

THE EFFECT OF LEARNING VIDEOS ON THE CRITICAL THINKING ABILITIES OF SCIENCE STUDENTS ON THE MATERIAL OF INDONESIAN CULTURAL WEALTH IN GRADE 4 OF ELEMENTARY SCHOOL

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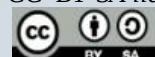
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Learning Videos, Critical Thinking, Science, Elementary Education, Independent Curriculum.

ABSTRACT

This study examines the effect of using video learning media on the critical thinking skills of fourth-grade students at UPT SD Negeri 017 Kualu in the subject of science. The background of the problem shows the low critical thinking skills of students, which are caused by less varied learning methods and minimal interaction in class. By using a quantitative approach through the experimental method of the *One-Group Pretest-Posttest Design*, this study involved 30 students as a sample. Data were collected through critical thinking ability test instruments (pretest and posttest) that have been tested for validity and reliability, and supported by qualitative data from observations and interviews. The results of the study showed a significant increase in students' average scores from 48.9 (pretest) to 74.8 (posttest). This increase was supported by a paired t-test, which produced a t-count value of 14.32, much greater than the t-table (2.045) with a significance value of 0.000 ($p < 0.05$). Qualitative findings confirmed that video media successfully increased students' motivation, enthusiasm, and active participation in learning. Thus, this study proves that learning video media has a significant influence on improving students' critical thinking skills, and is able to create a more interactive and effective learning environment.

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INTRODUCTION

Basic education plays a crucial role in developing students' critical thinking skills, an essential skill for understanding and adapting to the complexities of the modern world. This ability enables students to analyze information, evaluate arguments, and draw logical conclusions (Fitriani, Z. et al., 2022). In the context of the independent curriculum, particularly in Natural and Social Sciences (IPAS), critical thinking is the primary foundation for understanding interconnected concepts, including material on Indonesia's Cultural Heritage. This material requires students not only to memorize but also to examine cultural values, identify differences, and appreciate existing diversity.

However, the implementation of ideal science learning often faces challenges, especially in areas with limited infrastructure. Based on an interview with the fourth-grade homeroom teacher at the UPT SD Negeri 017 Kualu, Mrs. Ica Jasri, S.Pd., Gr., it was found that the main obstacles such as limited internet access and minimal opportunities for discussion cause students to tend to be passive. As a result, students' critical thinking skills in analyzing Indonesian Cultural Heritage material are not optimal. This condition is in line with the findings of Bintang, GR et al. (2020) who stated that a lack of interaction and cognitive stimulation can hinder the development of students' critical thinking skills

in schools.

In line with these challenges, various studies have identified instructional videos as an effective medium for enhancing student engagement and cognitive skills. Research shows that the use of animated videos can significantly improve conceptual understanding and motivation to learn science, as found in a study at SDN 230 Palembang (Ristanto, AH et al., 2021). At the junior high school level, Firmansyah, RA et al. (2021) also found that the application of instructional videos had a positive influence on students' critical thinking skills on the theme "My Air Is Polluted." Furthermore, a study by Puspitasari, RD & Handayani, N. (2023) concluded that YouTube videos are effective in facilitating the development of critical thinking in junior high school students on vibrations and waves. The use of videos, especially when combined with a *Problem-Based Learning* (PBL) approach, has been shown to strengthen analytical and conclusion-drawing skills (Mayudin & Rahmi, 2024). Other research also confirms that instructional videos can improve students' thinking skills in social studies at the elementary school level (Susilawati & Handoko, 2022).

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RESEARCH METHODS

This study uses a quantitative approach with an experimental method, specifically the *Pre-Experimental Design type*. The design chosen is the *One-Group Pretest-Posttest Design*, where one group of subjects is measured before (*pretest*) and after (*posttest*) given treatment. The treatment given is the use of learning videos (independent variable) to see its effect on students' critical thinking skills (dependent variable) in the subject of science. The location of the study is UPT SD Negeri 017 Kualu, which was chosen because of learning problems identified through initial observations, such as lack of student engagement and variations in learning media. The study population is all 30 fourth grade students, and because the population is less than 100, all populations are used as samples (*total sampling*).

Table 1One-Group Pretest-Posttest Design

Pretest	Treatment	Posttest
O_1	X	O_2

Source: Hardani et al., (2020: 350)

Three main techniques were used to collect data: observation, interviews, and tests. Observations and interviews were conducted to obtain qualitative data and identify problems in the field. Meanwhile, tests, consisting of a *pretest* and *posttest*, were used to measure students' critical thinking skills before and after the treatment. Before the tests were used, the question instruments were pre-tested to ensure their validity and reliability. The validity test used the Pearson *product moment formula*, while the reliability test used the *Cronbach's Alpha formula*. In addition, item quality tests, namely the discriminant power test and the difficulty index test, were also conducted to ensure the questions used were of good quality. The collected data will be analyzed in several stages. First, data prerequisite tests were conducted, namely the normality test and the homogeneity test, to ensure the data were normally distributed and had the same variance. This test is important as a prerequisite before conducting hypothesis testing. Next, the hypothesis test was conducted using a paired *sample t-test* to compare the average *pretest* and *posttest scores*. This test aims to see whether there is a significant difference in students' critical thinking skills after being given the treatment. All data analysis was assisted by statistical software. The results of this analysis will be used to test the hypothesis, whether learning videos have a significant influence on students' critical thinking skills.

