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Effective Learning of Pancasila Education through Technology-Based Interactive Media for Elementary School Students

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Abstract: Effective Learning of Pancasila Education through Technology-Based Interactive Media for Elementary School Students . Objective: This study aims to evaluate the effectiveness of technology-based interactive learning media in improving students' motivation, engagement, and learning outcomes in Pancasila Education subjects in elementary schools. **Methods:** This study used a mixed-methods approach, combining descriptive qualitative analysis with a pretest-posttest experimental design. The research was conducted at SDN Semarangan 4 and SDN Krapyak in Godean Sub-district, Yogyakarta, involving 54 grade 5 students selected by purposive sampling. Data collection techniques used questionnaires, observations, interviews, and pretest-posttest assessments. **Findings:** The results showed a significant increase in student learning outcomes (20.36%), activeness (18.24%), and motivation (14.64%) in the use of technology-based interactive media in learning Pancasila education. This finding is in line with constructivist theory which states that technology-based interactive media can improve students' understanding of abstract concepts through multisensory learning experiences, such as animations interactive games, and active learning. **Conclusion:** The application of innovative learning media in learning Pancasila education can help students in improving students' activeness, motivation, and learning outcomes. In addition, the use of interactive media helps teachers in meeting students' learning needs. This study emphasizes the need for targeted training and better access to technology to ensure the successful implementation and sustainability of interactive learning media.

Keywords: interactive learning media, Pancasila education, technology-based, effective learning.

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INTRODUCTION

Pancasila Education is a compulsory subject at all levels of education, from primary to tertiary levels, with its essence as moral and ethical education (Nurgiansah, 2021). The main objective of Pancasila Education is for students to have the ability to think rationally, dynamically, and have broad experiences as intellectual individuals (Susanti, 2021). This is emphasised by Kartini & Dewi (2021), who state that Pancasila provides a moral foundation for students, where Pancasila values become the basis and motivation in everyday life. The main challenge in teaching Pancasila Education is how to deliver the material in an interesting and relevant way for students who are already familiar with the daily use of technology. Teachers integrate technology in learning to ensure the achievement of competencies that emphasize creativity, innovation, and relevance of teaching materials (Julisa et al., 2023).

However, in practice in the field, namely at SDN Semarangan 4 and SDN Krapyak, teachers face challenges in delivering Pancasila education

materials in an interesting and relevant way for students who live in the digital era and are accustomed to using technology. Conventional learning methods that are still teacher-centered often make students less active and make it difficult to understand abstract materials (Hardiansyah, 2022). This condition results in low student participation and absorption of lessons, which shows the need for innovation in learning methods for Pancasila education in elementary schools. Therefore, teachers must make innovations and alternatives to meet students' learning needs and facilitate the achievement of educational goals with appropriate learning methods and media (Fasa & Purwanti, 2023; Rachmadtullah et al., 2018).

Technological advances provide some solutions to overcome these challenges through technology-based learning media, which can provide interactive content (Setyawan & Faqih, 2022). These media cover a wide range of formats, including educational applications, games, and interactive simulations, which can be accessed through digital devices such as computers, tablets, and smartphones. According to Yolanda (2022) in Sekarsari & Rusnilawati (2023), learning media that combines interactive, effective, and innovative elements can improve all aspects of learning. Creating interesting and interactive learning media can increase learning activities, thereby increasing students' motivation and interest in learning (Aprianty & Ketang Wiyono, 2021). Digital media is effective in improving the quality of interactive student learning (Hidayat et al., 2023).

Prasetya (2017) showed that the application of interactive multimedia using Adobe Flash has a significant effect on the academic achievement of fourth-grade students of SD Negeri Glagah, Yogyakarta. This is due to the ability of interactive media to increase students' absorption and understanding, so that they can visualize concepts more concretely. Alzubi (2023) added that visual and auditory content in interactive media can facilitate multisensory learning, which supports students' long-term memory. Research conducted by Daryanes et al. (2023) concluded that interactive learning media developed using the case method with Articulate Storyline effectively improved students' critical thinking and problem-solving skills, thus strengthening the argument about the contribution of interactive technology in improving cognitive skills. In addition, Damanhuri et al. (2024) emphasized the importance of interactive media-based civic literacy to create a more meaningful and engaging learning environment. In addition, research by Badawi et al. (2023) showed that the utilization of Ekoland interactive media created on Android with the iSpring Suite application improved student learning outcomes and understanding of ecological principles in elementary school science education. The use of interactive media is also able to increase learning interest and provide a more pleasant and interesting learning atmosphere for students (Sekarsari & Rusnilawati, 2023). Previous research has shown the effectiveness of interactive learning media in various subjects, such as science, as well as in the application of competency-based models and the advancement of analytical reasoning skills. However, this study specifically examines the effectiveness of technology-based interactive media in learning Pancasila Education, which focuses on strengthening civic and moral values in fifth grade elementary school students.

