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The Influence of the Inquiry Learning Model on Science Learning Outcomes of SDN 23 Ampenan Students

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ABSTRACT
This study aims to determine whether there is influence of the inquiry learning model on student learning outcomes in science learning. This inquiry learning model has the main advantages of five important components, namely asking questions, formulating hypotheses, collecting data, analyzing data, and making conclusions that can improve student learning outcomes. This research is a semi-experimental study with a non-equivalent control group design. The sample in this study consisted of two classes, namely the experimental class and the control class. The data collection instrument uses a description test that meets validity and reliability. The results of this study indicate that there are differences in student learning outcomes between the experimental class using the inquiry learning model and the control class using the conventional learning model. Because the average value of the experimental class is higher, it is concluded that there is an influence of the inquiry learning model on student learning outcomes.

INTRODUCTION

Learning is the most important activity in the entire educational process. This means that an individual's success in achieving educational goals depends a lot on how learning can take place effectively. Changes as a result of the learning process can be proposed in various forms such as changes in knowledge, understanding, attitudes, and skills as aspects that exist in individuals who learn (Sudjana: 2000).

Law on the National Education System (UUSPN) No. 20 of 2003 says learning is the process of student interaction with educators and learning resources in a learning environment. In the sense that learning is a learning process created by teachers with the aim of developing students' thinking creativity so that thinking skills also increase.

Learning is a two-way communication, teaching is done by the teacher as an educator, while learning is done by students. Learning as a learning process built by teachers to develop student creativity that can improve students' critical thinking skills, and can increase the ability to construct new knowledge as an effort to increase good mastery of learning material (Sagala, 2010). One of the subjects that can improve students' critical mindset is science.

Science is systematic knowledge and is formulated related to the existence of material phenomena and is based mainly on observation (Fowler, in Trianto, 2010). Daryanto (2014) revealed that learning with a scientific approach is a learning process designed in such a way that students

can actively construct concepts, laws, or principles through the stages of observing, formulating problems, proposing or formulating hypotheses, collecting data, analyzing data, and drawing conclusions. In science subjects, one of the learning models that can be used during the learning process is the inquiry learning model.

The inquiry learning model is a process of obtaining and obtaining information by conducting experiments to find answers or solve problems to questions using critical and logical thinking skills. The inquiry learning model is a learning activity that involves the maximum of all students' abilities to search and investigate something (objects, humans, or events) systematically, critically and logically, analysis so that they can formulate their own discoveries with confidence. The inquiry learning model can be one of the learning models that can improve learning outcomes.

Learning outcomes are changes in individual behavior that include cognitive, affective, and psychomotor domains. This change in behavior is obtained after researchers complete their learning programs through interaction with various learning sources and learning environments (Rusmono, 2017). Learning outcomes have an important role in the learning process. The main goal to be achieved in learning activities is that learning outcomes can be used to find out the extent to which students can understand and understand the material (Hamalik, 2004). Furthermore, Nawawi (2013) stated that learning outcomes can be interpreted as the level of student success in learning subject matter at school which is expressed in scores obtained by test results regarding a certain amount of subject matter. But unfortunately, learning models that are not optimal are often the cause of learning outcomes that are also not so optimal.

This is evident from the UNDP (Unit Nation Development Programe) report in 2002. Indonesia ranks 111th, in the field of education and in 2005 Indonesia ranks 110th. From the report shows that the level of quality of education in Indonesia is still low when compared to other countries in the world. After efforts to improve in the field of education, it is increasingly realized that there are still many shortcomings lying in the approaches and methods used by teachers in the teaching and learning process involving students and teachers (Semiawan, 2010).