RESEARCH RESULTS

This study examines the effect of using video instructional media on the critical thinking skills of fourth-grade students at SDN 017 Kualu in the science subject. Based on the results of quantitative and qualitative data analysis, strong evidence was found that video media significantly improved students' critical thinking skills. The following is a more detailed and structured explanation of each research result, complete with data tables and relevant interview sections:

1. Results of Instrument Validity and Reliability Tests

Before the test instrument was used to measure students' critical thinking skills, its validity and reliability were first tested. The validity test was conducted on 20 multiple-choice questions. Analysis using *product-moment correlation* showed that 17 items had a correlation coefficient (r_{xy}) value greater than the r_{table} value = 0.361 at a significance level of 5%. The other three items were declared invalid because their coefficient values were below the r_{table} . Thus, the items used in this study were 17 items that had been proven valid. After the validity of the items was confirmed, a reliability test was conducted to determine the consistency of the instrument. Based on calculations using the *Cronbach's Alpha formula*, the reliability coefficient (r_{11}) was obtained at 0.87. This value is above the minimum criterion of 0.70, so the instrument is declared very reliable and consistent in measuring students' critical thinking skills. The complete results of the validity and reliability tests are presented in Table 1.

Table 1. Summary of Instrument Quality Test Results

Test Aspects	Method	Results	Information
Validity	Product Moment Correlation	17 valid questions	$r_{xy} > r_{table}$ (0.361)
Reliability	Cronbach's Alpha	0.87	Reliable ($r_{11} > 0.70$)

2. Results of the Discriminatory Power and Level of Difficulty Test

To ensure the quality of the test items, a discriminatory power and difficulty level analysis were conducted. The discriminatory power analysis showed a good distribution:

- 12 questions are in the very good category ($DP > 0.40$),
- 4 questions in the good category ($DP 0.30-0.39$),
- 1 question in the sufficient category ($DP 0.20-0.29$).

These results indicate that most of the questions were able to differentiate between students with high critical thinking skills and those with low ones. No questions fell into the poor category ($DP < 0.20$), indicating the instrument's effectiveness.

The distribution of the difficulty level of the questions also shows an ideal balance, so that the instrument is neither too easy nor too difficult:

- 5 easy category questions ($0.71-1.00$),
- 9 questions in the medium category ($0.31-0.70$),

c. 3 questions in the difficult category (0.00–0.30).

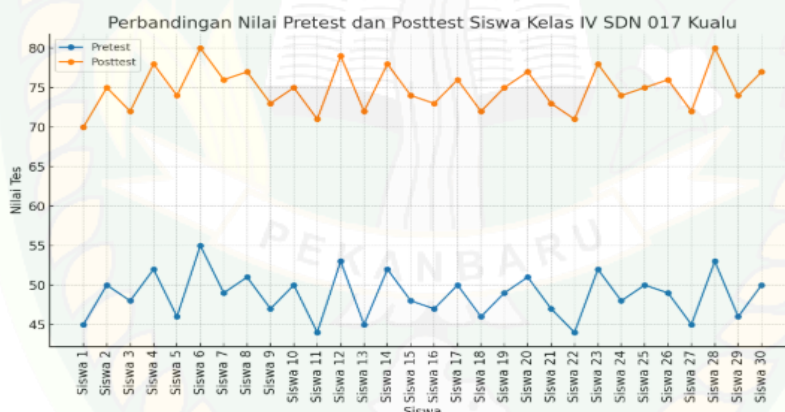
This balance is important to ensure that the test can comprehensively measure various levels of student ability.

Table 2. Distribution of Question Items Based on Distinguishing Power and Level of Difficulty

Category	Distinguishing Power	Number Questions	of	Difficulty Level	Number Questions	of
Very good	> 0.40	12		Easy	5	
Good	0.30–0.39	4		Currently	9	
Enough	0.20–0.29	1		Difficult	3	
Bad	< 0.20	0		-	-	

3. Pretest and Posttest Results

Student learning outcomes were analyzed through pretests (before treatment) and posttests (after treatment). The results showed a significant increase in students' average scores. The average pretest score was 48.9, while after treatment using learning videos, the average posttest score increased to 74.8. This 25.9-point increase indicates that the use of video media directly contributed to improving students' critical thinking skills. The graph visually reinforces this finding, showing that almost all students experienced an increase in their scores after participating in learning using video media. This increase occurred not only in students with low scores, but also in students with medium and high scores, indicating the broad effectiveness of video media.



