

THE EFFECT OF UTILIZING ANIMATED VIDEO MEDIA ON SCIENCE LEARNING IN GRADE V OF SD NEGERI 1 GEGESIK KULON

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ABSTRACT

Science learning in elementary schools often faces challenges due to the dominance of conventional teaching methods and the abstract nature of scientific concepts. This study aimed to examine the effect of animated video media on students' science learning outcomes on the Solar System topic among Grade V students at SD Negeri 1 Gegesik Kulon. The study employed a quantitative approach using a quasi-experimental design with a Nonequivalent Control Group Design. The sample consisted of 60 students, divided into an experimental class (30 students) and a control class (30 students), selected through saturated sampling. Data were collected using pre-tests and post-tests and analyzed using the Independent Sample T-Test. The findings revealed that the experimental class showed a substantial improvement in learning outcomes, with the mean score increasing from 31.33 on the pre-test to 91.67 on the post-test. Statistical analysis indicated that the calculated *t*-value (4.267) exceeded the critical *t*-value (2.001), with a significance value of 0.000 (< 0.05), indicating a significant effect of animated video media on students' science learning outcomes. These findings suggest that animated video media can serve as an effective instructional medium for facilitating students' understanding of abstract science concepts.

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INTRODUCTION

Education is a fundamental aspect in improving the quality of human resources and national competitiveness. In the 21st century, educational systems are required to adapt to rapid developments in science, technology, industrialization, and globalization. The integration of technology in education has transformed learning processes, enabling more interactive, flexible, and student-centered instruction (Anggita, 2022). Technology has become an essential component in supporting effective learning practices, particularly in elementary education, where students require concrete and engaging learning experiences (Bond et al., 2020).

In Indonesia, the importance of education is emphasized in Law Number 20 of 2003 concerning the National Education System, which states that education is a conscious and planned effort to create learning conditions that enable students to actively develop their potential. One of the essential subjects in elementary schools is Natural Sciences (IPA). According to Dewi et al. (2021), science is a systematically organized body of knowledge derived from natural phenomena through scientific methods and attitudes. Science learning at the elementary level should not merely focus on memorizing concepts but also facilitate students in understanding scientific phenomena through meaningful learning experiences.

However, the implementation of science learning in elementary schools still faces various challenges. Based on preliminary observations conducted at SD Negeri 1 Gegesik Kulon, Gegesik District, Cirebon Regency, during the 2025/2026 academic year, students' science learning outcomes were found to be relatively low. Of the 66 students, only 30 students achieved the minimum mastery criterion, while 36 students did not meet the expected standard. These findings indicate that students' understanding of science concepts remains insufficient. One of the factors contributing to this condition is the limited utilization of innovative learning media during classroom instruction.

Learning media play a crucial role in facilitating students' understanding and improving learning outcomes. According to Mulia and Wanty Khaira in Habibati (2024), learning media encompass all tools that support the implementation of learning activities to achieve instructional objectives. Furthermore, Levie and Lentz in Arsyad (2010) identified four primary functions of visual media, namely attentional, affective, cognitive, and compensatory functions. Effective learning media can stimulate students' attention, increase motivation, and assist them in comprehending abstract concepts.

In the digital era, the use of multimedia-based learning resources has become increasingly relevant. One type of media that has gained considerable attention is animated video. According to Furoidah in Rahmayanti (2018), animated video is a learning medium that combines visual and audio elements to convey instructional messages dynamically. Similarly, Susanti et al. (2021) define animation as a sequence of two-dimensional or three-dimensional images arranged systematically to produce moving visual effects. Animated videos are particularly suitable for science instruction because they can visualize abstract scientific concepts that are difficult to observe directly.

Previous studies have demonstrated the effectiveness of animated video in improving students' learning outcomes. Rodriguez-Bailon et al. (2021) reported that video-based learning media can enhance students' interest and facilitate understanding of complex concepts. Noetel et al. (2021), through a systematic review and meta-analysis, found that educational videos significantly improve student achievement when integrated with conventional instruction. In elementary science education, Hapsari and Zulherman (2019) revealed that motion graphic animation videos effectively improved science learning outcomes among elementary school students. Moreover, Naimah et al. (2022) concluded that video-based learning media contribute positively to learning effectiveness and student engagement in science learning. Research conducted by Adiati Cornellia et al. (2023) also demonstrated that animated videos enhance students' motivation and learning achievement, while Suban Hali et al. (2024) found that animation-based learning media significantly improve students' understanding of abstract concepts.

