Budapest International Research and Critics Institute-Journal (BIRCI-Journal)
Humanities and Social Sciences
ISSN 2615-3076 Online)
ISSN 2615-1715 (Print)
www.bircu-journal.com/index.php/birci
Budapest Institute

The Effect of Multimedia Assisted Scientific Learning Strategies and Scientific Attitudes on Critical Thinking Ability in Class IV Elementary School Students in IPA

Dwi Putamayanti[1], Happy Karlina Marjo[2], Amalia Sapriati[3]
[1]*Postgraduate Program, Universitas Terbuka, Indonesia*
[2]*Universitas Negeri Jakarta*
[3]*Universitas Terbuka*
putamayantidwi21@gmail.com, ut.happykarlina@gmail.com, lia@campus.ut.ac.id

Abstract

This study aims to analyze the effect of the interaction of the application of multimedia-assisted scientific learning and scientific attitudes on the critical thinking skills of fourth grade elementary school students in science subjects. The study used a quasi-experimental method with a 2 x 2 factorial design, with a population of 60 students and a sample of 30 students in class IV. The research instrument is in the form of tests and questionnaires that have been tested and tested for validity and reliability. After being given treatment to the two experimental classes, the results obtained (1) there is a difference between the application of multimedia-assisted scientific learning strategies and scientific learning strategies without multimedia significantly on the critical thinking skills of fourth grade elementary school students, namely 79.17 and 70, respectively. 73. (2) there is a difference between high scientific attitude and low scientific attitude towards students' critical thinking skills in elementary schools, namely 81.46 and 69.91. (3) there is an interaction between scientific learning strategies and scientific attitudes towards students' critical thinking skills, which is 0.033. The conclusion of this research is that there is an interaction between multimedia-assisted scientific learning strategies and scientific attitudes towards critical thinking of elementary school students in science subjects.

Keywords
scientific; multimedia; scientific attitude; critical thinking

I. Introduction

Scientific learning strategy is one of the learning strategies that requires students to be active as a science expert. Each learning activity of students is directed to carry out these activities based on the steps of applying the scientific method, namely 5M (observing, asking, collecting data, reasoning, and communicating). In these activities, it can be assisted by utilizing currently very sophisticated technology, namely the use of multimedia in conveying material to students in an interesting, fun way and can even improve or foster students' critical thinking. According to Pramusinto (2020) the power of technology including digitalization and automation continues to grow and change the pattern of production, distribution, and consumption. As with other areas of life, technology is used to make changes, so also with the legal system as technology in making changes (Hartanto, 2020). Meanwhile, the use of information technology is the benefit expected by users of information systems in carrying out their duties where the measurement is based on the intensity of utilization, the frequency of use and the number of applications or software used (Marlizar, 2021). Scientific learning

will be more perfect if it is supported by the use of learning media, one of which is by utilizing new technology, namely multimedia. Multimedia has an important role in the learning process because it can lead to a learning situation that is fun, creative, and not boring and will be the right choice to be implemented in scientific learning. seek and explore information from various sources through observation and experience not only obtained from being told by the teacher. The scientific attitude of students can be grown through activities that involve the activeness of students in the learning process. The existing approaches, strategies, and learning models have even been applied by educators. In fact, educators have integrated scientific attitudes, only less than optimal in their implementation. The use of multimedia today is very helpful as an alternative learning media in growing and improving the scientific attitude and critical thinking of students.

Based on the results of the midterm tests that have been carried out by students at SDN Bojong Rawalumbu IX, it appears that students are less able to think critically, this can be seen from the way to answer questions that lead to problem analysis and problem solving and evaluating the problems posed (critical thinking). students who still cannot answer correctly and precisely. The results of interviews (2017) with teachers in the Rawalumbu sub-district also revealed that only 8% of students had critical thinking skills (see Table 1). This can also be seen from teaching and learning activities in the classroom, which are less active and creative so that the learning outcomes obtained are not as expected and have an impact on the learning outcomes of students who are below the Minimum Completeness Criteria (KKM). One of them subjects Natural Sciences (IPA).

