the instructional intervention, the post-test results showed a considerable improvement, with 14 students achieving mastery and 8 students remaining below the mastery criterion. The mean score and the overall level of learning mastery in IPAS demonstrated satisfactory improvement. Based on these findings, the learning process showed positive progress, as 14 out of 22 students successfully achieved the expected level of mastery.

Implementation of Cycle II

Before implementing the IPAS lessons in Cycle II, the researcher prepared the same instructional materials as in Cycle I, including the lesson module, students worksheets (Lembar Kerja Peserta Didik [LKPD]), and a learning achievement test consisting of ten questions accompanied by an answer key.

The first meeting of Cycle II was conducted on Tuesday, August 5, 2025, focusing on the topic of leaves as one of the parts of a plant. During this lesson, students learned about the different types of leaf venation and the functions of leaves. In addition, they completed an ecoprinting project by applying paint to real leaves and pressing them onto paper to produce leaf-print artwork. This activity enabled students to explore plant structures through a creative, hands-on learning experience.

The second meeting was held on Friday, August 8, 2025, with the topic of flowers. During this session, students learned about the different parts of a flower and their respective functions. To reinforce their understanding, students completed a project by constructing flower models using plasticine. Similar to Cycle I, students completed a pre-test independently at the beginning of each lesson to assess their prior knowledge before instruction. After the learning activities had been completed, they took a post-test to evaluate their learning outcomes. The graph below presents the pre-test and post-test scores obtained by each student during Cycle II.

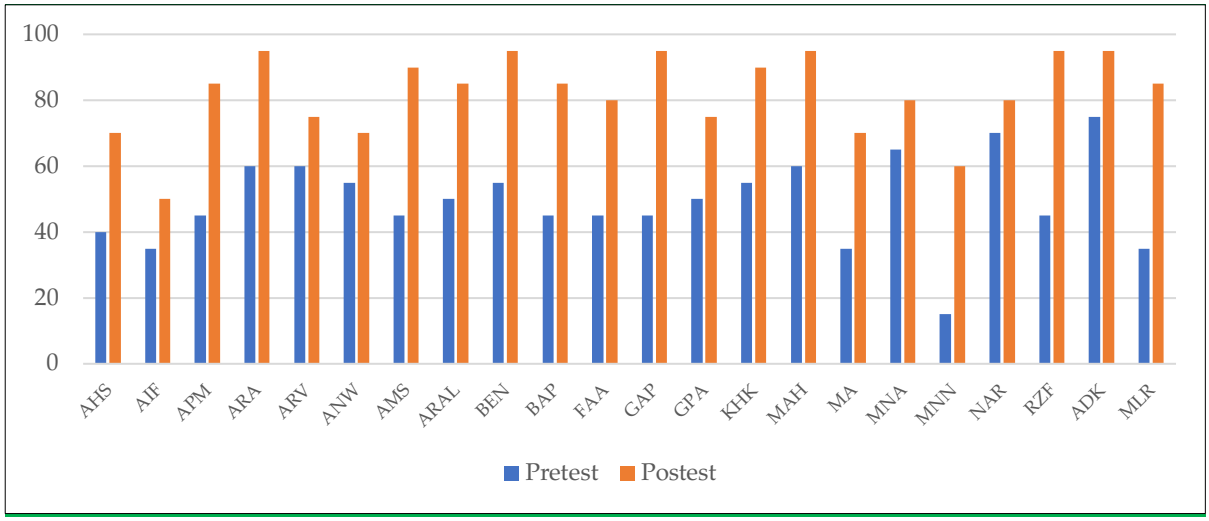


Figure 2. Pre-test and Post-test Scores in Cycle II

The graph above illustrates that both the pre-test and post-test scores continued to improve throughout Cycle II. This improvement indicates that students were more focused, actively participated in the learning process, and demonstrated stronger critical thinking skills during

classroom activities. The results suggest that the instructional intervention had a positive impact on students engagement and academic performance.

Furthermore, students IPAS learning outcomes in each cycle were classified according to the predetermined Minimum Mastery Criterion (KKM) of 75 for the IPAS subject. Based on this criterion, students achievement levels were categorized into two groups: mastery and non-mastery, as presented in the following table.

Table 2. Learning Achievement Test Results

Score	Category	Cycle II Pre-test		Cycle II Post-test	
		Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
0–74	Not Mastered	21	95%	5	23%
75–100	Mastered	1	5%	17	77%
	Total	**22**	**100%**	**22**	**100%**

As presented in Table 2, the Cycle II pre-test results showed that 1 student achieved the Minimum Mastery Criterion (KKM), while 21 students had not yet reached the required level of mastery. Following the instructional intervention, the post-test results demonstrated a substantial improvement, with 17 students achieving mastery and 5 students remaining below the mastery criterion. The mean score and the overall level of learning mastery in IPAS indicated considerable improvement compared with the previous cycle. These findings demonstrate that the instructional intervention was effective in enhancing students learning outcomes.

Based on the findings presented above, the implementation of IPAS instruction in Grade Four at SD Muhammadiyah Kutoarjo successfully improved students learning outcomes. This improvement can be attributed to the use of engaging multimedia learning materials. Students learning activities during Cycle II demonstrated a very high level of participation, concentration, active engagement, and critical thinking throughout the learning process, supported by the use of multimedia. Significant improvement was also observed in the implementation of learning media developed with Canva. Each learning session showed notable progress, enabling students to better understand and summarize the concepts they had learned. Furthermore, classroom observations indicated that the integration of multimedia into IPAS instruction substantially enhanced the overall quality of the learning process.