Although previous studies have consistently reported the positive impact of animated video media on students' learning outcomes, most of these studies were conducted in different educational contexts, schools, and learning materials. Empirical evidence concerning the implementation of animated video media in science learning, particularly on solar system materials at SD Negeri 1 Gegesik Kulon, remains limited. In addition, studies focusing on the characteristics of students at this school, who have demonstrated relatively low science achievement and limited exposure to innovative instructional media, are still scarce. Therefore, there is a need to investigate whether animated video media can effectively improve science learning outcomes within this specific educational context.

Considering the low science learning outcomes observed in SD Negeri 1 Gegesik Kulon, the limited use of innovative instructional media, and the lack of empirical studies conducted in this setting, further investigation is necessary. Therefore, this study aims to examine the effect of animated video media on students' science learning outcomes on solar system material at SD Negeri 1 Gegesik Kulon, Cirebon Regency.

METHOD

This study employed a quantitative approach using a Quasi-Experimental Design. The research was conducted in Grade V at SD Negeri 1 Gegesik Kulon, Gegesik District, Cirebon Regency, during the 2025/2026 academic year. The study applied the Nonequivalent Control Group Design, in which both the experimental and control groups were administered a pre-test before receiving different treatments. This design was selected because the existing classes could not be randomly assigned, while allowing researchers to compare students' learning outcomes before and after the intervention.

The research design is presented as follows:

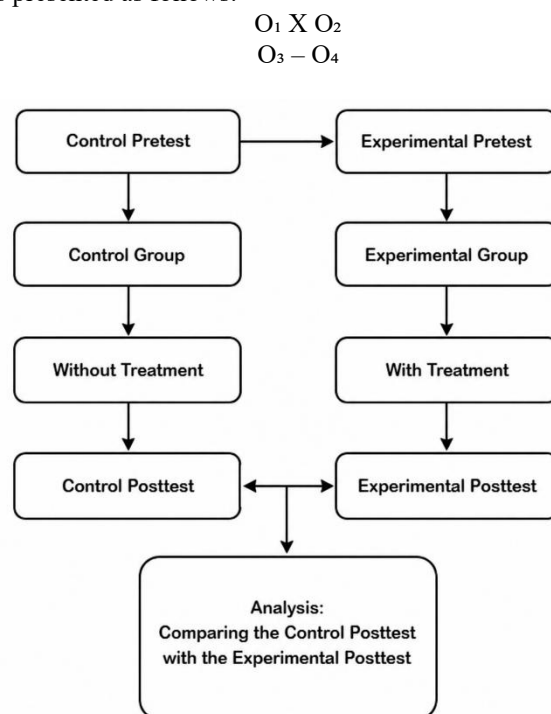


Figure 1. Research Design

The population of this study consisted of all fifth-grade students of SD Negeri 1 Gegesik Kulon in the 2025/2026 academic year. The sample included all Grade V students, totaling 60 students distributed across two classes. Class V-A, consisting of 30 students, was assigned as the experimental class and received instruction using animated video media, whereas Class V-B, consisting of 30 students, served as the control class and received conventional instruction. The selection of both classes was based on preliminary observations and interviews with the Grade V teacher, indicating that the students in both classes had relatively similar characteristics and academic abilities. The sampling technique employed was Saturated Sampling because the entire population was involved in the study.

Data collection techniques included interviews, observations, documentation, and tests. Interviews were conducted with the classroom teacher to identify problems encountered during science learning. Observations were carried out to examine classroom learning activities and students' responses during the implementation of animated

video media. Documentation was used to obtain supporting data related to the research setting and students' learning records.

The research instruments consisted of pre-test and post-test questions designed to measure students' science learning outcomes on the solar system topic. Before implementation, the test instruments were subjected to validity and reliability testing to ensure their appropriateness for data collection. Content validity was examined through expert judgment, while empirical validity was analyzed using product-moment correlation. Instrument reliability was determined using Cronbach's Alpha coefficient. In addition, a questionnaire was administered to collect data regarding students' responses toward the use of animated video media.

The research procedure was conducted in three stages. The first stage was preparation, which included preliminary observations, instrument development, and instrument validation. The second stage was implementation, where both classes received a pre-test. Subsequently, the experimental class was taught using animated video media, whereas the control class received conventional instruction. The treatment was conducted during the science learning process on the solar system material. After completing the treatment sessions, both classes were administered a post-test. The final stage involved data analysis and interpretation.