Table 1. Percentage of Class IV Science Test Questions

Type	C1	C2	C3	C4	C5	C6
PH 1	40%	30%	20	5%	4%	1%
PH 2	40%	30%	20	5%	4%	1%
PH 3	40%	30%	20	5%	4%	1%
PTS	20%	40%	10%	10%	5%	5%
PAS	10%	30%	40%	10%	10%	10%

Based on the results of tests that have been carried out in the mid-semester assessment at SDN Bojong Rawalumbu IX, it appears that students are less able to think critically, this can be seen from the learning outcomes of students who are under the KKM (Minimum Completeness Criteria) this is because there are still many students who are wrong and lacking appropriately answer questions that lead to analyzing problems and solving and evaluating problems about critical thinking. The following is Table 1.2 analysis of the results of the PH, PTS, and PAS test questions for class IV.

Table 2. Percentage of Grade IV Science Test Results

Type	C1	C2	C3	C4	C5	C6
PH 1	50%	50%	-	-	-	-
PH 2	50%	40%	10%	-	-	-
PH 3	40%	400%	-	-	-	-
PTS	8%	50%	8%	7%	3%	-
PAS	4%	36%	30%	6%	2%	-

Based on table 2, it can be seen that only 10% of students can answer questions with dimensions C4-C6 in PTS and 8% in PAS activities while in PH no one answers questions with dimensions C4-C6 because not all teachers provide questions with these dimensions. So that when PTS and PAS have questions with dimensions C4-C6, students cannot answer the questions. Scientific learning according to Sudarwan (2013), is intended to provide understanding for students to know, understand, practice what is being studied scientifically. Therefore, in the learning process it is taught so that students seek information or information from various sources through observing, asking questions. , try, process, present, conclude, and create for all subjects.

Students' critical thinking skills can be developed since elementary school. According to Dewey in Yaumi (2013), "critical thinking is active, persistent, confident and careful in deciding something, and concluding existing problems". Faccione in Yaumi (2013) states that there are six processes that can measure students' critical thinking, namely, "the ability to interpret, analyze, evaluate, inference, explain, and reflect". This process can be carried out as an effort to harmonize the thinking processes of students so that when receiving or obtaining information from others, they can evaluate the truth of the information first. This process can be carried out by considering a learning atmosphere that can foster students' critical thinking abilities. Therefore, a learning strategy is needed that can make students active and fun, as Vygotsky wrote that constructive learning, creativity, and activeness will help students shape their cognitive structures.

Based on this background, overall it can be concluded that, in elementary school learning, learning strategies are needed that can help students think critically. Furthermore, in the learning process to develop critical thinking skills, an attitude that supports scientific learning strategies is needed, namely, a scientific attitude so that it will produce critical thinking skills as expected. learning that is assisted by technological advances, namely using multimedia. It is hoped that this can overcome the problems of critical thinking that occur in Cluster 3 in the Rawalumbu sub-district of Bekasi city.

Learning with the application of scientific learning strategies is a learning process that has been designed with the aim that students can actively develop, build every principle, law, and concept through scientific stages which include observing, formulating problems, proposing or formulating hypotheses, and collecting data in various ways/techniques, analyze existing data, draw conclusions and communicate the principles, laws, and concepts that have been found. According to Daryanto (2014), iScientific learning includes: observing, asking, exploring, experimenting/reasoning, and communicating on each theme.

The use of multimedia in the learning and teaching process can train students to think critically, solve their own problems, find information on their own, and be more motivated in learning. According to Neo and Neo (2001), over time, multimedia will become a way for students to provide information about the knowledge gained in class and to build their own interpretation of the information obtained. According to Jusita (2008), the use of multimedia that is presented appropriately can significantly improve student learning outcomes.