The graph above shows that almost all students experienced substantial improvements in their grades after the treatment. This improvement occurred not only among students with low initial grades, but also among those with relatively good initial grades. Before conducting a hypothesis test, a data prerequisite test is carried out to ensure the validity of the statistical analysis.

- Normality Test: Based on the *Kolmogorov-Smirnov test*, the significance value for the pretest and posttest data is greater than 0.05, so it can be concluded that both groups of data are normally distributed.
- Homogeneity Test: The results of the homogeneity test show a significance value greater than 0.05, which indicates that the data comes from a population that has homogeneous variance.

After the prerequisites were met, hypothesis testing was conducted using a paired t-test (*Paired Sample T-test*). The results showed that the t-count value was 14.32, much greater than the t-table value of 2.045 at a significance level of 5% with degrees of freedom (df) = 29. The significance value (2-tailed) obtained was 0.000, which is smaller than 0.05. This proves that there is a significant difference between the pretest and posttest scores. Furthermore, hypothesis testing using a paired t-test was conducted to compare the pretest and posttest averages. The result obtained a t-count value of 14.32. This value is much greater than the t-table value of 2.045 at a significance level of 5% with degrees of freedom (df) = 29. Because t-count > t-table, the null hypothesis (H0) is rejected and the alternative hypothesis

(Ha) is accepted. This statistically proves that there is a significant difference between the pretest and posttest results. In other words, learning video media has a significant influence on improving students' critical thinking skills.

In addition to quantitative data, this research data was also strengthened by the results of observations and interviews. Observations conducted during the treatment showed significant changes in student learning behavior. In the initial phase, before the use of video media, students tended to be passive, lacked focus, and participated in discussions very little. However, when the learning video about Indonesian Cultural Wealth was played, the classroom atmosphere changed to be more dynamic. Students appeared more enthusiastic, focused, and actively involved. They began to ask questions, discuss with their classmates, and even provide spontaneous responses to the visuals displayed. These changes indicate that visual-auditory media is able to attract students' attention and create a more interactive learning environment. An interview with the class teacher, Mrs. Indah, confirmed the findings from the observations. The following is an excerpt from the interview: Researcher: "Ma'am, what do you think about the students' enthusiasm when learning using video media?" Teacher: "I think the change is extraordinary. Before using videos, the children got bored very quickly. If I lectured, only a few students listened. But when using videos, they seemed more 'alive.' Almost all the students were focused, and some even asked questions immediately after watching the video."

Interviews were also conducted with several students to gain their perspectives. One student, Rina (pseudonym), revealed:

Researcher: "How does Rina feel about learning using videos?"

Student: "Great, Sis! It's easier to understand. Because there are pictures and sound too. So, you don't just have to listen to the teacher."

These statements from teachers and students corroborate the quantitative data, showing that video media not only improves test scores but also qualitatively improves student motivation and participation. **Learning** videos that combine visual, audio, and animation elements have been proven to successfully capture students' attention and maintain their focus. Based on observations and interviews, this media changes the classroom atmosphere from passive to more interactive and dynamic. Students are encouraged not only to receive information, but also to analyze (e.g., by asking questions), evaluate (e.g., by providing feedback), and synthesize the information they see, which are key components of critical thinking skills. In short, video media serves as a catalyst that triggers deeper cognitive processes.

The results of this study comprehensively demonstrate that the use of video learning media has a significant impact on improving students' critical thinking skills. This finding is supported by quantitative and qualitative data analysis.

Table 3. Summary of Research Results

Data Categories	Key Results	Interpretation
Quantitative Data	The average pretest score (48.9) increased to posttest (74.8), with a significant increase of 25.9.	This increase shows that there is a big positive impact of video media on improving students' grades.
Hypothesis Testing	The results of the paired t-test show that the calculated t value (14.32) is much greater than the t table (2.045). The significance value (0.000) is also smaller than 0.05.	The difference between pretest and posttest scores was significant, confirming that the video-based treatment effectively improved students' critical thinking skills.
Qualitative Data	Observations showed that students became more enthusiastic, focused, and actively engaged. Interviews with teachers and students confirmed that video media made learning easier to understand and less boring.	These findings strengthen the quantitative data by showing that video media not only impacts grades, but also qualitatively improves student motivation and participation.

