Implementation of Inquiry Method in Science Subject to Improve Learning Outcomes of Second Grade Elementary School Students

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Abstract: Natural and Social Sciences (IPAS) should be a vehicle for students to study the natural surroundings and then apply it in everyday life so that students' learning experiences are meaningful. However, in reality, IPAS learning at UPT SD Negeri 144 Gresik is still teacher-centered and does not involve students in the teaching and learning process so that students do not understand the material, so that student learning outcomes are low. Based on the background of the problem, the researcher uses the inquiry learning method to improve student learning outcomes. The purpose of this study is an effort to improve the learning outcomes of grade II elementary school students in the subject of IPAS on energy sources. The subjects of this study were students in grade II of UPT SD Negeri 144 Gresik. The research method uses Classroom Action Research (CAR), with a CAR cycle model consisting of planning, implementing actions, observing, and reflecting. From the test results that have been conducted, the following data were obtained: The learning completion of class II students of UPT SD Negeri 144 Gresik increased by 47.56% from 40.9% (pre-cycle) to 88.46% (cycle II), and the average student learning outcomes increased by 24.23% from 58.84 (pre-cycle) to 83.07 (cycle II) after using the inquiry method. Based on the test results obtained during the study, it can be concluded that the inquiry method can improve the learning outcomes of class II students at UPT SD Negeri 144 Gresik.

Keywords: Inquiry Method, Learning Outcomes

PRELIMINARY

Natural and Social Sciences (IPAS) are subjects related to how to systematically find out about nature, so that Natural and Social Sciences (IPAS) are not only mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery. In addition, learning Natural and Social Sciences (IPAS) can be a vehicle for students to study the surrounding environment, as well as further develop the knowledge gained by applying it in everyday life so that students' knowledge becomes meaningful. However, in reality, IPAS learning at UPT SD Negeri 144 Gresik is still

teacher-centered because it is still dominated by teachers and does not involve students in the teaching and learning process. The understanding of students at UPT SD Negeri 144 Gresik regarding the material on energy sources is still low, only a few students understand the material. When a written test is held, students are still below standard. Only 5 out of 26 students get a score of 70. While the rest get scores below 70. In fact, the standard for completing the value determined by the researcher is 70.

Learning outcomes are seen in changes in behavior. Learning outcomes according to (Sudjana, 2017) are the abilities that students have after receiving their learning experiences. Learning outcomes are used by teachers as a measure or criterion in achieving an educational goal. This can be achieved if students already understand learning accompanied by better behavioral changes. According to Slameto in (Nabiilah & Abadi, 2020) it is stated that there are two types of factors that influence learning success, namely internal factors and external factors. Internal factors are within the student, namely physical and psychological factors. While external factors include factors from the family, school, and community environments. From the phenomena above, the problem that must be solved immediately is the low learning outcomes of students in understanding the material "Energy Sources", this is because teachers are less able to adjust learning methods to the characteristics and learning needs of class II students at UPT SD Negeri 144 Gresik in the 2023/2024 academic year or teachers are less precise in choosing learning methods. According to (Faradita, 2017) educators, in this case teachers are expected to be able to develop learning strategies to be more innovative and interesting so that students' learning motivation can be increased. The alternative that researchers choose is to apply the inquiry learning method to students. Previous research by (Widyawati, 2022) obtained results that the application of the inquiry learning method properly and smoothly can increase student activity and involvement in the learning process.

According to Sanjaya in (Fanani, 2014) the learning method is a way used to implement a plan that has been prepared in the form of real and practical activities to achieve learning objectives. One of the learning methods that can be used in learning activities is the inquiry method. According to Komalasari, the inquiry method is a learning method that seeks to instill the basics of scientific thinking in students, so that in the

learning process students learn more by themselves, develop creativity in understanding concepts and solving problems (Sari & Sumarli, 2019).