Based on observations and interviews at SDN 23 Ampenan Mataram City on April 15, 2022, the problem in class V in the learning process is that there are many tasks that require students to memorize the material, therefore student learning outcomes do not improve and do not meet KKM standards in each subject, especially in science subjects. The lack of student learning outcomes is also suspected because the learning process carried out by teachers more often provides lecture methods so that students tend to be passive. On the other hand, student activities take notes, listen and do practice questions from textbooks as a benchmark in learning, so that the ability to improve learning outcomes, students are not too prominent. The reality in the field shows that the learning results obtained are still not satisfactory. active in reading because there are still many students who have difficulty reading texts in books and school exam results that do not meet subject passing standards, especially in science subjects. The inquiry learning model is applied to encourage students to think critically, express their opinions freely, encourage students to contribute their thoughts to solve problems together, and take one alternative answer to solve problems based on careful consideration. The method of image media-assisted discussion is chosen based on student needs. In addition, students will be accustomed to thinking critically, creatively and able to argue so as to increase students' understanding of thinking. With the hope that there is an influence on the inquiry learning model given to students in student learning outcomes.

Based on the background where the inquiry learning model can improve student achievement and there are influences that can affect learning outcomes, the inquiry learning model can be applied to science learning outcomes in Grade V students of SDN 23 Ampenan for the 2021/2022 Academic Year, especially on the material properties of light.

METHODS

Based on the formulation of the problem and research objectives, the approach used in this study is a quantitative approach of quasi-experimental design. Quasi-experimental research is research used to look for the effect of treatment on others under controlled conditions. (Sugiyono 2010). So that in this study the experimental group will be treated by applying the inquiry learning model while the control group is given treatment by applying the lecture method.

The population in this study was the entire student of SDN 32 Ampenan class V which amounted to two classes, namely VA, VB. To determine the control class and experimental class that have the same characteristics, the sampling technique uses random sampling techniques. However, before doing random sampling, class matching is first carried out to take two classes as an experimental class and a control class.

The data collection used in this study was a test in the form of description questions to measure student learning outcomes. The test is given twice, namely pretes before treatment and postes after treatment. According to Azwar (1993), the use of description questions in the implementation of evaluation has several advantages over other forms of questions. The advantages in question include that they can be used to measure students' ability to organize thoughts, analyze problems, interpret and express ideas in detail and regularly expressed in written form. Therefore, researchers use description questions in testing student learning outcomes. The following is presented a grid of instrument description questions.

Data analysis techniques in this study use statistics, namely descriptive statistics. It aims to find out whether any data obtained in the field can be analyzed using parametric statistics (Sugiyono, 2017). Furthermore, the prerequisite analysis test uses the Kolmogorov-Smirnov test to determine whether the data is normal or not. Then, test F (Fisher) for homogeneity test. Homogeneity testing with F test can be done if there are only 2 samples or groups of data to be tested. Test the hypothesis in this study using the T-test of 2 independent samples at a significant level α = 0.05. If the data meets the requirements of the analysis then it uses parametric statistics but if it is not met then it uses non-parametric statistics. The entire data analysis technique uses the help of a computer program SPSS for windows.

RESULT AND DISCUSSION

Matching Experiment Class and Control Class

The population used, namely class V consisting of 2 classes, first carried out class matching to determine the sample as an experimental class and a control class. After class alignment, classes are obtained that have similarities by looking at components such as the number of students, teachers teaching the same, material and allocation of learning time are relatively the same. Then random selection or random sampling was carried out to determine the experimental class and control class. The matching is carried out as follows:

Number of Students

The number of students between the experimental class and the control class has a similarity of 32 students. Females are 20 students while male students are 12 students.

Teacher

In teaching and learning activities, teachers who teach are the same. Both in the experimental class and the control class. The experimental class and control class in this study were guided by Mrs. Fetty Ariska Mindarsih, S.Pd and Mrs. 0 as follows:

Table 1 Experimental Class and Control Class T Test Results

Class	Mean	Standard Deviation	Min	Max	tcalculate	tTable
Experiment	46,87	8.86	30	60	0,453	2,000
Control	45,78	11,78	20	65		

Source: primary data processing

Based on Table 1 above, a calculated value of 0.453 < smaller than the ttable value of 2,000. So it can be concluded that the learning outcomes of the experimental class and the control class have no difference and deserve further investigation.