This study aims to determine the effectiveness of developing technology-based interactive learning media relevant to Pancasila education, especially on the application of Pancasila values in elementary schools to improve student engagement, motivation, and learning outcomes. The use of interactive media is based on the theory of constructivism, rooted in the ideas of Piaget and Vygotsky, where constructivist

learning environments can improve students' academic achievement, motivation, engagement, and reflection (Seraji & Olsadat Musavi, 2023). Technology is expected to not only replace conventional methods that tend to be passive, but also create a dynamic learning environment and allow students to play an active role in building their own understanding (Fauzan & Arifin, 2019). This is in line with constructivism theory, which supports the role of media in stimulating students to improve learning outcomes (Ugwuozor, 2020).

This research offers innovative insights in learning Pancasila education through interactive technology so that learning becomes more interesting and relevant for students. In addition to providing practical guidance for media developers, this research also improves the quality of Pancasila education, teachers' digital competence, and students' character building. The results of this research are expected to help the development of interactive learning media specifically designed for Pancasila education in elementary schools.

METHOD

Participants

The sample in this study amounted to 54 fifth grade students taken from two elementary schools, namely SDN Semarangan 4 and SDN Krapyak, Godean District, Yogyakarta. Godean sub-district, Yogyakarta became the research population. The subject of focus of this research is Pancasila Education. This study used purposive sampling technique to determine participants, to minimize bias through clear selection criteria and in-depth analysis. The sample selection includes similar characteristics, such as the number of students and the initial ability level identified through pretest results. Controlling for external variables was done by maintaining homogeneity of teaching materials and ensuring the same allocation of learning time for both groups.

Research Design and Procedure

This research used mixed methods with a descriptive qualitative approach and a quantitative experimental design. The purpose of this study was to explore the effectiveness of technology-based interactive media in improving learning motivation, student engagement, and learning outcomes in Pancasila Education subjects in primary schools. A mixed methods approach was chosen to provide a comprehensive understanding, where qualitative data provided deep insights into participants' experiences, while quantitative data provided measurable empirical evidence.

The research design consisted of two stages. The first stage used a descriptive qualitative approach to explore the phenomenon in depth, in line with the perspective of Miller et al. (2022) who emphasized the importance of direct description and in-depth understanding of the meanings conveyed by participants. The second stage applied a pretest-posttest experimental design with an experimental group (using technology-based interactive media) and a control group (using conventional methods). Data collection was conducted over two months through observation, interviews, and questionnaires to obtain in-depth qualitative and quantitative data. Quantitative data were analyzed using inferential analysis, namely paired t-test and independent t-test, using SPSS IBM 25 software, and supplemented with validity and reliability tests.

Observation is a method that allows researchers to examine subject behavior in its natural setting through direct observation and involvement in ongoing activities (Alaslan, 2021). In this study, researchers used an observation guide to monitor the continuity of the learning process and measure the level of student engagement. The researcher observed students' participation, interaction, and response during learning by using digital interactive learning media.

In addition, observation was also used to assess the effectiveness of the use of media by educators and its suitability to students' needs. Observations were conducted systematically in the experimental and control groups during the learning process. An interview according to Waruwu (2024) is a conversation between two or more people that takes place between researchers and participants with the aim to obtaining information. Interviews in this study were conducted to collect data from educators to assess students' needs and interest in interactive learning media, as well as to evaluate the impact of learning media on students' motivation and learning outcomes. Questionnaires are a collection of written questions used to collect information from respondents, both in the form of personal data and knowledge possessed by respondents (Yasin et al., 2024).