According to (Harahap, 2023) using the inquiry learning method will create effective, conducive learning conditions, so that it can facilitate and smooth the teaching and learning process. The inquiry method provides students with the opportunity to learn to develop their intellectual potential in the network of activities that they themselves arrange to find something. Students are encouraged to actively seek answers to the problems they face and then draw their own conclusions through critical, logical, and systematic thinking processes (Gulo & Waruwu, 2022)

The essence of inquiry or investigating is the process of moving from observation to understanding. In this activity, students learn to use critical thinking skills. The steps of the inquiry method are (1) observation, questioning, hypothesis, data gathering, conclusion. With the inquiry method or finding their own understanding, children will conduct direct experiments where children will gain their own experience so that what they have learned will not be forgotten later (Rositawati, 2019). Based on the problems that have been discussed, the purpose of this study is to determine the application of the inquiry method in improving the learning outcomes of the subject of science in class II students of UPT SD Negeri 144 Gresik. The benefits of this study are to provide students with learning experiences in using the inquiry method and to improve the learning outcomes of science in class II students of UPTD SD Negeri 144 Gresik.

METHOD

This study uses a research method or classroom action research design (CAR). According to (Wardhani, 2017) Classroom Action Research (CAR) is a research conducted by the class teacher himself through self-reflection with the aim of improving his performance so that student learning outcomes increase. The reference for the research design used is through 4 stages, as follows:
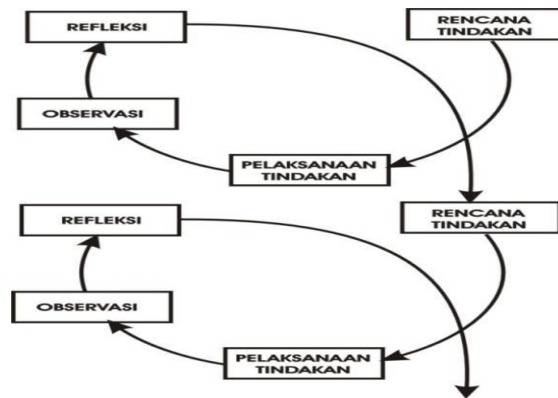
Picture 1 PTK stages (Arikunto, 2014)

This classroom action research was conducted through 2 cycles, for each cycle four main activities were carried out, namely (1) planning; (2) implementation, (3) observation, and (4) reflection. The research location was carried out at UPT SD Negeri 144 Gresik in the odd semester of the 2023-2024 school year. The research subjects were 26 students of class II UPT SD Negeri 144 Gresik, consisting of 14 female students and 12 male students. In this study, to determine the increase in student learning outcomes, the instrument used was a test sheet and the data sought were student learning outcomes and student learning completeness. To calculate the average class value, it can be analyzed using the following formula.

$$\overline{X} = \frac{\sum X}{\sum N}$$

Information: $\overline{X}$ = Average value

$\sum X$ = The sum of all student grades

$\sum N$ = The number of students

The learning outcome test data were analyzed using individual and classical completion levels. Based on the minimum completion criteria (KKM) from UPT SD Negeri 144 Gresik, a student can be said to have completed if they get a score of ≥ 70. The average student score data were analyzed using:

$$\text{Final score (NA)} = \frac{Total\ Scores\ Obtained\ by\ Students}{Maximum\ Total\ Score} \times 100\%$$

Classical completion is said to be achieved if all students in the class have completed their studies as much as possible. ≥85%.

To calculate the percentage of learning completion, the following formula is used:

$$\text{Percentage of completion} = \frac{Number\ of\ frequencies\ that\ have\ completed\ learning}{Total\ number\ of\ students} \times 100\%$$

$$P = \frac{n}{N} \times 100\%$$

Information:

P = Percentage of completion

 n = Number of frequencies that have completed learning (mark ≥70)

N = Total number of students

RESULTS

The presentation of data obtained in learning activities in cycle I is as follows:

Table 1 Results of Cycle Test I

| No	Name	Value	Completed	Not Complete	No	Name	Value	Completed	Not Complete
1	Student1	80	√		14	Student14	75	√	
2	Student2	75	√		15	Student15	55		√
3	Student3	70	√		16	Student16	70	√	
4	Student4	85	√		17	Student17	60		√
5	Student5	75	√		18	Student18	75	√	
6	Student6	60		√	19	Student19	70	√	
7	Student7	70	√		20	Student20	90	√	
8	Student8	60		√	21	Student21	65		√
9	Student9	65		√	22	Student22	75	√	
10	Student10	80	√		23	Student23	80	√	
11	Student11	70	√		24	Student24	75	√	
12	Student12	70	√		25	Student25	80	√	
13	Student13	60		√	26	Student26	65		√
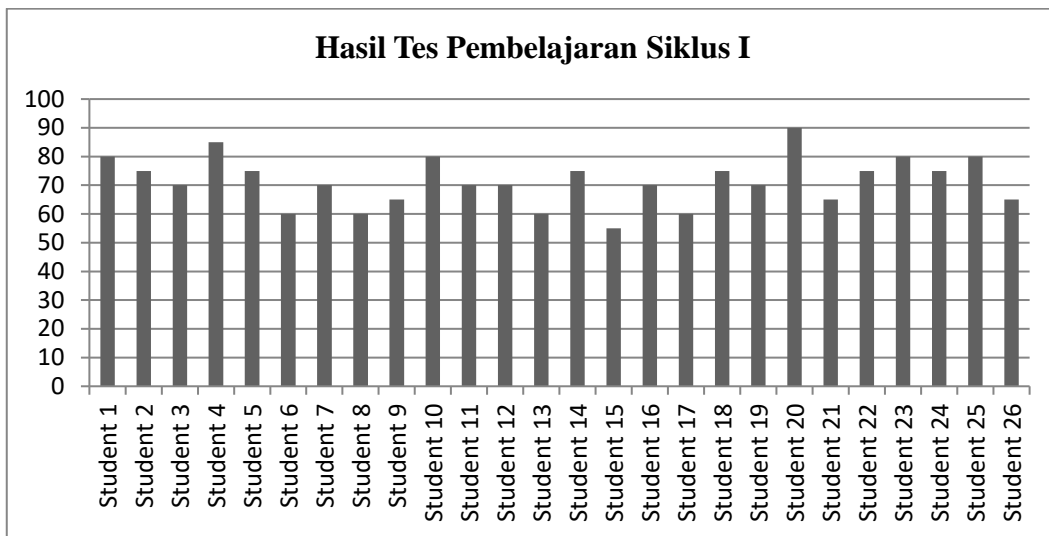
Figure 2 Student Learning Outcomes Achievement Cycle I

The frequency of student learning outcomes in cycle 1 is shown in the following table.:

Table 2 Frequency of Student Learning Outcomes Cycle I

Value	Frequency	N x F
55	1	55
60	4	240
65	3	195
70	6	420
75	6	450
80	3	240
85	2	170
90	1	90
TOTAL	26	1860

From the presentation of the data above, the average class value is obtained as follows::

$$X = \frac{\sum X}{\sum N} \ = \ \frac{1860}{26} = \ 71,53$$

Meanwhile, the student's learning completion can be obtained by calculating using the following formula:

$$p = \frac{n}{N} x \ 100\% = \frac{18}{26} \ x \ 100\% = 69,23 \ \%$$

The following diagram shows the percentage of students who completed and did not complete learning in cycle I.
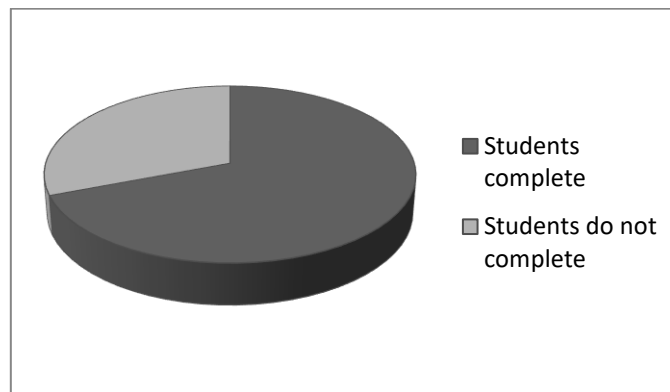
Figure 3 Percentage of Student Completion in Learning Cycle I