Results Validity and Reliability

Validity Test

The questions tested in this study have previously been tested for validity first. The validity test of this question item was carried out in the VA class with a total of 22 students. The following validity test results can be seen in the table below.

Table 2 Instrument Validity Test

Item No Instrument Item	Person Colleration	R Table	Information
1	0.42042	0.344	Valid
2	0.417757	0.344	Valid
3	0.61616	0.344	Valid
4	0.449065	0.344	Valid
5	0.47024	0.344	Valid
6	0.535108	0.344	Valid
7	0.610191	0.344	Valid
8	0.65252	0.344	Valid
9	0.358162	0.344	Valid
10	0.381181	0.344	Valid

Based on the test results with the product moment correlation formula, the results of this analysis show that all questions are declared valid.

Reliability Test

If the instrument has been declared valid, then the instrument reliability test is carried out. The reliability test of the problem is calculated using the Cronbach Alpha formula > 0.60 with the decision criterion if the value (r11) is greater than 0.60 then the data can be said to be reliability. The results of the analysis stated that a value (r11) of 0.631 was obtained. Based on the results obtained, the problem can be said to be reliability because it is greater than the Cronbach Alpha formula > 0.60.

Student Learning Outcomes in Science Subjects

The results of students' creative thinking abilities were obtained in sociology learning after being given treatment (postes) in experimental classes with the treffinger learning model and control classes were not given treatment using only conventional models (lectures).

Table 3 Learning Outcomes in Science Subjects

Class	N	Min	Max	Mean	SD	Variant
Experiments	32	60	85	70,15	11, 28	84,65
Control	32	30	75	51,25	9,20	127,41

Source: primary data processing

Based on the results in table 3 above, postes were obtained in the experimental class with an average of 70.15 while in the control class an average value of 51.25 was obtained. This shows that the learning outcomes of experimental class students are higher than those of the control class.

Test Results Data Analysis Requirements

Test analysis requirements is a step taken by researchers in analyzing data that has been collected after conducting research. In addition, a requirements test is carried out as a condition for conducting a hypothesis test. The following data are described data from the data normality test and data homogeneity test.

Student learning normalization test

The normality test aims to find out whether the data of each variable is normally distributed. In this study, the normality test used the Kolmogorov-Smirnov test with two different samples with the following criteria: if the significance value ≥ 0.05 the data is normally distributed, while if the

significance value is ≤ 0.05 the data of this study is not normally distributed. The normality test results can be seen in table 4 below.

Table 4 Normality Test Results

Class	N	¯x	Normality Test	Significance 5%	Information
Experiment	32	70	0,304	0,05	Usual
Control	32	51			

Source: primary data processing

Based on table 4, it is known that the significance value of Asym. Sig. (2-tailed) of 0.304 with a significant level of 5% or 0.05. So that the results show 0.304 greater than the sig > 0.05 it can be concluded that the data is normally distributed.

Homogeneity Test

The homogeneity test was carried out to determine the data variance between the two classes, both the control class and the experimental class. Test homogeneity using the Fisher test formula (F). The homogeneity test results can be seen in table 5 below.

Table 5 Homogeneity Test Results

Class	N	¯x	SD	S2	Fcalculate	Ftabel	Information
Experiment	32	70,15	11,28	84,65	0,664	1,882	Homogeneous
Control	32	51,25	9,20	127,41			

Based on table 5, results are obtained according to the criteria if the values of Fcalculate ≥ Ftable variance of both groups are not homogeneous and vice versa if the values of Fcalculate ≤ Ftable of variance of both groups are homogeneous. In this study shows the results that Fcalculate with a value of 0.664 ≤ smaller than Ftabel with a value of 1.822 so that it can be concluded that the data is homogeneous.

Test the hypothesis

The hypothesis test used in this study is a two-sample t-test using a two-independent sample T test with a significance level of 5%. The results can be seen in table 6 below.