Instrument

The research instruments consisted of questionnaires, observations, and interviews, as well as pre-test and post-test. The questionnaire instrument used a 4-point Likert scale, namely Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD), to measure student motivation and involvement in the learning process using technology-based interactive media. This questionnaire consists of 10 items with learning motivation indicators including interest in the material and the desire to continue learning, as well as indicators of student involvement which include activeness in discussions, participation in group activities, and response to technology-based activities.

The observation instrument is in the form of an observation sheet with a checklist to record student activeness when using interactive media, student responses to various features in the learning media, and the level of cooperation between students during learning activities. Observations were conducted systematically in the experimental and control groups before and after the intervention to evaluate the changes that occurred. Interviews were semi-structured to allow for a more in-depth exploration of informants' responses. These interviews aimed to complement the quantitative data obtained through questionnaires and observations, as well as evaluate the needs and experiences of students and educators regarding interactive media. The pre-test and post-test were designed based on learning indicators relevant to the material objectives. The test questions were used to measure students' learning outcomes before and after the intervention, so as to evaluate the effectiveness of using technology-based interactive learning media.

Table 1. Student observation rubric

Aspects	Indicator	Statement
Student Engagement	Activeness in asking questions and interacting Participation in learning Interest in Interactive Media	a. I actively participate in learning activities b. I often ask questions during learning c. I am focused on following all learning activities d. I engage in discussions during learning
Purchase motivation	Enthusiasm in learning Interest and the Learning Process	a. I am interested in learning this material b. I feel enthusiastic when learning

this material
c. I want to learn more about this material
d. I feel happy when learning this material

The questionnaire instrument and interview guide were tested for validity using the Content Validity Index (CVI) by three experts, namely two experts in the field of Pancasila Education and one educational media expert with a value of e" 0.90 which indicates the content validity of the instrument is very good. Realibility was tested using Cronbach's Alpha with a value of 1, e" 0.80 which indicates high and acceptable referring reliability. Reliability and validity calculations adapt (Ameu et al., 2024; Marzi et al., 2024). Observations were made after and before the intervention.

Data Analysis

The data in this study were analyzed using quantitative descriptive techniques. Descriptive statistics, such as mean, median, frequency, and percentage, were used to provide an overview of student motivation, student engagement, and student learning outcomes in the experimental and control groups. In addition, an independent sample t-test was used to test the difference in learning outcomes between the control group using conventional media and the experimental group using technology-based interactive learning media. In addition, paired sample t-test was used to measure the effect of interactive learning media on student learning outcomes. This test is used because the data collected is in the form of an interval scale for the variables of student motivation, student learning outcomes, and student activeness. This test aims to see the average difference in student learning outcomes and the significant effect of using interactive learning media on each variable, such as student learning motivation, student learning outcomes, and student activeness in learning. For the results of interviews and observations, the data were analyzed using a qualitative descriptive approach to show the results of student motivation and engagement.

■ RESULT AND DISCUSSION

Needs Analysis of Interactive Media for Learning

The findings from interviews conducted by researchers with The Pancasila Education teachers for grade V at SDN Semarangan 4 and SDN Krapyak are as follows:

Interview Results

The results of the interviews that have been conducted are that students are less enthusiastic in participating in Pancasila Education learning, students have difficulty in understanding the concepts of material in Pancasila learning which are abstract and complex in linking to everyday life, students are passive in learning and easily bored when learning, students show high enthusiasm and enthusiasm when using technology-based learning media and students show increased interest and motivation when the media used is related to digital technology.

Based on the interview data, it can be concluded that the repeated use of conventional methods in learning Pancasila Education causes students to tend to be passive and easily bored in learning and have difficulty in understanding abstract and complex concepts in learning Pancasila Education. However, when using learning media and digital technology, students show increased interest, motivation and enthusiasm as their curiosity arises. Students show

positive responses to interactive media in learning such as increased enthusiasm, participation and interaction when using digital-based media. Therefore, the integration of learning media and digital technology needs to be considered to the effectiveness of Pancasila Education learning.

Observation Result

The learning process resulted in various conclusions compiled by the researcher. Observations focused on assessing student responses, learning media, and the application of technology-based media in learning.