By looking at the data obtained by each student on the test, it can be seen that 18 students got a score above 70, while 8 students got a score below 70. And if the average value of class II UPT SD Negeri 144 Gresik is 71.53% with learning completion reaching 69.23%. Because classical completion has not reached 85%, there needs to be improvement in learning in the next cycle, namely cycle II. However, when compared to the learning outcomes before improvement, the results of learning improvement in cycle I show an increase. The learning outcomes before improvement show that the average class is 58.84 with learning completion of 30.76% or 7 students out of 26 students. For more details, the comparison between learning outcomes before improvement and cycle I improvement is presented in table 2 below:

Table 3 Comparison of Final Test Results Between Pre-Cycle and Cycle I

Comparison	Pre-Cycle	Cycle I
Average Value	58, 84	71, 53
Mastery learning (≥70)	40,9 %	69,23 %

Learning in cycle II is carried out with the aim of improving learning so that learning activities are more effective and student learning outcomes are more improved. The data results in cycle II are as follows.

Table 4 Results of Cycle II Test

No	Name	Value	Information		No	Value	Value	Information	
			Completed	Not Complete				Completed	Not Complete
1	Student1	85	√		14	Student14	80	√	
2	Student2	85	√		15	Student15	60		√
3	Student3	80	√		16	Student16	80	√	

4	Student4	90	√		17	Student17	65		√
5	Student5	85	√		18	Student18	85	√	
6	Student6	65		√	19	Student19	80	√	
7	Student7	80	√		20	Student20	100	√	
8	Student8	70	√		21	Student21	80	√	
9	Student9	75	√		22	Student22	80	√	
10	Student10	90	√		23	Student23	85	√	
11	Student11	80	√		24	Student24	80	√	
12	Student12	80	√		25	Student25	85	√	
13	Student13	75	√		26	Student26	80	√	

The following is a presentation of the achievement of student learning outcomes in cycle II learning in the form of a diagram.
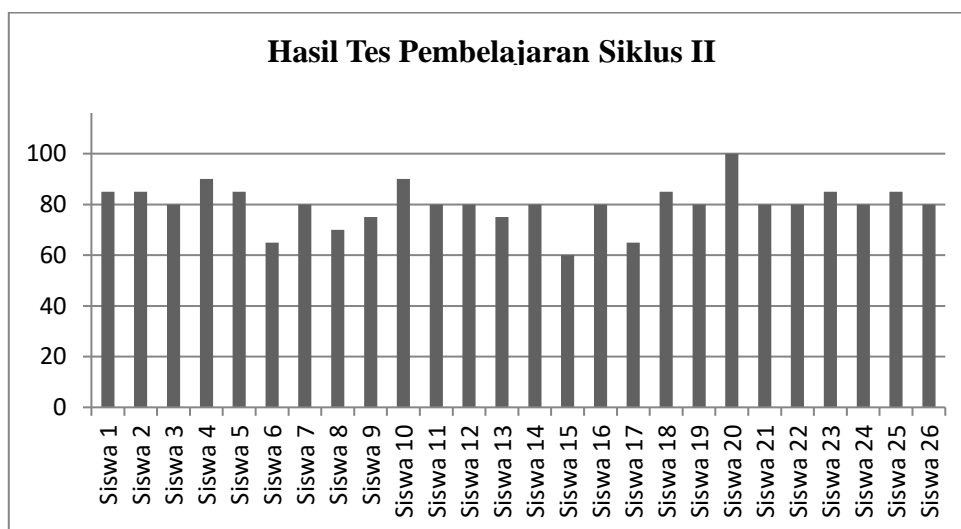

Figure 4 Achievement of learning outcome values in learningcycle II

Berikut ini sajian frekuensi hasil belajar Studentpada pembelajaran siklus II dalam bentuk tabel.