Data were analyzed using descriptive and inferential statistics. Descriptive statistics were employed to describe students' learning outcomes, whereas inferential statistics were used to test the research hypothesis. The data analysis procedures included the N-gain score test to determine the effectiveness of the treatment, the normality test using the Liliefors test, the homogeneity test using SPSS version 26 for Windows, and hypothesis testing using the paired sample t-test.

RESULTS AND DISCUSSION

Pre-requisite Test Results

The normality test aims to determine whether the distribution of student science learning outcome data, both in the experimental class and control class, is normally distributed or not. The analysis results show that the significance value obtained for the pre-test data of the experimental class is 0.145, the control class pre-test data is 0.225, the experimental class post-test data is 0.218, and the control class post-test data is 0.177. These values are greater than 0.05, confirming that all research data are normally distributed and meet the basic statistical assumptions.

Table 1. Normality Test

Data	Sig.	Description
Pre Eks	.145	Normal
Pre Kontrol	.225	Normal
Post Eks	.218	Normal
Post Kontrol	.177	Normal

The homogeneity test is conducted to determine whether the variance or data spread of the two sample groups, namely the experimental class and the control class, has the same or homogeneous properties. Based on the calculation results of the homogeneity test conducted on the initial test (Pre-test) data of the experimental class and control class, a Levene statistic value of 3.789 was obtained with a significance value of 0.067. The value 0.067 is greater than 0.05, concluding that the variance of student learning outcome data in the experimental class and control class is homogeneous.

Table 2. Homogeneity Test

Data	Levene's Static	Sig.	Ket
Pretest Experiment and Control	3,789	0,067	Homogen

Learning Outcomes Data

Based on the statistical calculation results of the initial test (Pre-test) data of the experimental class science learning outcomes before being given treatment using animated video media, the lowest score obtained by students is 0, while the highest score is 50. The average score (Mean) achieved by students is 31.33 with a standard deviation of 11.740. After being given treatment using animated video media, the post-test results show the lowest score is 80, and the highest score reaches 100. The average score (Mean) achieved is 91.67 with a standard deviation of 5.774.

In the control class, the initial test (Pre-test) data shows the lowest score is 15, and the highest score is 45. The average score (Mean) obtained overall is 28.67 with a standard deviation of 8.996. After learning using the conventional or lecture method without the help of animated video media, the post-test results show the lowest score is 5, while the highest score achieved is only 30. The average score (Mean) overall is only 17.17 with a standard deviation of 6.909.

Table 3. Descriptive Statistics of Pre-test and Post-test

Descriptive Statistics		
	N	Mean
Pre Eks	30	31.33
Pre Kontrol	30	28.67
Valid N (listwise)	30	
Post Eks	30	91.67
Post Kontrol	30	17.17
Valid N (listwise)	30	

Hypothesis Testing

Hypothesis testing was conducted to determine whether or not there is a significant effect of using animated video media on the science learning of grade V students at SDN 1 Gegesik Kulon. The statistical calculation results of the t-test show that the t-count value obtained is 4.267, while the t-table value at a 95% confidence level or a 5% error level is 2.001. The t-count value is greater than the t-table value ($4.267 > 2.001$). Furthermore, the significance value (Sig. 2-tailed) obtained is 0.000. Because the significance value is smaller than 0.05 and the t-count $>$ t-table, the decision made is H_0 is rejected and H_a is accepted.

Table 4. Independent Sample T-Test Results

Description	K. Eksperimen	K. Kontrol	Hasil Uji	Score
Sample	30	30	T hitung	4,267
Average	91,67	17,17	T tabel	2,001
Deviation Standard	7,47	1,15	Sig. (2-tailed)	0,000

Discussions

Analysis of the Implementation of Science Learning Using Animated Video Media

Based on the observation results, the implementation of science learning using animated video media in Grade V of SD Negeri 1 Gegesik Kulon was carried out very well and was in accordance with the lesson plan that had been prepared. The observation sheet indicated that all 13 observed aspects obtained a score of 3 with the "Good" criterion. Overall, the implementation percentage reached 100%, which falls into the Very Good category.

The successful implementation of learning was mainly supported by the use of animated video media during the instructional process. Through animated videos, teachers were able to present science concepts more attractively, while students actively observed, recorded important information, and engaged in discussions. Classroom interactions between teachers and students, as well as among students, became more active compared to conventional learning activities.

These findings indicate that animated video media can create a more interactive and student-centered learning environment. This result is consistent with constructivist learning theory, which emphasizes that students actively construct knowledge through meaningful learning experiences. The integration of visual and auditory elements in animated videos facilitates students in understanding learning materials more effectively. This finding is in line with

Noetel et al. (2021), who reported that educational videos significantly improve learning quality by increasing students' engagement and participation during the instructional process. Similarly, Hapsari and Zulherman (2019) found that animation-based learning media encourage active student involvement and create a more enjoyable learning atmosphere.

