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THE EFFECT OF SCIENTIFIC APPROACH ON ELEMENTARY SCHOOL STUDENTS' LEARNING OUTCOMES IN SCIENCE LEARNING

Yanti Fitria[1], Ary Kiswanto Kenedi[2], Suang Kupon Syukur[3]

[1,3]Universitas Negeri Padang, [2]Universitas Samudra

yanti_fitria@fip.unp.ac.id

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Abstract

This research motivated was the low science learning results of elementary school students as a need for a learning approach that can improve the learning outcomes of elementary school students. The purpose of this research was to determine the influence of scientific approaches on students' learning outcomes of science learning in elementary schools. This research is an experimental study. The research instruments used was study test results. The results of the research with the calculation of t-test obtained the value t-count = 2,179 while t-table = 1,680 where t-count > t-table then H0 is rejected and H1 is accepted. These results confirm that there is an influence of scientific approaches on students' learning outcomes in science learning. The implication of this research can be used as a reference for teachers in improving the science learning outcomes of elementary school.

Keywords: scientific approach, learning outcomes, elementary school

A. Introduction

Elementary schools are one of the formal institutions that aim to develop basic concepts of skills and knowledge (Kenedi et al, 2019). These skills and knowledge are developed into something valuable that can be applied in the processes of everyday life. One of the sciences that must be developed in elementary school is natural science which is called science (Kenedi, 2017).

Science is one of the lessons that must be taught to elementary school students. Science is learning related to all causes that occur in nature (Kiswanto, 2017; Juprianto, 2019; Andriana et al, 2020). Science is the study of all the symptoms and phenomena that occur in nature in the process of scientific experiments (Astimar, Helsa and Kenedi, 2019; Nisa and Rezkita, 2019). Science is a learning related to natural phenomena that is studied through scientific methods such as experimentation and observation (Kenedi, Chandra and Fitria, 2019; Amini and Fitria, 2019) . This statement proves that science learning can be carried out through the investigation process. Especially the science learning in elementary school.

Science learning in elementary schools must be carried out properly. This is because science in elementary schools has the goal of increasing the quality of elementary school students' belief in the power of purpose as creators (creating something). Science in elementary schools also aims to maximize the concept of science in helping the everyday life process. Besides that, science in elementary schools also aims to improve a positive attitude that aims to solve problems in society. Science in elementary schools also aims to develop process skills and generates elementary school students to protect nature as a creation of God (Fraser, Aldrige, and Adolphe, 2010; Pratama, 2018; Fitria, Helsa, and Hasanah, 2019) . From these objectives it can be seen that the purpose of science learning in elementary schools is to increase the knowledge, attitudes and skills of elementary school students related to natural knowledge.

The successes of achieving the goals of science learning can be seen from the learning outcomes of elementary school students (Jasdilla, Fitria and Sopandi, 2019; Amini et al,

2019). However, based on a literature review, it was found that the science learning outcomes of elementary school students were still low (Hamdu and Agustina, 2011; Pranyandari et al, 2014; Oktavera, 2015). This is also evidenced by observations made by researchers in one elementary school which stated that the results of science learning at the school were in the low category. The results of these findings by researchers were analyzed and found the conclusion that low elementary school students' science learning outcomes were caused by the learning process that was not in accordance with the characteristics of elementary school students and the characteristics of science learning. Therefore we need a solution in order to overcome this problem. Workable solutions related to the learning process in accordance with elementary school students' characteristics.

Based on the literature review conducted by researchers, it was found that the scientific approach can improve the quality of science learning for elementary school students (Rini and Mawardi, 2015; Syafriana, 2017; Rahmi, 2017). The scientific approach is a learning approach that aims to create active student learning in constructing concepts, laws and principles with a scientific approach process (Zaim, 2017; Saeroji, Slamet and Khafid, 2018) This fact proves that the scientific approach is in accordance with the characteristics of elementary school students and the characteristics of science learning.