Table 5 Frequency of Student Learning Outcomes in Learning Cycle II

Value	Frequency	N x F
60	1	60
65	2	130
70	1	70
75	2	150
80	12	960
85	6	510
90	2	180
100	1	100
Total	26	2160

From the statement above, the average class value is obtained as follows:

$$X = \frac{\sum X}{\sum N} = \frac{2160}{26} \, x = 83,07$$

And the student's learning completeness can be obtained by calculating using the following formula:

$$X = \frac{n}{N} x \, 100\% = \frac{23}{26} \, x \, 100\% = 88,46 \, \%$$
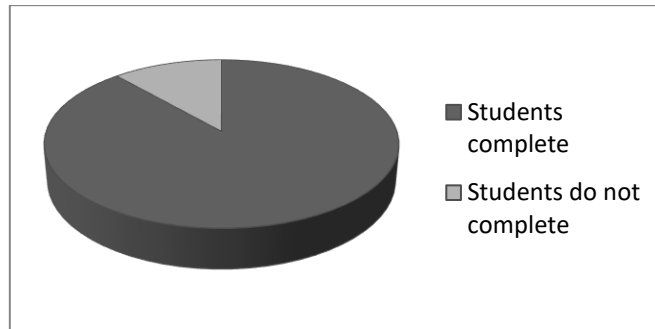

Figure 5 Percentage of Student Completion in Learning Cycle II

From the data obtained above, it can be seen that the increase in the average value of Class II Students of UPT SD Negeri 144 Gresik in cycle I was an average value of 71.53 to 83.07. The class completion obtained was previously 69.23% to 88.46%. For more details, here is the comparative data between pre-cycle, cycle I, and cycle II..

Table 6 Comparison of Final Test Results Between Pre-Cycle, Cycle I and Cycle II

Comparison	Pre-Cycle	CycleI	CycleII
Average Value	58, 84	71, 53	83,07
Mastery learning (≥70)	40,9 %	69,23 %	88,46%

Based on the data, Student class II UPT SD Negeri 144 Gresik has achieved the minimum completion criteria of 70 and has achieved classical completion of 85%. So that there is no need for improvement in the next cycle. The following is a presentation of the comparison of the average learning scores of Students in the pre-cycle, cycle I, and cycle II.
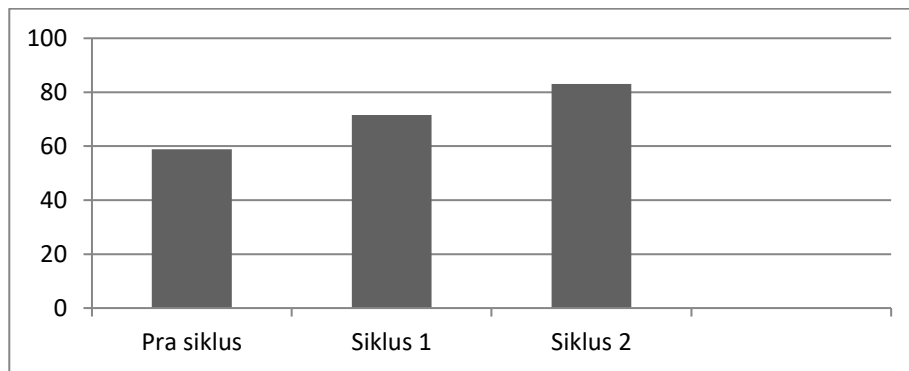
Picture 6 Comparison of the average value of the class between pre-cycle, cycle I, and cycle II

Comparison of student learning completion in pre-cycle, cycle I, and cycle II learning is presented in the following diagram.
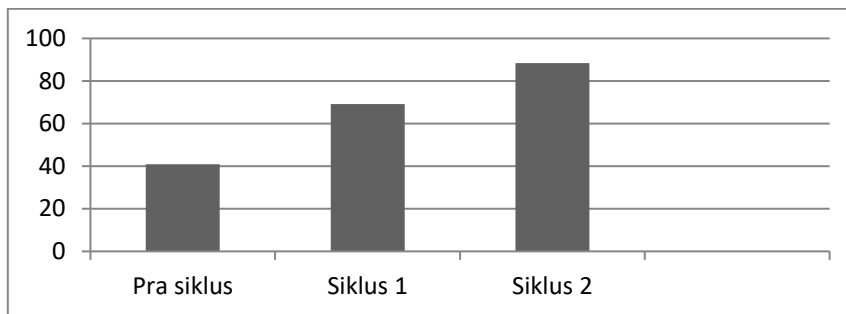