Table 2. Student observation rubric

Learning Environment	Student Engagement	Understanding	Learning Outcomes
With Digital Interactive	High enthusiasm, active participation.	Good understanding is shown.	Significant improvement in understanding.
Without Digital Media	Lower engagement, passive learning	Limited understanding of abstract concepts	Learning outcome standards Learning outcomes

The findings show that the use of digital interactive learning media significantly improves student engagement, material understanding and learning outcomes compared to learning methods without the use of digital media. This suggests that digital media has a positive impact in creating a more effective and engaging learning experience.

Questionnaire Results

Completion of the questionnaire resulted in the following data.

From the table above, it can be concluded that teachers need to be technically supported in the use and development of technology-based interactive media so that the learning process

Table 3. Teacher questionnaire results

Aspects	Indicator	Results
Technology Accessibility and Availability	Infrastructure Technology	Internet access is available in the school, but not evenly distributed in all rooms.
		The school has LCDs, computer labs and other devices to display learning media.
		The school gives teachers the freedom to use technology for learning.
	Student Accessibility	90% of students have access to technological devices, such as cell phones.
		At school, students can learn to use computers.
Conformity to needs	Variation and customization	Media is recommended to accommodate a variety of student learning preferences.
	Availability of Supporting	The developed media is able to attract students' interest, motivation, and

	Resources	learning outcomes. The need for technical support for teachers in using and developing technology-based interactive media.
Learning process	Student engagement and understanding of the material	Students are less enthusiastic/passive in the Pancasila Education learning process and have difficulty in understanding abstract and general material in learning.
Educational Media Utilization	Use of conventional media and technology-based interactive media	Worksheets and textbooks are often used, but technology-based media (such as videos/animations, games, interactive media) are rarely used.

becomes more interesting and effective. Students tend to be less enthusiastic and passive in learning, especially in abstract and general material such as Pancasila Education. Conventional learning media is still the main choice, however, the use of technology-based interactive media is needed to increase student activeness and understanding of the material. This underscores the need for training and support for educators to effectively integrate technology into the classroom. This approach aims to increase the effectiveness and enjoyment of the learning process for students aligned with educational objectives. Educators also facilitate the creation of technology-based interactive learning resources to enhance the educational experience.

Table 4. Student questionnaire results

Aspects	Indicator	Results
Interest in learning Pancasila Education	Interest and understanding of Pancasila Education learning.	The level of student interest is still low in learning Pancasila Education and considers the material very boring. In learning, students pay less attention to the teacher.
Use of teaching materials	LKS or textbook	Students have difficulty in understanding the concept of Pancasila education material because books and worksheets are limited in presenting the material.
Implementation of Technology Enhanced Learning Media and content understanding	Technology-based learning media.	Have used it but not often, such as using Power Point. Never used technology-based interactive media.
	Learning Materials and Content	Students struggle to understand the subject due to its general complexity and the abstract nature of the conversation.

Interest in technology-based interactive media	Utilization of technology-based interactive media in education	Students are very happy, enthusiastic and interested in learning with videos, pictures, quizzes, materials and games in learning.
Use of Electronic Devices	Use of laptops, computers and smartphones.	Students are enthusiastic when learning using interactive media with technological devices.
Needs related to technology-based interactive media in learning Pancasila education	Students' opinions if technology-based interactive media is developed.	90% of students agree with the incorporation of technology-based learning tools into Pancasila education.
Convenience of Using Electronic Devices	Students feel comfortable when using technology in the learning process, including its accessibility and ease of use.	

The data in the table shows that the use of technology-based interactive media in Pancasila Education effectively attracts students' attention and improves their focus. It effectively meets students' learning needs by catering to their diverse learning styles, thus improving their understanding, interest, motivation and overall learning outcomes. The data shows that students showed considerable enthusiasm for incorporating technology into their learning experience. As many as 90% of students agree that technology-based learning tools improve their understanding of the material. In addition, students feel comfortable and experience no difficulties when using electronic devices. Therefore, the advancement of technology-based interactive media can be an effective solution in improving the quality of Pancasila education learning.