DISCUSSION

This study comprehensively demonstrates that the use of video learning media has a significant impact on improving the critical thinking skills of fourth-grade students. This finding is supported not only by statistical analysis showing an increase in pretest and posttest scores but also by qualitative data from observations and interviews. This significant improvement can be explained through several relevant theories and studies that reinforce the role of visual-auditory media in students' cognitive processes. The improvement in students' critical thinking skills after using video media can be explained from the perspective of the cognitive theory of multimedia learning (Mayer, 2020). This theory emphasizes that learning is more effective when material is presented in both verbal (text and audio narration) and visual (visual) formats simultaneously. In the context of this study, video learning that combines visualizations (images, animations) with audio narration (voice) helps students build stronger and more integrated mental representations. This reduces the cognitive load that might occur when students rely solely on text or verbal explanations from the teacher. As a result, students can process information more deeply and allocate their cognitive resources to critical thinking, such as analyzing, evaluating, and synthesizing information. Rahmi et al. (2024) explained that learning videos integrated with the Problem Based Learning (PBL) model effectively improve students' critical thinking skills. They stated: "Video media helps students learn to think critically through the reconstruction of events and values contained in real learning situations."

Research by Puspita & Rosy (2022) also highlights that the use of interactive video media can facilitate higher-order thinking skills. They found that students were better able to connect concepts, solve problems, and draw conclusions when learning through visually engaging media. The learning videos in this study provided a rich visual context, making abstract concepts in science subjects more concrete and easier to understand. For example, visualizing Indonesia's rich culture through video allowed students to directly observe cultural practices and artifacts, rather than simply imagining them from verbal descriptions. This process directly trained students' abilities to observe, analyze details, and draw conclusions based on visual evidence, which are core elements of critical thinking.

In addition to cognitive impacts, qualitative findings in this study indicate that video media successfully increased student motivation and participation. The results of observations and interviews with teachers and students align with research conducted by Setiawan et al. (2021), which stated that video media is effective in capturing students' attention and creating a more dynamic learning environment. Fourth-grade students, who tend to have short attention spans, responded positively to the visual and audio stimuli presented in the videos. This increased enthusiasm and focus are essential prerequisites for effective learning. When students are motivated and actively engaged, they are more likely to ask questions, discuss topics, and explore further, all key indicators of critical thinking skills.

Furthermore, the use of instructional videos also facilitates student-centered learning. As Pradana & Saputra (2023) noted, digital media such as videos enable students to learn independently at their own pace. Although this research was conducted in a classroom setting, the videos used stimulated active student interaction, rather than passively receiving information from the teacher. The teacher's role shifted from lecturer to facilitator, as evident from the interview excerpts. This shift provided space for students to explore ideas, ask questions, and discuss with peers, indirectly fostering collaboration and communication skills—other crucial aspects of critical thinking.

The paired t-test results, which showed a statistically significant difference between the pretest and posttest, confirmed that the effectiveness of video media was not a coincidence. The t-value, which was significantly greater than the t-table, and the significance value of $p < 0.05$, provide a strong scientific basis for concluding that the treatment (use of video media) was the main cause of the improvement in critical thinking skills. This finding is consistent with other studies in the field of education (Hanif & Hidayati, 2022; Ramadhan & Utami, 2023) which showed similar results, where multimedia-based interventions were proven effective in improving students' learning outcomes and thinking skills.

Overall, this study enriches the educational literature by providing strong empirical evidence regarding the benefits of video learning media, particularly at the elementary school level. The implication is that teachers and educational policymakers need to consider integrating video media into the curriculum and teaching methodology. This is expected to improve the quality of learning, not only in terms of conceptual understanding but also in terms of developing higher-order thinking skills essential for students in the modern era.

CONCLUSION

This study comprehensively proves that the use of video learning media has a significant influence on improving the critical thinking skills of fourth-grade students at SDN 017 Kualu in the science subject. This finding is supported by quantitative and qualitative data analysis. Quantitatively, there was an increase in the average student score from

48.9 (pretest) to 74.8 (posttest). This increase of 25.9 points is statistically very significant, as evidenced by the results of the paired t-test ($t_{hitung} = 14.32 > t_{tabel} = 2.045$ and a significance value of $p < 0.05$), so the research hypothesis is accepted. Qualitatively, the results of observations and interviews support this finding. Students showed increased motivation, enthusiasm, and active participation in learning, which previously tended to be passive. Interviews with teachers and students confirmed that video media made the subject matter easier to understand and less boring. Video media has been proven to be able to change the classroom atmosphere to be more interactive and dynamic, encouraging students to ask questions, discuss, and analyze the information presented. This finding is consistent with multimedia learning theory and previous research that shows the effectiveness of visual-auditory media in facilitating high-level cognitive processes. This research suggests that it is hoped that adequate facilities, such as projectors, laptops, and stable internet access, can be provided and maintained to optimally support the implementation of video-based learning. Schools can also hold training or workshops to improve teacher competency in selecting, creating, and managing effective learning video media.

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