Therefore, researchers try to apply a multimedia-assisted scientific learning strategy, according to Orton in Latuheru (2006), multimedia-based learning has many advantages compared to learning that only uses a whiteboard and markers. Multimedia-based learning involves almost all sensory elements. The use of multimedia can facilitate students' understanding in learning, and the time used is more effective and efficient. In addition, learning using multimedia can increase student learning motivation. Where

with increased motivation, it is hoped that achievement will be achieved more optimally. The use of multimedia in learning will also introduce technology earlier.

In learning, one attitude is needed that can increase motivation in student learning activities, namely a scientific attitude. Scientific attitude can provide an overview of how to behave in learning, responding to a problem, completing assignments and developing themselves. This is certainly expected to affect the critical thinking ability of students in a positive direction. According to Pophan in Anderson and Kathwhol (2001), scientific attitude will determine the success of a student in the learning process so that minimum completeness can be achieved. Scientific attitude is a thinking disposition related to high-level skills such as critical thinking, creative, problem solving, decision making, and metacognition.

According to Harlen (in Maulise, 2010), scientific attitude has two meanings, namely attitude toward science and attitude of science. Attitude toward science emphasizes more on attitudes towards science while attitude of science is an attitude that already exists in oneself after studying science. In 1996, Harlen developed his scientific attitude which can be seen in the following table:

Table 3. Dimensions of Harlen's Scientific Attitude

Dimension	Indicator
Curious attitude	Enthusiastically looking for answers Attention to the object being observed Enthusiasm for the scientific process Asking every step of the activity
	Objective/honest Not manipulating data Not presumptuous Making decisions based on facts Don't mix facts with opinions
	Doubt the findings of friends Ask for any changes/new things Repeat the activities carried out Don't ignore data even if it's small
	Continue researching after the novelty is gone. Repeat the experiment even though it results in failure. Completes one activity even though a classmate finishes early.
Respect for data	Using facts for conclusion data Shows different reports with classmates. Changing opinions in response to facts. Using tools like never before Suggest new experiments. Describe new conclusions and observations.

Dimension	Indicator
Critical reflection attitude	Respect the opinions/findings of others. Want to change your opinion if the data is lacking Receive suggestions from friends Doesn't always feel right Assume every conclusion is tentative Actively participate in groups.
Perseverance attitude	Attention to surrounding events Participation in social activities Keeping the school environment clean.

Based on the description, the scientific attitude of students can be grown through activities that involve the activeness of students in the learning process. The existing approaches, strategies, and learning models have even been applied by educators. In fact, educators have integrated scientific attitudes, only less than optimal in their implementation. Therefore, researchers will maximize scientific attitudes into multimedia-assisted scientific learning so that it is hoped that it will foster maximum critical thinking skills and achieve maximum completeness.

Knowledge received by students through active, persistent activities, and careful consideration through one belief will form students' critical thinking. Ennis (2015), argues that critical thinking is thinking rationally and reflectively by emphasizing making decisions about what to believe or do. Meanwhile, according to Mustaji (2015), critical thinking is thinking rationally and reflectively by emphasizing making decisions about what to believe or do. Walker (2015) argues, critical thinking as the basis for taking an action to get results from conceptualizing, applying, analyzing, synthesizing, and evaluating various information.

Based on this description, the objectives of this study are (1) to analyze the difference between scientific learning strategies with multimedia assistance and scientific learning strategies without multimedia assistance on students' critical thinking skills in grade IV elementary schools in science subjects. (2) analyze the difference between high scientific attitude and low scientific attitude towards students' critical thinking skills in grade IV elementary schools in science subjects. (3) describe the interaction between scientific learning strategies and scientific attitudes towards the critical thinking skills of fourth grade students in science subjects.

II. Research Methods

This study uses quantitative research, in the form of quasi-experiments that use groups that have been formed naturally. This quasi-experimental uses a control group that functions to control external variables that can affect the implementation of the experiment. The experimental design used in this study was a 2 x 2 factorial experimental group design. The population in this study were 11 elementary schools in cluster 3 in Rawalumbu sub-district. Sampling was carried out using random sampling, totaling 60 students at SDN Bojong Rawalumbu IX.