Based on the results of the validity and reliability tests, the questionnaire instrument consisting of 10 statement items was declared to have excellent content validity (Content Validity Index, CVI), with an average value of 0.833. This value indicates that each item in the questionnaire has met the criteria for high content suitability based on expert judgment. The instrument was also declared to have a good and consistent level of reliability, indicated by a Cronbach's Alpha value of 0.814. This value indicates that the instrument has sufficient internal stability in measuring the intended construct. Thus, based on these two analysis results, this questionnaire instrument is declared feasible and can be used for further research purposes.

Effectiveness of Interactive Media on Student Motivation, Engagement, and Learning Outcomes in Pancasila Education Learning

The following are the statistical results of the average value of motivation, involvement and student learning outcomes in the pre-test and post-test scores of the experimental class.

Based on the data above, there is a difference between the pre-test and post-test scores in learning Pancasila education in the experimental class. In the involvement variable, there is an increase in score of 17.74, this shows that the posttest results are higher than the pretest. The resulting t-value is -15.641, indicating a very significant difference between pretest and posttest. The value of 0.000 <0.05 indicates that the use of interactive media increases student activeness. Then on the learning outcomes and

Table 5. Results of the initial and final tests of the experimental class

Results	Engagement	Learning outcomes	Motivation
Initial test	73.00	74.22	70.22
Post test	87.77	92.95	87.77
d	2.36	2.16	3.01
P Value	-15.641	-12.20	-11.21
Sig (2-tailed)	0.000	0.000	0.000

learning motivation variables, the average difference in scores was 18.70 and 14.78. Then the p-value = 0.000 <0.05), showing statistically significant results. And the calculated t value of -12.20 and -11.21, it can be concluded that there is a very significant difference between the pre-test and post-test when not using interactive media and using interactive media. The conclusion is that the use of interactive media in learning Pancasila Education is proven to be effective in improving students' activeness, learning outcomes, and learning motivation. The results of the analysis showed highly significant differences between pretest and posttest scores in all measured variables, indicating a strong and positive impact of interactive media in learning. These findings are in line with the research of Badawi et al. (2023), which concluded that the use of interactive media improved students' understanding. Similarly, Prasetya (2017) highlighted that interactive multimedia significantly influences primary school students' learning outcomes by visualizing the concepts being studied and providing a more engaging learning experience. In addition, the development of interesting and interactive learning media supports learning activities and fosters student motivation (Aprianty & Ketang Wiyono, 2021).

Comparison of Interactive Media Implementation and Conventional Media in Pancasila Education Learning

The comparison of scores after the intervention between SDN Semarangan 4 and SDN Krapyak in the application of learning media is as follows:

Table 6. Posttest scores of experimental and control classes in Pancasila education

	Class	Means	Std. Devitation	t	Average Difference
Engagement	Control	74.52	5.983	-9.266	-13.593
	Experiment	88.11	1.502		
Learning outcomes	Control	72.93	5.794	-10.901	-14.852.
	Experiment	87.78	2.900		
Motivation	Control	75.11	6.300	-9.266	-11.000
	Experiment	86.11	2.044		

Based on the data above, it is obtained that all variables, namely learning outcomes, motivation and engagement have a Sig (2-tailed) value of 0.000 (<0.05) which means that there is a significant difference between the use of technology-based interactive media in the experimental group and conventional media in the control group. In the engagement indicator variable, the average difference is -13.593. In learning motivation, the average difference is -

11.000. Then on the learning outcomes indicator -14.852. From these data it can be concluded that the experimental group consistently showed higher scores than the control group. The highest difference is in learning outcomes then engagement and learning motivation. Learning motivation increased by 14.64%, student engagement increased by 18.24% and learning outcomes increased by 20.36%. The following figure shows the difference in the percentage comparison of the increase in scores before and after using technology-based interactive media. These findings are in line with research conducted by Sekarsari and Rusnilawati (2023) who highlighted that interactive media not only increases student motivation but also creates a more fun and interesting learning environment. The ability to foster a dynamic learning atmosphere is essential in maintaining student interest and participation. Similarly, Prasetya (2017) showed that the application of interactive multimedia significantly improved students' academic achievement. This improvement is due to the ability of interactive media to increase student absorption and understanding by allowing visualization of concepts in a more concrete way. In addition, Alzubi (2023) emphasized that visual and auditory content in interactive media facilitates multisensory learning, which supports long-term memory retention. This multisensory approach allows students to bridge the gap between abstract concepts and their practical application, which further strengthens students' understanding.