Figure 7 Comparison of Student Completion Percentage Between Pre-Cycle, Cycle I, and Cycle II

DISCUSSION

Based on the results of learning improvements in cycle I based on the data that has been previously presented, the average value of Student is 71.53 and the number of Students who have completed their studies is 18 students so that there are still 8 students who have not completed their studies. From the number who have completed their studies, 69.23% completion was obtained. This means that classical completion has not been achieved because it is said to be complete if in the class there are more than 85% of Students who have completed their studies. The results of observations on the application of the inquiry method show that researchers in learning cycle I are still less than optimal. This is due to several reasons as follows.

1. Teachers do not prepare enough learning activity plans so that Student discovery activities are lacking. Therefore, it is necessary to add activities that involve Students more in conducting inquiries into the RPP.
2. Students do not understand the material, this is evidenced by the lack of Student activity in groups.
3. Students are less motivated to express their opinions. Therefore, teachers need to provide motivation in the form of awards with praise and giving prizes in the form of star stickers for those who want to express their opinions in class discussions.

Based on the results of learning improvements in cycle II as stated above, the average value of Student is 83.07 and the number of Students who have completed their studies is 23 students so that only 3 Students have not completed their studies. From the number who have completed their studies, 88.46% completeness was obtained. This means that classical completeness has been achieved. Because it is said to be complete learning if in the class there are more than 85% of Students who have completed their studies. By using the inquiry method, the learning outcomes achieved by Class II Students of UPT SD Negeri 144 Gresik increased. It can be seen from the results of the tests that the researcher has conducted, namely the average class value in cycle I was 71.53 increasing to 83.07%.

This inquiry method is appropriate if applied to Elementary School Students because it supports several characteristics of Elementary School Students. According to Piaget's theory, the characteristics of elementary school students are: (1) Students have a high curiosity, (2) in conversation, Students always want to talk and communicate their ideas, (3) in building (constructing) knowledge, Students always make something, (4) Students always express themselves, (5) the intellectual development of elementary school students is at the concrete operational level, and (6) the social development of elementary school students is in the play phase. (Arin, Gianistika, & Rahmat, 2019) This is in line with the opinion of (Yasmini N. M., 2022) through the inquiry method, students can play a more active role in the learning process so that learning becomes more meaningful. The increased learning outcomes of students are due to students understanding the material well because students directly discover the energy produced by an object by observing concrete objects and are able to think critically by conveying

their findings in front of other students. From the discussion of cycle I and cycle II, the application of the inquiry method in the subject of science and natural sciences on the material of energy sources can improve the learning outcomes of class II students at UPT SD Negeri 144 Gresik Driyorejo Gresik.

CONCLUSION

The learning completion of class II students of UPT SD Negeri 144 Gresik Semester 1 Academic Year 2023 - 2024 in the subject of science and natural sciences on the material of energy sources increased by 47.56% from 40.9% (pre-cycle) to 88.46% (cycle II), and the average learning outcomes of students increased by 24.23% from 58.84 (pre-cycle) to 83.07 (cycle II) after using the inquiry method. From the results of the research that has been conducted, it can be concluded that the application of the inquiry method in the subject of science and natural sciences on the material of energy sources can improve the learning outcomes of class II students of UPT SD Negeri 144 Gresik. Based on the conclusions above, the research results provide several recommendations as follows: (1) The application of the inquiry method requires well-planned preparation in terms of learning activities, appropriate learning media, and time allocation must be truly taken into account, (2) in the application of the inquiry method in lower grades, good student conditioning is needed, teachers need to guide students and go around to help groups in conducting experiments, and (3) to train students to think critically, teachers need to give students the opportunity to present the results of their work in front of the class and give them the opportunity to give their opinions.

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