Table 6 Hypothesis Test Results

Class	Mean	Standard Deviation	Min	Max	Manual	
					tcalculate	tTable
Experiment	70	11,28	60	85	7,42	2,000
Control	51	9,20	30	75		

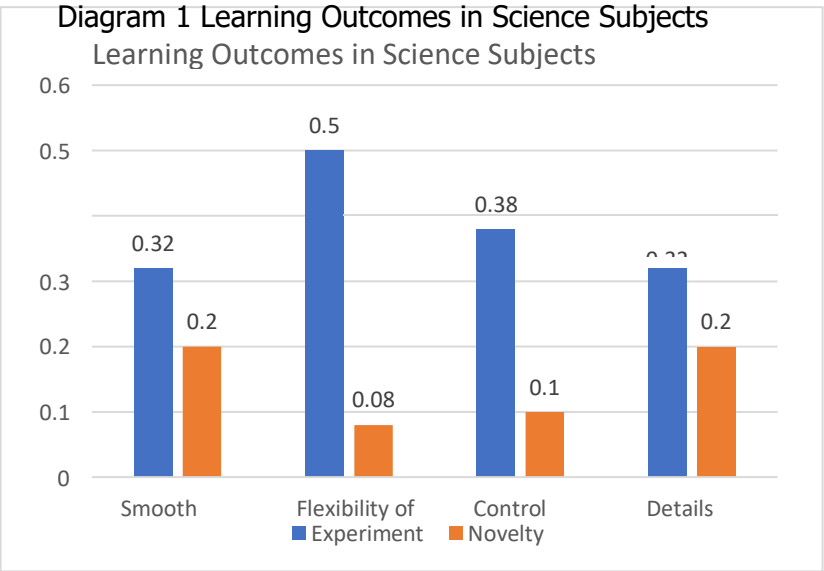
Source: primary data processing

Based on the results of the T test two independent samples on postes after treatment in the experimental class with the inquiry learning model and in the control class with the conventional model. Showing results with a calculated value of 7.42 ≥ more than the value of ttable 2.000 which means that ho is rejected and ha is accepted, so it can be concluded that there is an influence of the inquiry learning model on student learning outcomes in science learning.

N Gain Test

After the hypothesis test, an N-Gain test was carried out to determine the difference or difference in the average value between the Pretest and Postest results from the experimental class and the control class. Based on the results of the N-Gain test processing, a comparison of results can be seen in the following indicators:

Diagram 1 Learning Outcomes in Science Subjects



Based on diagram 1 above, it can be seen that the experimental class has a higher gain score category than the control class. This means that the learning outcomes of students who use the inquiry learning model are greater than the learning outcomes of students using conventional models. The following overall N Gain results can be seen in the table below.

Table 7 N-Gain Test Results

Class	x̄ initial test	x̄ Final Test	*N-Gain*	Category
Experiment	46,87	70,15	0,43	Keep
Control	45,78	51,25	0,10	Low

Source: primary data processing

Based on Table 7, it can be seen that the experimental class N-Gain test result is 0.43 with the medium category. While the result in the control class was 0.10 with a low category. This means that student learning outcomes using inquiry learning models are different from those using conventional learning models.

Discussion

Based on the results of the hypothesis test, it shows that the sig value of <.000 is smaller than 0.05 with a significant level of 5%. So it can be concluded that there is an influence of the inquiry learning model on the learning outcomes of elementary school students in science learning. This study strengthens research (Sasmiyati, 2019, &; Jumaidin, 2020), which states that the use of inquiry learning models can improve student learning outcomes in a fairly high category compared to using conventional methods. This is because students are trained to express the ideas they have creatively. The syntax of inquiry learning consists of 5 stages like this, the first stage of students asking questions, at this stage students improve thinking skills, The second stage formulates hypotheses so that students are able to provide temporary answers or solutions to problems obtained, The third stage collects data, so that students are able to find the necessary information, data, and facts, The fourth stage of student data analysis is able to draw conclusions answers or generelization, The last stage is making conclusions, students are able to apply conclusions. This is supported by (Huda, 2011) which states that student learning outcomes in solving science problems increase after being treated with an inquiry learning model.