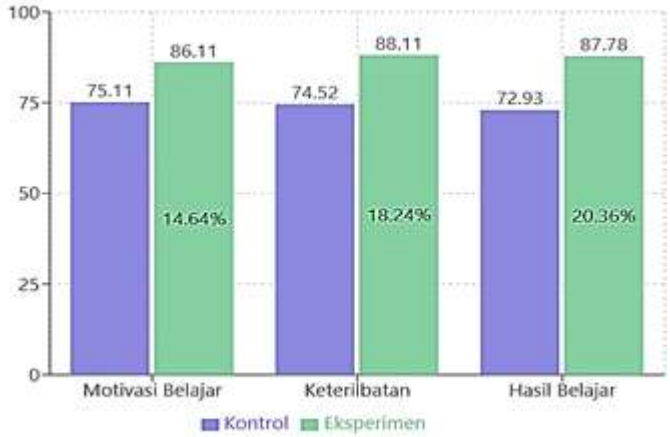

Figure 1: Percentage difference of improvement comparison using technology-based interactive media

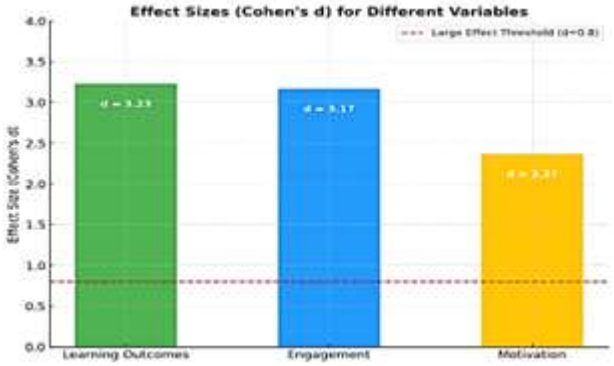

Figure 2. Graph of the impact of interactive media on Pancasila education

Impact of Interactive Use

To determine whether there is a significant effect of using interactive media on Pancasila education learning in increasing student involvement, motivation and student learning outcomes. Then it is done by using Cohen's d effect size.

Based on the graph above, it can be seen that student learning outcomes show a very large effect size with a value of Cohen's d = 3.23. This shows that the use of interactive media has a very significant impact on improving student learning outcomes compared to conventional media. This means that interactive media shows that interactive media helps students understand the material better and is more effective in improving students' understanding and learning achievement. The findings are supported by Sekarsari & Rusnilawati (2023) who emphasized that learning media that combine interactivity, effectiveness, and innovation significantly improve all aspects of learning. The ability of interactive media to visualize abstract concepts concretely helps students understand complex material, making it a powerful tool in the educational context.

Student engagement obtained a result of 3.17 which also showed a very large influence. The use of technology-based interactive media significantly increases student engagement in learning Pancasila Education compared to conventional media. This interactive media makes students more active and involved in the learning process when using interactive media, thus creating a more dynamic and effective learning environment. This is in line with Hidayat et al. (2023), who found that digital media significantly improved the quality of student interaction in learning, leading to a more engaging and participatory educational experience. These findings support the argument that fostering active engagement through interactive tools is essential to achieving effective pedagogy.

Motivation obtained a value of Cohen's d = 2.37 which also shows a very large influence on student learning motivation. The use of interactive media significantly increased students' learning motivation compared to conventional media. Students showed a much higher level of interest and drive to learn when using interactive media. This supports the findings of Daryanes et al. (2023), who concluded that interactive learning media, developed using a case-based method with tools such as Articulate Storyline, effectively improved critical thinking and problem-solving skills. These results underscore the multifaceted benefits of interactive media, which not only increase motivation but also foster important cognitive skills in students.

Overall, all effect size values that were well above the large effect threshold line (0.8) provided strong evidence that the use of interactive media provided significant gains to students' learning outcomes, engagement, and motivation. These results suggest that investment in the development and implementation of interactive learning media is highly recommended to improve the quality of learning.

Constructivism in Interactive Media Implementation

The findings of this study confirm the relevance of constructivism theory, which states that interactive media can create a learning environment that supports students' active engagement and facilitates the knowledge construction process. This strengthens the argument that technology-based learning is not just a tool, but also an important medium to encourage active participation and improve student learning outcomes (Abdulrahaman et al., 2020).

