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The Effect of Applying Video Learning Media in Science Learning on The Critical Thinking Skills of Fourth-Grade Madrasah Ibtidaiyah Students

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Abstract *This study aims to determine the effect of applying video learning media in Science (IPA) on the critical thinking skills of fourth-grade Madrasah Ibtidaiyah (MI) students. The study employed a quantitative approach with a quasi-experimental method and a nonequivalent control group (pretest–posttest) design. It was conducted at MIN 2 Serang in the even semester of the 2025/2026 academic year. The samples, selected through purposive sampling, were class IV D (n = 27) as the experimental class taught using video learning media and class IV C (n = 27) as the control class taught using the textbook. Critical thinking skills were measured using a ten-item essay test of the higher-order thinking skills (HOTS) type, administered as a pretest and a posttest. The data were analyzed using descriptive statistics, the Shapiro–Wilk normality test, Levene's homogeneity test, and the Independent Samples t-test with the aid of SPSS 20. The mean posttest score of the experimental class (87.70) was higher than that of the control class (78.81), and the t-test yielded a significance value of 0.000 < 0.05; thus, H0 was rejected and Ha was accepted. These findings indicate that video learning media have a significant effect on the critical thinking skills of fourth-grade MI students in science learning.*

Keywords: *Video Learning Media, Critical Thinking, Science Learning.*

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Abstrak Penelitian ini bertujuan untuk mengetahui pengaruh penerapan media pembelajaran video pada mata pelajaran IPA terhadap kemampuan berpikir kritis siswa kelas IV MI. Penelitian ini menggunakan pendekatan kuantitatif dengan metode kuasi eksperimen dan desain *nonequivalent control group* (*pretest–posttest*). Penelitian dilaksanakan di MIN 2 Serang pada semester genap tahun ajaran 2025/2026. Sampel dipilih dengan teknik *purposive sampling*, yaitu kelas IV D (n = 27) sebagai kelas eksperimen yang belajar menggunakan media pembelajaran video dan kelas IV C (n = 27) sebagai kelas kontrol yang belajar menggunakan buku paket. Kemampuan berpikir kritis diukur menggunakan tes uraian tipe HOTS sebanyak 10 soal yang diberikan sebagai *pretest* dan *posttest*. Data dianalisis menggunakan statistik deskriptif, uji normalitas Shapiro–Wilk, uji homogenitas Levene, dan uji *Independent Samples t-test* dengan bantuan SPSS 20. Rata-rata *posttest* kelas eksperimen (87,70) lebih tinggi daripada kelas kontrol (78,81), dan hasil uji t menunjukkan nilai signifikansi 0,000 < 0,05 sehingga H0 ditolak dan Ha diterima. Artinya, media pembelajaran video berpengaruh signifikan terhadap kemampuan berpikir kritis siswa kelas IV MI pada pembelajaran IPA.

Kata Kunci: *Media Pembelajaran Video, Berpikir Kritis, IPA.*

A. INTRODUCTION

In an increasingly advanced digital era, technology has become an inseparable part of daily life, including in education. Technological progress is unavoidable because it develops in line with the advancement of science. In the current era, technology plays an important role in education, as it enables students to learn about natural phenomena and facts (Maritsa et al., 2021). This indicates that education has entered the 21st century, an era commonly associated with 21st-century learning. Twenty-first-century learning is not new; it is a student-centered form of learning. The learning mandated by the 2013 Curriculum uses a scientific approach, which, when applied in learning activities, can improve students' abilities, including critical thinking, problem solving, creativity, innovation, collaboration, and communication (Fikri et al., 2021). Accordingly, education today needs to emphasize not only the provision of basic knowledge but also the development of 21st-century skills such as critical thinking, creativity, collaboration, and communication (Nuraydah et al., 2023).

However, an interview with the fourth-grade teacher revealed that most fourth-grade students showed little initiative during lessons; they tended to remain silent and

were reluctant to ask questions when they did not understand the material, and the use of interactive media in learning activities was still limited. In addition, students' lack of confidence in expressing their opinions indicated that their critical thinking skills were still relatively low (Kiki Rizkiah, 2024).

One subject with great potential to develop these skills is Science (*Ilmu Pengetahuan Alam*/IPA) (Septaria, 2019). However, the use of learning media in science remains very limited because some science teachers do not yet know how to utilize learning media in the subject (Diana et al., 2022). Teachers tend to explain lessons using only conventional media, namely the whiteboard and the textbook, and do not attempt to use the media already available at school. As a result, the material presented is less engaging and fails to motivate students to learn science (Ummah & Mustika, 2024).

Several studies have attempted to identify ways to improve critical thinking skills by examining variables presumed to influence them either directly or indirectly. According to Eliani, as cited in Aniswatul, critical thinking is a mental activity in which a person uses information obtained from various sources to make decisions in order to solve the problems faced in different ways (Farida et al., 2022). Critical thinking is essential for students because it enables them to solve social, scientific, and practical problems effectively (Wahyuni et al., 2023). Thus, critical thinking is a higher-order thinking skill that has the potential to strengthen students' analytical abilities.