Table 4. Experiment Design

Strategy (A) / Attitude (B)	Multimedia-assisted Scientific learning strategies	Scientific learning strategies without multimedia
High scientific attitude	$A_1 B_1$	A_2B_1
Low scientific attitude	$A_1 B_2$	$A_2 B_2$

Information:
A1: multimedia-assisted scientific learning strategies
A2: Scientific learning strategies without multimedia
B1: high scientific attitude
B2: low scientific attitude

This study used two instruments, namely a test instrument and a questionnaire. The research data was obtained through a set of instruments for each of the variables studied. Data collection was carried out with 2 instruments, namely: 1) a questionnaire instrument for scientific attitudes and 2) a test instrument for critical thinking skills. This instrument is structured in the form of statement items and questions that are built based on indicators for each variable that has been obtained in the theoretical study.

IV. Discussion

In the following, the results of calculating science learning outcomes which include: mean, median, mode, maximum score, minimum score, variance, and standard deviation are presented in Table 5.

Table 5. Statistical Descriptive Analysis Results

Data Description Statistics								
		Multimedia-assisted Scientific strategy	**Scientific strategies without the help of multimedia**	**low scientific attitude**	**high scientific attitude**	A1B1	A1B2	A2B1	A2B2
N	Valid	30	30	30	26	13	17	21	9
	Missing	4	4	4	8	8	4	0	12
Mean		79.17	70.73	68.97	81.46	70.00	86.18	69.95	72.56
Median		79.50	73.00	67.00	80.00	70.00	87.00	67.00	73.00
Mode		87	67	67	87	53[a]	87	67	60[a]

Std. Deviation	13.373	11.899	11.403	11.476	11.902	9.869	13.079	8.960
Variance	178.833	141.582	130.033	131.698	141.667	97.404	171.048	80.278
Range	47	43	37	40	34	30	43	27
Minimum	53	50	50	60	53	70	50	60
Maximum	100	93	87	100	87	100	93	87
Sum	2375	2122	2069	2118	910	1465	1469	653

a. Multiple modes exist. The smallest value is shown

The description of the data on the results of critical thinking in science subjects in the group of students who were treated with multimedia-assisted scientific learning and scientific learning without multimedia-assisted learning related to high scientific attitudes and low scientific attitudes can be seen in Table 6.

Table 6. Statistical Descriptive Analysis Results

Descriptive Statistics

Dependent Variable: critical thinking skills

scientific learning strategy	scientific attitude	**Mean**	**Std. Deviation**	**N**
multimedia-assisted scientific learning strategies	low scientific attitude	70.00	11.902	13
	high scientific attitude	86.18	9.869	17
	Total	79.17	13.373	30
scientific learning strategies without the help of multimedia	low scientific attitude	69.95	13.079	21
	high scientific attitude	72.56	8.960	9
	Total	70.73	11.899	30
Total	low scientific attitude	69.97	12.457	34
	high scientific attitude	81.46	11.476	26
	Total	74.95	13.250	60

Application of multimedia-assisted scientific learning strategies and scientific learning strategies without multimedia on the critical thinking skills of fourth grade elementary school students

The average science learning outcomes of students who study using multimedia-assisted scientific learning strategies (A1) is 79.17, while the average science learning outcomes with multimedia-assisted scientific learning strategies (A2) is 70.73. These results indicate that the average multimedia-assisted scientific class has better learning outcomes than the multimedia-assisted scientific class. This result also shows that there is a very big

difference between the scientific class that uses multimedia and those who do not use multimedia. Multimedia-assisted Scientific Class produces scores far above the value of the Multimedia-assisted scientific class. The results of the two-way ANOVA calculation obtained a significance value for the learning model of 0.032 at the real level = 0.05. A significance value of 0.032 < 0.05, it can be concluded that there is a significant difference between the science critical thinking of students who learn with the application of multimedia-assisted scientific learning strategies (A1) and scientific learning strategies without multimedia-assisted (A2) significantly, thus (H0) is rejected and H1 is accepted.