According to Piaget, children learn through a process of assimilation and accommodation, where they integrate new experiences into existing knowledge structures and adjust their understanding to accommodate new information (Fauzan & Arifin, 2019). In this context, technology-based interactive media facilitate these

processes by providing specific learning experiences, such as visualization, animation, and educational games. These features allow students to connect new concepts with prior knowledge and deepen their understanding through meaningful direct interaction. Observation data shows that students are more actively involved in learning when using interactive media, which is in line with Piaget's principle of active learning through assimilation and accommodation. The use of interactive media allows students to construct understanding by interacting directly with Pancasila education content. This engagement is reflected in the increased enthusiasm when working with digital interactive tools, which illustrates how technology effectively applies constructivist principles in Pancasila education.

The significant improvements in learning outcomes, motivation, and student engagement underscore the success of the constructivist approach facilitated by technology. Interactive media is more than just a learning tool; it fosters an environment where students actively construct their understanding of Pancasila values, especially in the context of a fifth-grade elementary school. This suggests that the use of interactive technology is not only in line with constructivist theory but also enhances its applicability in practical learning scenarios.

Quantitative Results and Observations

Based on the results of interviews and observations, there is a gap between conventional Pancasila Education learning and learning using technology-based media. Qualitatively, the interview results show that students are less enthusiastic about participating in Pancasila Education learning. Students have difficulty understanding abstract and complex concepts in the material taught and feel passive and easily bored during the learning process. Further observation results also support this finding, where students show positive attitude changes when technology-based learning media are used. Quantitatively, these changes are reflected in significant improvements in several aspects of learning. Student learning motivation increased by 14.64% with a score of 75 to 86, student engagement in learning increased by 18.24% with a score of 74 to 88, and student learning outcomes increased by 20.36% with a score of 72 to 87. The increase shows that the use of technology-based media is not only able to attract students' interest but also helps to better understand complex material, thus having a positive impact on learning outcomes. This combination of qualitative and quantitative data shows that a technology-based learning approach can be an effective solution to overcome challenges in learning Pancasila Education.

■ CONCLUSION

This study concludes that the use of technology-based interactive learning media has a significant impact on the quality of Pancasila Education learning at the elementary school level. This media is proven to be able to significantly increase students' motivation, engagement, and learning outcomes compared to conventional learning methods. This improvement can be seen from the results of data analysis which shows an average increase of 14.64% in learning motivation, 18.24% in student involvement, and 20.36% in learning outcomes after the application of technology-based interactive media. This media allows students to more actively participate in learning, overcome boredom, and understand abstract and complex concepts that are often a challenge in Pancasila Education. This research also confirms the relevance of interactive media to constructivism theory, which emphasizes the importance of the role of students to actively construct their knowledge. Through technology-based media, students are provided with learning experiences that support multisensory learning, such as visualization, animation, and educational

games. This not only helps students connect new concepts with existing knowledge, but also strengthens long-term memory and critical thinking skills.

In addition, the comparison between the experimental group using interactive media and the control group using conventional methods showed significant differences in each learning indicator. The experimental group consistently obtained higher scores, especially in terms of learning outcomes, followed by student engagement, and learning motivation. This shows that interactive media is more effective in creating a dynamic and interesting learning atmosphere. However, there are some limitations, such as uneven technology facilities and teachers' skills in using technology that still need to be improved. This research shows that the integration of technology-based interactive media can be an effective solution in improving the quality of Pancasila education learning. This research contributes to the development of theories on the use of technology in learning and offers new insights into how interactive media can be implemented in the context of Pancasila Education.

Research Limitations

This study has significant limitations in terms of depth of understanding and scope of assessment. In terms of depth of understanding, this study could not investigate the long-term impact of internalizing Pancasila values through interactive media, and did not measure in depth the cognitive and affective transformation of students. The scope of the assessment was limited to two primary schools in Godean, Yogyakarta, focusing only on grade V students. Technological infrastructure and teacher ability have not been comprehensively studied, so this research requires a more in-depth and widespread study to produce more representative insights in the context of technology-based Pancasila education.

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