Based on the description above, critical thinking skills can be improved through the application of learning media (Mubarrok et al., 2025). One learning medium that can improve students' critical thinking skills is video. Therefore, this study aimed to examine the effect of applying video learning media in science on the critical thinking skills of fourth-grade Madrasah Ibtidaiyah (MI) students.

B. METHOD

This study used a quantitative approach with a *quasi-experimental* method. This method was chosen because the study was conducted with intact classes in a school setting, so the researcher could neither randomly assign individual students to groups nor

fully control all external variables. The study involved two variables: the independent variable (X), namely the use of video learning media, and the dependent variable (Y), namely students' critical thinking skills. The quasi-experimental method was used to determine the difference in critical thinking skills between students taught using video learning media and those taught using the textbook.

The research design was the *nonequivalent control group design* (pretest–posttest). The study involved two groups, an experimental group and a control group, each receiving a different treatment: the experimental group was taught using video learning media, whereas the control group was taught using the textbook. Both groups took a *pretest* before the treatment and a *posttest* after the treatment to determine the extent of students' critical thinking skills in each group.

The population of this study comprised all fourth-grade students of MIN 2 Serang. The sample consisted of two classes, namely class IV C (27 students) and class IV D (27 students), for a total of 54 students. The sample was selected using a purposive sampling technique, in which classes were chosen based on considerations relevant to the research objectives, namely classes studying the same science material in the same semester. Based on the pretest results, the class with the lower mean score (IV D, M = 61.78) was assigned as the experimental class, and the class with the higher mean score (IV C, M = 65.96) was assigned as the control class. The research subjects were fourth-grade students of MIN 2 Serang, the study began with a preliminary site observation in July 2024, and the research was carried out in the even semester of the 2025/2026 academic year.

The data collection techniques used in this study were tests, observation, and documentation. Test, the test was the main data collection technique. It was a subjective essay test administered as a pretest and a posttest to measure students' critical thinking skills, and its items were aligned with the basic competencies of the material taught. Observation, Observation was conducted during the preliminary study to identify learning conditions in the fourth-grade class, including student engagement and the learning media used by the teacher, and was supported by an interview with the classroom teacher. Documentation, Documentation was used to obtain written and visual data, such

as student attendance lists, photographs of learning activities, and the test scores of both sample classes.

The main instrument was a critical thinking test in Science (IPA) on the topic of forces around us, consisting of 10 essay items of the higher-order thinking skills (HOTS) type. The same instrument was used for the pretest and the posttest. Students' answers were scored using a critical thinking scoring rubric developed based on the theory of Sonia Firmala Putri. The critical thinking indicators assessed were the ability to identify problems, analyze relevant information, evaluate arguments, and draw logical conclusions.

Data Analysis Techniques

The data were analyzed quantitatively using descriptive and inferential statistics with the aid of IBM SPSS Statistics 20. Descriptive statistics (minimum, maximum, mean, and standard deviation) were used to describe the pretest and posttest scores of each class. Inferential statistics were used to test the hypothesis through a comparative hypothesis test with the following steps:

a. Normality Test

The normality test was conducted on the *pretest* and *posttest* critical thinking scores of the experimental and control groups to determine whether the data were normally distributed. Because each group had fewer than 50 students (n = 27), the *Shapiro–Wilk* test was used. The data were considered normally distributed if the significance value was greater than the 5% alpha level (Sig. > 0.05).

b. Homogeneity Test

After the data of both groups were confirmed to be normally distributed, a homogeneity of variance test was conducted on the *pretest* and *posttest* data of both groups. This test was used to determine whether the variances of the two groups were homogeneous or heterogeneous by comparing them, using *Levene's test* (Test of Homogeneity of Variance) in SPSS 20.

c. Hypothesis Test

The hypothesis test was conducted to prove the formulated hypothesis and draw conclusions. After the prerequisite tests were met, the posttest data of both classes

were analyzed using the *Independent Samples t-test* in IBM SPSS Statistics 20 at a significance level of α = 0.05. If Sig. (2-tailed) < 0.05, H0 is rejected and Ha is accepted; if Sig. (2-tailed) ≥ 0.05, H0 is accepted. The hypotheses tested were as follows:

H0: There is no difference between the *posttest* results of the experimental and control classes.

Ha: There is a difference between the *posttest* results of the experimental and control classes.

C. RESULTS AND DISCUSSION

Before video learning media were used, students in both classes took a *pretest* to determine the mean score of each class. The class with the lower mean score was assigned as the experimental class, and the class with the higher mean score was assigned as the control class.

The study consisted of six *treatment* meetings: three in the experimental class and three in the control class. The topic taught was the effect of force on objects. To determine the effect of applying video learning media in science on the critical thinking skills of fourth-grade MI students, an essay test was administered before and after the different treatments, in which the experimental class was taught using video learning media and the control class was taught using the textbook.

The descriptive statistics of the results, obtained using SPSS 20, are presented below.