The following data is presented in the form of a histogram of the results of science critical thinking for students who use Multimedia-assisted scientific learning.

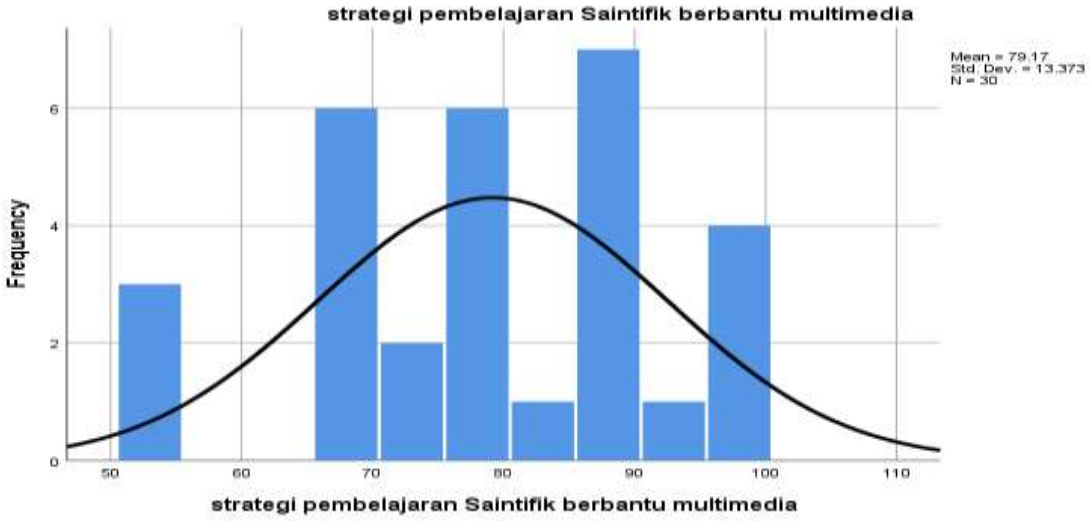

Figure 1. *Histogram of the Frequency of Science Critical Thinking Results of Students Using Multimedia-assisted Scientific Learning (A1)*

The following data is presented in the form of a histogram of the results of science critical thinking for students who use scientific learning without multimedia assistance:

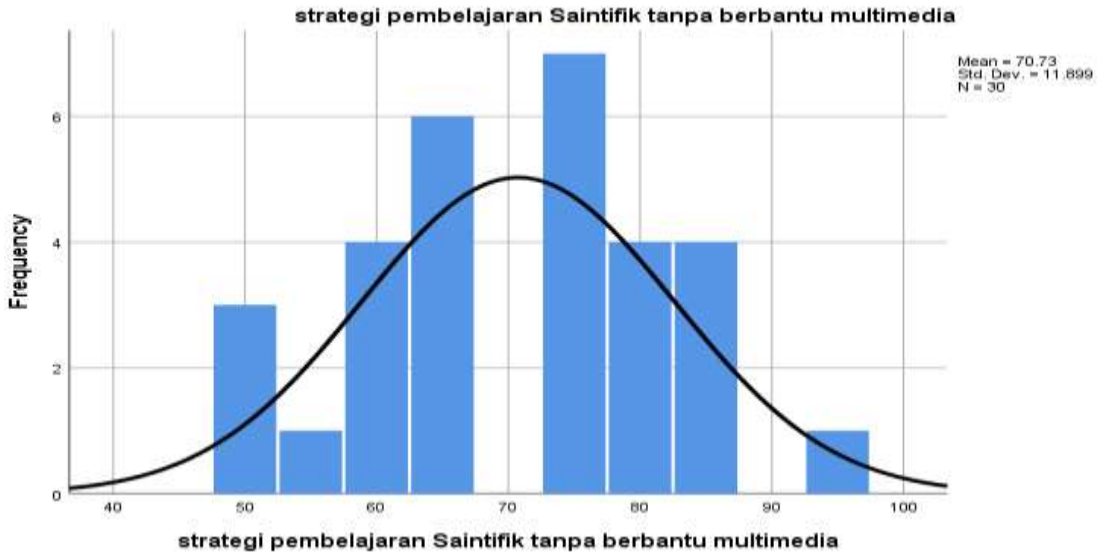

Figure 2. *Histogram of Science Critical Thinking Results Using Scientific Learning without Multimedia Assistance (A2)*