Analysis of the Effectiveness of Animated Video Media in Science Learning

The findings demonstrated that students who learned through animated video media achieved substantially higher learning outcomes than those who received conventional instruction. The considerable increase in the experimental class suggests that animated video media effectively support students in understanding science concepts.

This result can be explained through the Cognitive Theory of Multimedia Learning proposed by Mayer, which states that students learn more effectively when information is presented simultaneously through visual and verbal channels. Animated videos combine moving images, narration, text, and sound, enabling students to process information through dual channels while reducing extraneous cognitive load. Consequently, students are better able to organize and integrate new information into their existing cognitive structures.

The effectiveness of animated video media is also closely related to the characteristics of elementary school students. According to Piaget's theory, children aged 10–11 years are generally in the concrete operational stage, in which they understand concepts more easily when learning materials are presented concretely and visually. Science topics such as the solar system contain many abstract concepts that cannot be directly observed by students. Through animation, planetary movements, rotation, revolution, and the relationships among celestial objects can be visualized dynamically, thereby facilitating conceptual understanding.

Field observations further revealed that prior to the intervention, science learning was predominantly teacher-centered and relied mainly on lecture methods. As a result, students tended to be passive and less motivated during classroom activities. The introduction of animated videos transformed the learning atmosphere into a more engaging and interactive experience, encouraging students to participate actively in discussions and ask questions.

These findings support previous studies conducted by Adiati Cornellia et al. (2023) and Suban Hali et al. (2024), which revealed that animated learning media significantly improve students' learning outcomes and conceptual understanding. Likewise, Rodriguez-Bailon et al. (2021) reported that educational videos increase students' interest and facilitate the comprehension of complex concepts, particularly in science subjects.

However, unlike some previous studies that reported only moderate improvements in learning outcomes, the present study demonstrated a very substantial increase. This difference may be attributed to the limited use of innovative instructional media at SD Negeri 1 Gegesik Kulon prior to the intervention. Consequently, students experienced a novelty effect, leading to increased motivation and engagement during the learning process.

Analysis of the Effect of Using Animated Video Media on Science Learning Outcomes

The hypothesis testing results statistically confirmed that the use of animated video media significantly affected science learning outcomes among Grade V students at SD Negeri 1 Gegesik Kulon. The t-test results indicated that the calculated t-value (4.267) exceeded the critical t-value (2.001), with a significance value of 0.000 (< 0.05). Therefore, the null hypothesis was rejected, indicating that animated video media significantly improved students' science learning outcomes.

The positive influence of animated video media can be attributed not only to improved conceptual understanding but also to increased learning motivation and student engagement during classroom activities. Students showed greater enthusiasm, actively participated in discussions, and demonstrated a more positive attitude toward learning. Such conditions contributed to a more meaningful learning process and ultimately improved learning outcomes.

Conversely, conventional lecture-based instruction tended to provide fewer opportunities for visualization and active student participation. Consequently, students experienced greater difficulty in understanding abstract science concepts. This finding is consistent with Noetel et al. (2021), who concluded that video-based instruction positively affects students' learning performance across various educational levels. Similarly, Naimah et al. (2022)

emphasized that video learning media effectively increase students' engagement, motivation, and academic performance.

Overall, the findings suggest that animated video media can serve as an effective instructional alternative for elementary science education, particularly when teaching abstract concepts that require visual representation.

CONCLUSION

Based on the results of the study, it can be concluded that the use of animated video media significantly improves science learning outcomes among Grade V students at SD Negeri 1 Gegesik Kulon, Gegesik District, Cirebon Regency. Students who learned using animated video media achieved higher learning outcomes than those who received conventional instruction. Statistical analysis also confirmed that animated video media had a significant positive effect on students' science learning outcomes, as indicated by the t-test results showing that the calculated t-value exceeded the critical t-value and the significance value was less than 0.05.

These findings imply that animated video media can be used as an effective instructional alternative in elementary science learning, particularly for presenting abstract concepts that require visual representation. Therefore, elementary school teachers are encouraged to integrate animated video media into classroom instruction to enhance students' understanding and learning achievement.

Future research is recommended to involve larger samples, different science topics, and various educational settings to improve the generalizability of the findings. In addition, further studies may examine other variables, such as students' motivation, engagement, and critical thinking skills, in relation to the use of animated video media.

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