Table 1. Descriptive Statistics of Class IV C (Control)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Class C	27	62	70	65.96	2.157
Posttest Class C	27	75	83	78.81	2.370
Valid N (listwise)	**27**				

Table 2. Descriptive Statistics of Class IV D (Experimental)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Class D	27	56	67	61.78	2.913
Posttest Class D	27	82	94	87.70	3.506
Valid N (listwise)	27				

Before the hypothesis test was conducted, the prerequisite tests for data analysis, namely the normality and homogeneity tests, were carried out.

The normality test was conducted using the *Shapiro–Wilk* test in SPSS 20. The data were considered normally distributed if the Shapiro–Wilk significance value (Sig.) was ≥ 0.05.

The results of the normality test for the *pretest* and *posttest* critical thinking data are presented below.

Table 3. Normality Test Results

Tests of Normality

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Score	Pretest C (Control)	.129	27	.200*	.967	27	.531
	Posttest C (Control)	.098	27	.200*	.959	27	.354
	Pretest D (Experimental)	.111	27	.200*	.971	27	.625
	Posttest D (Experimental)	.113	27	.200*	.961	27	.382

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

As shown in Table 3, the Shapiro–Wilk significance values were 0.531 for the control class *pretest*, 0.354 for the control class *posttest*, 0.625 for the experimental class *pretest*, and 0.382 for the experimental class *posttest*. All significance values were > 0.05; therefore, the data of both classes were normally distributed.

Homogeneity Test

The homogeneity test was used to determine whether the variances of the two groups were homogeneous or heterogeneous. It was conducted using the *Test of Homogeneity of Variance* (Levene's test) in SPSS 24, and the results are presented in the following table.

Table 4. Homogeneity Test of the Control and Experimental Classes

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Score	Based on Mean	1.973	1	52	.166
	Based on Median	1.823	1	52	.183
	Based on Median and with adjusted df	1.823	1	51.974	.183
	Based on trimmed mean	2.166	1	52	.147

Table 4 shows that the *posttest* data of both classes had a significance value of 0.166 > 0.05; thus, H0 was accepted, indicating that the variances of the two samples were homogeneous.

Independent Samples t-test

The results of the normality and homogeneity tests showed that the data of the experimental and control classes were normally distributed and homogeneous. Therefore, the hypothesis regarding the effect of video learning media on the critical thinking skills of fourth-grade students could be tested. The test was conducted in SPSS 20 using the *Independent Samples t-test* to determine whether there was a difference in mean *posttest* scores between the two sample classes.

Table 5. Independent Samples t-test Results

	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig	T	df	Sig (2-tailed)	Mean Difference
Equal Variances assumed	5,781	,020	-10,913	52	,000	-8,889
Equal Variances not assumed			-10,913	45,659	,000	-8,889

Based on the calculation above, the significance value was 0.000 < 0.05, meaning that H0 was rejected and Ha was accepted. Thus, applying video learning media in science had an effect on the critical thinking skills of fourth-grade MI students.

Before video learning media were applied, the critical thinking skills of fourth-grade students at MIN 2 Serang in Science (IPA) tended to be low. This was evident from the pretest results, which showed that most students had difficulty identifying problems, analyzing relevant information, evaluating arguments, and drawing logical conclusions. Students tended to receive information passively without in-depth reasoning, which made it difficult for them to solve problems requiring critical thinking. The mean pretest score of the experimental class was 61.78, indicating that students' critical thinking skills were still below the minimum mastery standard or the established criteria. This condition shows that the learning strategies previously used had not been optimal in stimulating and developing students' critical thinking skills. After the treatment, the mean posttest score of the experimental class rose to 87.70, higher than that of the control class (78.81).

These findings are consistent with the study by (Waode, 2023), which found that students had difficulty thinking critically during teacher-led learning; consequently, they only knew what the teacher explained without further curiosity about the material. In addition, students who have not yet developed critical thinking skills during learning tend to become passive and are unable to generate critical thoughts in response to things around them (Anisa, 2024). Applying video learning media in the experimental

class encouraged students to be more active because they were interested in the videos shown, which in turn improved their critical thinking skills (Febriani et al., 2024). This result is also in line with the study by Yustri Yuhelma and Nunuk Suryanti, who found that video-based learning media had an effect on improving students' critical thinking skills (Yuhelma & Suryanti, 2025).

CONCLUSION

This study aimed to determine the effect of applying video learning media on the critical thinking skills of fourth-grade MI students. Based on the data analysis, the following conclusions can be drawn:

1. Before video learning media were applied, the critical thinking skills of fourth-grade students at MIN 2 Serang in Science (IPA) tended to be low, as shown by the mean *pretest* scores of the experimental class (61.78) and the control class (65.96).
2. After video learning media were applied, students' critical thinking skills improved significantly, as shown by the mean *posttest* score of the experimental class (87.70), which was higher than that of the control class (78.81).
3. There was a difference in critical thinking skills in science between students taught using video learning media and those taught using the textbook. The *Independent Samples t-test* yielded Sig. (2-tailed) = 0.000 < 0.05; thus, H0 was rejected and Ha was accepted, indicating that applying video learning media in science has an effect on the critical thinking skills of fourth-grade MI students.

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