In conclusion, the integration of multimedia learning media, particularly those developed using Canva, in IPAS instruction for Grade Four students at SD Muhammadiyah Kutoarjo had a

positive impact on improving both students learning outcomes and their critical thinking skills.

Discussion

The findings of this study indicate that multimedia-based learning media are effective in supporting the teaching of Natural and Social Sciences (IPAS) by improving both students learning outcomes and their critical thinking skills in Grade Four at SD Muhammadiyah Kutoarjo. Learning media constitute one of the most essential components of the instructional process because they play a crucial role in facilitating the delivery of learning materials. Teachers have a significant responsibility in managing the learning process; therefore, their ability to utilize appropriate instructional media greatly influences the effectiveness of classroom instruction. In teaching IPAS, teachers should employ appropriate instructional strategies, teaching methods, and learning media to ensure that learning objectives are achieved effectively while promoting flexible and independent learning opportunities for students (Luh et al., 2021). Interactive multimedia is one form of digital learning media that offers numerous advantages in presenting instructional content through the integration of text, images, videos, animations, and audio. Furthermore, its interactive features enable students to select and explore learning materials according to their learning needs, thereby enhancing engagement and understanding (Donna et al., 2021).

Interactive multimedia integrates audio, video, images, text, and animation to communicate information while providing users with opportunities to interact with learning content through various selectable features (Fatimatul Aulia, 2025). As a digital technology-based instructional medium, interactive multimedia enhances communication by utilizing a wide range of technological features. For example, social media platforms and video-conferencing applications that incorporate interactive multimedia have transformed the way individuals communicate, exchange information, collaborate, and establish social relationships. This phenomenon is consistent with Marshall McLuhan's communication theory, which argues that technological media enhance the effectiveness of communication and therefore play a vital role in contemporary social interactions (Mubarok, 2022).

The development of instructional media that carefully considers learning objectives has resulted in learning materials receiving excellent evaluations from expert validators. In addition, careful attention to the organization, presentation, and sequencing of instructional content ensures that learning materials are delivered systematically and effectively (Wulandari et al., 2023). Web-based interactive multimedia developed through Google Sites functions as an attention-enhancing

instructional medium by attracting students interest and directing their attention toward understanding the learning materials being presented (Inawan & Ulfa, 2022). Likewise, interactive multimedia supported by digital literacy principles incorporates text, images, graphics, animations, audio, and video to create engaging learning experiences that reflect authentic real-world situations and enrich students learning experiences (Arimas, 2022).

The findings of the present study demonstrate that interactive multimedia is both valid and effective in improving students learning outcomes, particularly on the topic of Plant Parts. These findings are consistent with previous research indicating that interactive multimedia facilitates students learning in IPAS (Inawan & Ulfa, 2022). Similarly, animation-based learning media have been shown to support the learning process effectively and are appropriate for classroom implementation. For example, animated videos introducing letters and numbers have been found to stimulate the cognitive and language development of young children (Agung et al., 2022).

Although numerous previous studies have examined multimedia learning, relatively few have investigated interactive multimedia integrated with digital literacy. Such multimedia provides significant benefits for both students and teachers, making it an effective instructional medium. In this study, interactive multimedia was developed using the Canva application for the topic of Plant Parts. Canva offers a wide variety of design tools and features that enable users, including those with limited design experience, to create attractive visual materials with ease. Consequently, this study is expected to provide practical guidance and valuable insights into optimizing design (Agung et al., 2022) techniques within Canva to produce engaging instructional media that meet contemporary aesthetic standards (Kurniawan et al., 2024)

Teachers play a fundamental role in improving the quality of classroom instruction. Their selection of appropriate teaching methods and instructional media has a substantial influence on how effectively learning materials are communicated and understood by students. The integration of instructional media is strongly recommended because it enriches students learning experiences, improves conceptual understanding, and makes learning activities more engaging. Furthermore, instructional media enable teachers to communicate information more effectively while promoting interaction among students, thereby creating a more interactive, collaborative, and enjoyable learning environment. One application that effectively supports innovation in instructional media development is Canva. As an intuitive graphic design platform, Canva provides a wide range of ready-made templates, illustrations, and customizable design features that enable teachers to create

visually appealing instructional materials with minimal technical expertise (Nisa et al., 2025). Through these features, teachers can efficiently develop presentations, posters, infographics, and other educational resources that enhance students interest and motivation to learn. The visually appealing designs produced using Canva also improve the attractiveness and clarity of instructional content, making learning materials easier for students to understand.

CONCLUSION

Based on the findings of this study regarding the implementation of multimedia in IPAS instruction at SD Muhammadiyah Kutoarjo, the following conclusions can be drawn:

a. Students learning outcomes in IPAS improved, as evidenced by significant progress in both students learning activities and academic achievement across Cycle I and Cycle II.
b. The results of the Cycle I Post-Test showed that 64% of the students achieved the mastery criterion, with 14 out of 22 students achieving mastery.
c. Meanwhile, the results of the Cycle II Post-Test showed an increase in the mastery rate to 77%, with 17 out of 22 students achieving mastery.Based on the classroom observations, it can be concluded that the use of multimedia learning media in IPAS instruction effectively improved students learning outcomes and enhanced their critical thinking skills.

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