This research is also based on some previous research. Research conducted by Machin (2014) states that the scientific approach is able to instill the character of high school students. Research conducted by Hermawati et al (2018) stated that the scientific approach was able to improve student process skills in the biology program. Research conducted by Syaroni, Dewi and Kasmui (2016) states that learning which was carried out using digital modules and applying scientific-based learning can improve learning independence and learning outcomes of junior high school students. The other research, researched by Tambunan (2019) states that the scientific approach has a positive effect on learning outcomes for junior high school students. Research conducted by Gerde, Schacter and Wasik (2013) states that

the scientific approach is able to improve language skills, literacy skills and mathematical abilities of kindergarten students. These studies prove that learning using a scientific approach can improve the quality of learning so it is suitable to use on this problem. However, the fundamental difference between this research and previous research is that this reserch was conducted at the elementary school level with a different age development process from previous researches. Then this research focused on the science learning process by looking at the learning outcomes obtained. So it can be believed that the application of the scientific approach can affect the learning outcomes of elementary school students.

This research is important to carry out to overcome the problem of the low learning outcomes of elementary school students in science learning. This is based on the goal of science learning which has a huge impact on the life processes of elementary school students in solving daily problems. To prove and at the same time to overcome the problems faced regarding the low learning outcomes of elementary school students, it is necessary to research an experimental study related to the scientific learning process. Therefore, the purpose of this research was to determine the effect of the scientific approach on the learning outcomes of elementary school students.

B. Research Methodology

This research is an experimental research using a quasi-experiment. The research design used was Nonequivalent Control Group Only Design. The sample was divided into two groups, namely the experimental class and the control class. The treatment given to the experimental class was to use the Scientific learning approach while the control class did not use the Scientific learning approach.

The research instrument used a learning outcome test questions. The data analysis technique was carried out by checking the test results. After that, the normality test was carried out using the chi-squared distribution test. The normality test in this research states that

the data are normally distributed. Furthermore, the homogeneity test was carried out by looking for the F-value and it was found that the variance was considered homogeneous. Then the two-party test (t) is carried out. Hypothesis testing aims to compare whether the science learning outcomes of 5^{th} grade students are different.

C. Research Result and Discussion

The first step is done by validating the instruments used. The validity test was carried out using the bisereal point formula. After the validity test of the 50 questions, 35 questions were declared valid. Then the reliability test is carried out which aims to make the instrument used can be trusted as a data collection tool. This test uses the KR 21 formula and the instrument is declared reliable to use. After the instrument is declared valid and reliable, the sample is given the treatment.

The experimental class was treated by applying the scientific approach while the control class applied conventional learning methods or without using the scientific approach.

The data obtained in this research is the data on the final test scores (multiple choice questions) on science subjects. After the learning was carried out, a final test was held in each sample class. The data obtained from the sample class students are as follows:

Table 1. Result

Class	N	$\bar{X}$	S	X-max	X-min
Experiment	23	72,61	10,96	90	50
Control	23	60,90	12,40	80	40

It can be seen that the average science learning outcomes of the experimental class are higher than the average learning outcomes of the control class. The standard deviation of the experimental class is smaller than the standard deviation of the control class. This shows that the experimental class has little diversity, so that the students' scores are not too far from the class average. The maximum and minimum value acquisition between the

experimental class and the control class has a difference in the scores number of 10. The table also shows that the average science learning outcomes of the experimental class students ($\bar{x}$ = 72.61) are higher than the average science learning outcomes of the control class students. ($\bar{x}$ = 60.9). The standard deviation of the experimental class (S = 10.96) was higher than the standard deviation of the control class (S = 12.4).

The acquisition of the highest and lowest scores between the experimental class and the control class has different scores, the highest score of students in the experimental class ($xmaks$ = 90) is higher than the control class ($xmaks$ = 80), so it is also seen from the lowest score obtained by students in the experimental class ($xmin$ = 50) was higher than the score in the control class ($xmin$ = 40). Furthermore, the students' scores can be seen in the following table.

Table 2. Students' Completeness Scores of the Experimental Class and Control Class

Class	The number of students	Completed		Not complete	
		amount	Percentage	Amount	Percentage
Experiment	23	10	43.48	13	56.52
Control	23	4	37.40	19	82.60

The table 2 shows that the completeness percentage of experimental class students is higher than the percentage of control class students. In the experimental class, the number of students who completed were 10 students or 43.48% and those who did not complete were 13 students or 56.52% with the total number of students in the experimental class are 23 students. Whereas in the control class 4 students or 17.40% were completed and 19 students or 82.60% were incomplete from 23 students. From the analysis found that there is an influence on the learning outcomes of elementary school students in the experimental class using a scientific approach with a control class that does not use an approach. It can be seen from the average score, the experimental class students are higher than the control class. The mean score of the experimental class students was

72.61 while the control class students' mean score was 60.9.