The results of the two-way ANOVA calculation obtained a significance value for the learning model of 0.032 at the real level = 0.05. A significance value of 0.032 < 0.05, it can be concluded that there is a significant difference between the science critical thinking of students who learn with the application of multimedia-assisted scientific learning strategies (A1) and scientific learning strategies without multimedia-assisted (A2) significantly, thus (H0) is rejected and H1 is accepted. The results of this study indicate that there is a difference between the application of multimedia-assisted scientific learning strategies and non-multimedia scientific learning strategies on students' critical thinking skills.

The results of this study are the same as the results of Anggun Larasati's research (2019), in his research on the application of a multimedia-assisted scientific approach, it shows that there is an increase in learning outcomes in 5th grade students who apply multimedia-assisted scientific learning. The implementation of the application of multimedia-assisted scientific learning has several obstacles, namely, (1) students are less active in asking questions, (2) learning steps are less coherent, (3) time is not effective, (4) students are less active in opinion. The solutions to these obstacles, (1) providing motivation and stimulus, (2) delivering learning steps according to the scenario, (3) setting time effectiveness, (4) attracting the attention of students to be more enthusiastic and active.

The difference between high scientific attitude and low scientific attitude towards students' critical thinking skills in elementary school grade IV in science subjects. In this hypothesis test, two hypothesis tests were conducted, namely the two-way Anova test and the Independent sample test. Before carrying out the two-way ANOVA test on the results of critical thinking on students who have low scientific attitudes and high scientific attitudes overall, independent sample tests are carried out in each class (classes that use multimedia-assisted scientific learning strategies and classes that use learning strategies Scientific learning without multimedia assistance) to determine the average critical thinking results in students who have low scientific attitudes in classes using multimedia-assisted scientific learning strategies and students with low scientific attitudes in classes using non-multimedia-assisted scientific learning strategies. This is also to see if there are differences in the two classes.

The results of the independent sample test calculation on critical thinking skills for students with low scientific attitudes who use multimedia-assisted scientific learning strategies with those using scientific learning without multimedia obtained a 2-tailed significance value of 0.992 at a significant level = 0.05 (0.992 > 0.05) . These results indicate that there is no difference in critical thinking skills for students with low scientific attitudes who use multimedia-assisted scientific learning strategies with those using scientific learning strategies without multimedia.

The results of the independent sample test calculation on critical thinking skills for students with high scientific attitudes using multimedia-assisted scientific learning strategies with those using scientific learning without multimedia obtained a 2-tailed significance value of 0.002 at a significant level of = 0.05 (0.002 < 0.05). These results indicate that there is a difference between the results of critical thinking for students with high scientific attitudes who use multimedia-assisted scientific learning strategies and those using scientific learning strategies without multimedia.

Based on table 6 the average science learning outcomes of students who have a low scientific attitude (B1) is 69.97, and a high scientific attitude (B2) is 81.46. These results indicate that students who have a high scientific attitude will affect their critical thinking. The results of the two-way ANOVA calculation obtained a significance value of 0.004 at a significant level of = 0.05 then, because the average science critical thinking result in students who have a high scientific attitude is greater than the average science critical thinking result in students who have a high scientific attitude. have a low scientific attitude (μB1 B2) and the

significance value for scientific attitude is 0.007 <0.05, it can be concluded that there is a significant difference between the average science critical thinking results of students who have low scientific attitudes and students who have scientific attitudes. tall. Based on this, H0 is rejected and H1 is accepted.