In line with the results of research by Rohaeti (2013), Larasati (2020), Pomalato (2005), and Akhmad et al, (2021) that one way to achieve student learning outcomes is by applying the inquiry learning model. The inquiry learning model also affects student learning outcomes because the inquiry learning model is based on constructivism theory that can train student learning outcomes. By applying the inquiry learning model, it can improve student learning outcomes and science

problem solving abilities. The inquiry learning model can improve student learning outcomes in science learning.

The implementation of inquiry learning (Gulo, Trianto, 2009) states, that inquiry not only develops intellectual abilities but all existing potentials, including emotional development and inquiry abilities is a process that starts from formulating problems, formulating hypotheses, collecting data, analyzing data, and making a conclusion. The skills needed to carry out the inquiry learning process are as follows: 1) Asking questions or problems, Inquiry activities begin when questions or problems are asked. To make sure that the question is clear, the question is written on the board, then the student is asked to formulate a hypothesis. 2) Formulate a hypothesis, A hypothesis is a provisional answer to a question or problem solution that can be tested with data. To facilitate this process, the teacher asks students about possible hypothetical ideas. Of all the ideas, one hypothesis was chosen that was relevant to the given problem. 3) Collecting Data, Hypotheses are used for the data collection process. Data can be material tables or graphs. 4) Data Analysis, Students are responsible for testing hypotheses that have been formulated by analyzing the data that has been obtained. The most important factor in testing a hypothesis is right or wrong, if the hypothesis is false or rejected, students can explain according to the inquiry process that has been carried out. 5) Making conclusions, The closing step of the inquiry study is to make provisional conclusions based on the data that has been obtained by students.

Sudjana (1989) stated, there are five stages taken in carrying out inquiry learning, namely: a) Formulating problems to be solved by students; b) Establish provisional answers or better known as hypotheses; c) Seeking information, data, and facts needed to answer hypotheses or problems; d) Draw conclusions or generelization; and e) Apply conclusions

From the results of this study showed that the experimental class was superior to the control class because the experimental class used the inquiry learning model while the control class used a conventional model. The inquiry learning model can direct students to get learning outcomes in solving problems from a combination of existing knowledge and experience to produce new, more complex ideas (Huda, 2013) and describe how these ideas are used, with several stages including: first; Understanding the Challenge Here students are given a game in the form of Make Meach to challenge students in finding a suitable partner from the questions and answers given related to the impact of water quality on life. Second; Generating ideas (generating ideas) students are given the task of looking for environmental pollution then analyzed using 5 W + 1H and provide methods of solving problems. Third; Preparing for action. Students present the results of their discussions in front of the class.

The use of this model cannot be separated from constructivistic thinking. According to NCSS (Sudewi et al, 2012) the social constructivist-based learning process is a powerful learning experience, because the learning process and outcomes become more meaningful, integrated, value-based, full of challenges, and involve students learning actively and creatively. These findings strengthen the hypothesis. Surdinata (2018) that the use of a social constructivist-based model is effective in influencing student innovation and creativity. This view views that the knowledge possessed related to the new concepts obtained must be able to identify and solve existing social problems, especially in the child's environment (Sukardi et al, 2014). Avianty & Cipta (2018) describes several obstacles in student learning outcomes that are influenced by the conditions of several schools with teachers who dominate learning with less attractive learning models. Wadi et al (2017) said that most teachers in schools still do not pay attention to the student-centered learning process but conventional learning is still inherent because student learning outcomes are still in the low category.

CONCLUSION

By looking at the results of research and discussion that the experimental class has a higher average score when compared to the control class, this is because the experimental class is given treatment by applying the inquiry learning model while the control class only uses the convisional learning model. The inquiry learning model has 5 important components that can improve student science learning outcomes. It can be concluded that this inquiry learning model has an influence on the science learning outcomes of SDN 23 Ampenan students.

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