The hypothesis test results are done using the t-test. From the calculation results, it is found that H0 is rejected because the obtained t count = 3.574 is greater than t table = 1.680. It can be concluded that H0 is rejected so that there is an effect of the scientific approach on student learning outcomes in science learning of elementary schools.

The results of this research are supported by many previous researches. Research conducted by Kusmaryono and Suyitno (2016) states that a scientific approach can improve students' understanding of mathematical concepts. Research conducted by Shofiyah, Afrilia and Wulandari (2020) states that a scientific approach can improve the literacy skills of junior high school students. Research conducted by Herman and Jupri (2017) found that the scientific approach was able to improve the problem-solving abilities of elementary school students. Research conducted by Firman, Baedhowi and Murtini states that a scientific approach can improve learning outcomes for high school students. Research conducted by Wiwin, Kustijono and Hakim (2019) states that the scientific approach has an influence on the learning activities of vocational students. From previous research, it can be seen that the scientific approach has an effect on the quality of student learning. These results are reinforced by the researchers' findings that the scientific approach has an effect on improving science learning outcomes of elementary school students.

This research proves that the scientific approach affects the learning outcomes of elementary school students. This scientific approach is an approach that aims to increase the level of student knowledge, especially in improving students' higher-order thinking skills in solving a problem systematically and being able to train students in communicating ideas and ideas in each step arranged therein (Atmarizon and Zaim, 2016 ; Subagia, Wiratma and Selamat, 2019; Alberida, 2020). This activity is what encourages the formation of a learning process that makes students need learning to encourage the achievement of learning outcomes. In the scientific approach, there are 5 stages that encourage the

achievement of student learning outcomes. The first stage is the observing stage. The stages of observing in a scientific approach are very influential on the achievement of learning outcomes. The observation stage is carried out by means of observation (Sodik, Faridi and Saleh, 2020). The observation process can increase meaningfulness of the learning process so that it can improve learning outcomes. By observing, it can present objects in real terms so that students can understand the material as a whole, (Susantini, Faizah and Prastiwi, 2016; Hikmawati, Rokhmat and Sutrio, 2017).

The next stage in this scientific approach is to ask questions. Asking activities can encourage and guide students' abilities in digging up information so that it can increase the students' insight (Basiroh, 2017; Gani and Ardi, 2020). In questioning activities, the teacher opens wide opportunities for students to ask questions about what they saw, listened to, read or seen. The next stage in this scientific approach is gathering information. This activity is an activity to explore and collect information from various ways, (Istuningsih, Baedhowi and Sangka, 2018; Maulida and Anwar, 2020). This activity can be done through experiments. Experimental activities are able to develop a conscientious, honest, polite attitude, respect the others' opinions, the ability to communicate, apply the ability to gather information in various ways that are learned, develop lifelong learning and learning habits. Another activity in a scientific approach that is able to improve the learning outcomes is association. This activity aims to improve students' reasoning skill, (Prayoga, Sutarsyah and Yufrizal, 2020) This activity is carried out to determine the linkages of information with other information, find patterns of linkages information so that students are able to solve problems in the science learning process (Afriyanti, 2018). Other activities that can improve learning outcomes in a scientific approach are communicating activities. This activity provides an opportunity for students to convey what they have learned, (Prayoga, Sutarsyah and Yufrizal, 2020). This activity can develop honesty, conscientiousness, tolerance, the ability to think systematically, express opinions briefly and clearly, and develop good and

correct language skills. This is what causes the influence of the scientific approach in science learning at the elementary schools.

D. Conclusion

The results of the research with the calculation of t-test obtained the value t-count = 2.179 while t-table = 1,680 where t-count> t-table then H0 is rejected and H1 is accepted. These results confirm that there is an influence of scientific approach on students' learning outcomes in science learning. This research recommends that teachers can use a scientific approach in the science learning process. The implications of this research can be used as a reference in improving science learning at the elementary schools.

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