Table 7. Test Results Independent Samples T Test

The ability to think critically on a scientific attitude is low

Group Statistics

	scientific learning strategy	N	Mean	Std. Deviation	Std. Error Mean
critical thinking skills at low scientific attitude	multimedia-assisted scientific learning strategies	13	70.00	11.902	3.301
	scientific learning strategies without multimedia	21	69.95	13.079	2.854

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
critical thinking skills at low scientific attitude	Equal variances assumed	0.300	0.588	0.011	32	0.992	0.048	4.464	-9.046	9.141
	Equal variances not assumed			0.011	27.443	0.991	0.048	4.364	-8.899	8.995

1) The ability to think critically on a high scientific attitude

Group Statistics

	scientific learning strategy	N	Mean	Std. Deviation	Std. Error Mean
critical thinking skills in high scientific attitude	multimedia-assisted scientific learning strategies	17	86.18	9.869	2.394
	scientific learning strategies without multimedia	9	72.56	8.960	2.987

Independent Samples Test

		Levene's Test for Equality of Variances								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
critical thinking skills at low scientific attitude	Equal variances assumed	0.18	0.675	3.451	24	0.002	13.621	3.947	5.474	21.768
	Equal variances not assumed			3.559	17.888	0.002	13.621	3.827	5.576	21.666

Based on the results of the independent t-test in table 7, it can be seen that the results of critical thinking in students who have low scientific attitudes in the multimedia-assisted scientific class are 70.00 greater than the results of critical thinking in students who have low scientific attitudes in the unassisted scientific class multimedia of 69.95. This shows that there are differences and influences between students who have low scientific attitudes in multimedia-assisted scientific learning and students who have low scientific attitudes in scientific learning without multimedia-assisted. Multimedia that is used can improve students' critical thinking although it is not too significant but the average results of students who have low scientific attitudes in the multimedia-assisted scientific class are better than the students in the scientific class without the aid of multimedia. The average result for students who have a high scientific attitude in the multimedia-assisted scientific class is 86.18. Meanwhile, the average result for students who have a high scientific attitude in the scientific class without multimedia assistance is 72.56. This shows that the use of multimedia greatly affects the results of critical thinking in students who have a high scientific attitude.

This is in accordance with the results of Gusmentari's research (2015), in his research on the scientific attitude of class IVc in science learning at SD Muhammadiyah Condongcatur, there are several factors that inhibit the emergence of scientific attitudes in students, namely (1) the different nature of students, (2) teachers are less able to organize activities, and (3) the availability of facilities and infrastructure for those who are not yet adequate. These factors can also hinder students' critical thinking skills even though in learning the teacher has provided facilities for providing material using multimedia.

The effect of the interaction between multimedia-assisted scientific learning strategies and scientific attitudes on the critical thinking skills of fourth grade students in science subjects.

Table 8. Summary of Two-way Analysis of Variance (ANAVA) Calculation Results

Tests of Between-Subjects Effects

Dependent Variable: critical thinking

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3037.205[a]	3	1012.402	7.743	.000
Intercept	302952.170	1	302952.170	2317.146	.000

Tests of Between-Subjects Effects

Dependent Variable: critical thinking

Strategi pembelajaran	634.443	1	634.443	4.853	.032
Sikap ilmiah	1197.633	1	1197.633	9.160	.004
Strategi pembelajaran * sikap ilmiah	625.633	1	625.633	4.785	.033
Error	7321.645	56	130.744		
Total	347409.000	60			
Corrected Total	10358.850	59			

a. R Squared = .293 (Adjusted R Squared = .255)

Sumber: Data diolah

The results of testing the third hypothesis indicate that there is an interaction effect between scientific learning strategies and scientific attitudes on students' critical thinking skills. The results of the ANOVA calculation obtained a significance value for the interaction factor, namely 0.033 at the real level = 0.05 (0.033 > 0.05), it can be concluded that there is an interaction between multimedia-assisted scientific learning strategies and scientific attitudes towards students' critical thinking skills. This means that there is an influence given by multimedia-assisted scientific learning strategies and scientific attitudes towards students' critical thinking. So, with the application of multimedia-assisted scientific learning strategies in the 5m process, it will motivate students who have scientific attitudes, especially high scientific attitudes, will be able to improve the critical thinking outcomes of fourth grade elementary school students. Multimedia-assisted scientific learning strategies have a greater influence on students' critical thinking in science subjects.

The application of scientific learning strategies that are in accordance with the existing syntax, will be able to improve student learning outcomes. This can be seen from the learning outcomes obtained by class IVb which has increased from the first meeting and the second meeting. This is in accordance with the opinion of Kurniasih (2014; 35) who argues that one of the objectives of scientific learning is to improve intellectual abilities, especially the ability of students' higher-order thinking. This scientific learning strategy, if applied very well in the classroom, will be able to foster students' critical thinking, especially if scientific learning is assisted by multimedia in presenting the material.

IV. Conclusion

The conclusions from this research are:

1. The results of the study indicate that there are differences between the application of multimedia-assisted scientific learning strategies and non-multimedia-assisted scientific learning on the critical thinking skills of fourth grade students in elementary schools.
2. The results of this study indicate that there is a difference between high scientific attitudes and low scientific attitudes towards the critical thinking skills of fourth grade students in elementary school.
3. The calculation results show that there is an interaction between multimedia-assisted scientific learning strategies and scientific attitudes towards students' critical thinking skills.

References

Daryanto (2017). 21st Century Learning. Yogyakarta: Media Style

Daryanto. (2014). Scientific Learning Approach Curriculum 2013. Yogyakarta: Gava Media.

Hartanti, D. (2020). Sociology Review of Social Phenomenon, Social Rules and Social Technology. Budapest International Research and Critics Institute-Journal (BIRCI-Journal) Vol 3, (2): 1175-1184.

Herson, A. (2009). Scientific Attitude Assessment in Science Learning. Jakarta: Earth Literacy

Hosnan. (2014). Scientific and Contextual Approaches in 21st Century Learning. Bogor: Ghalia Indonesia.

Kurinasih, I. (2014). Successfully Implementing Curriculum 2013. Bandung: Pena's Word.

Marlizar, et.al. (2021). Effect of Service Quality and Use of E-Service Technology on Customer Loyalty: A Case Study of Maxim in Aceh. Budapest International Research and Critics Institute-Journal (BIRCI-Journal) Vol 4, (4): 8002-8016.

Miles, M.Band Huberman A.M. (1994). An Expanded Sourcebook Qualitative. Jakarta: Pustaka Raya.

Mulyasa, E. (2006). Competency-Based Curriculum. Bandung: Youth Rosda Karya

Munir. (2012). Multimedia Concepts & Applications in Education. Bandung: Alphabeta

Poerwati, L.E. (2013). Guide to Understanding the 2013 Curriculum. Jakarta: Pustaka Raya Achievements.

Pramusinto, N.D., Daerobi, A., and Hartanto, D. (2020). Labor Absorption of the Manufacturing Industry Sector in Indonesia. Budapest International Research and Critics Institute-Journal (BIRCI-Journal) Vol 3 (1): 549-561.

Priyatno, D. (2009). "5 Hours of Learning Data Processing With SPSS 17". Yogyakarta: ANDI.

Priyatno, D. (2013). "Independent Learning to Analyze Data with SPSS". Yogyakarta: Media Kom.

Rafiuddin. (2012). Assessment of Scientific Attitudes towards Process Skills in Elementary Science Learning. Sulawesi: WordPress.

Santoso, S. (2013). “Mastering SPSS 21 in the Information Age”. Jakarta: Elek Media Komputindo.

Sihkabuden. (2005). Learning Multimedia. Malang: Eagle Press.

Sudjana and Rivai. (2001). Learning Media (Manufacture and Use). Bandung: Rosdakarya.