



Improving Students' Understanding Using Experimental Methods At SD Inpres Besakolka

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ABSTRACT

This increase was motivated by the finding that when science learning on human and animal organs was held at grade V SD Inpres Besakolka, it should not have reached 0.3% if 0.76% of students had not reached the KKM. So it is categorized as bad. Therefore, the purpose of this study is to improve students' understanding of human and animal organs through experimental methods. The implementation of cycle I was carried out on October 11, 2023, for improvement on cycle II on October 18, 2023. The data needed in this study were obtained through observation of discussions, observation of student and teacher activities, and formative tests. The analysis technique used was quantitative descriptive analysis, with the aim of determining student learning achievement. Based on the results of this study, it can be concluded that implementing the experimental method can improve student learning outcomes by reaching 23 students/88% who completed and 3 students/0.11% who did not complete in science learning on human and animal organs in grade V SD Inpres Besakolka students.

Keywords: *Experimental Methods, Natural Science, Elementary School*

INTRODUCTION

Science or natural science (IPA) is a human effort to understand the universe through precise observations of targets, using procedures, and explaining with reasoning to reach a conclusion (Suparno et al., 2019). Science education in elementary schools aims for students to master knowledge, facts, concepts, principles, and discovery processes, and have a scientific attitude that will be useful for students in studying the natural environment. Science education emphasizes providing direct experience to find out and do so that they are able to explore and understand the natural environment scientifically (Sukawati. Inti, 2020).

One of the problems that often occurs during science learning is the lack of student understanding in learning activities. In addition, science subjects are considered difficult subjects by most students (Effiyati Prihatini, 2017). This is caused by the weak implementation of learning methods applied by teachers in schools. The learning process so far has been less able to develop thinking skills, but has only been directed at the ability to memorize information. Students' brains are forced to remember various information without being required to understand the information obtained to relate it to situations in everyday life. The learning process is still widely carried out conventionally. Teachers have not fully implemented active and creative learning in involving students and have not used various approaches or learning strategies that vary based on the character of the subject matter.

In an effort to improve teachers, they do not only create a set of learning but more importantly, teachers are required to be precise in choosing media, learning materials, and methods in the learning process. Choosing the right method really helps teachers in achieving the success of the learning that is carried out (Mia Titin Yulianti et al., 2023). In the advancement of science and technology, everything requires experiments, including in the way teachers teach in class using experimental methods. What is meant by the experimental method is that when a student carries out an experiment, each process and result of the experiment is observed by each student (Hayuningtyas et al., 2018). This experimental method was widely used by people in the past. All new discoveries, many of which were obtained

through experiments. In addition, the experimental method is a learning method where teachers and students work together on something as a practical exercise of what is known.

The experimental method here is a practical effort using demonstrations aimed at students with the aim that all students can more easily understand and practice what they have learned (Hayuningtyas et al., 2018). The continuous application of this method makes students as questioners, as people who always want to find out because in their minds there are questions and curiosity.

Based on direct observation of teachers at SD Inpres Besakolka, it was obtained that the difficulties faced by students were: a. Lack of student understanding in learning caused by the continuous use of the lecture method. b. Students are very passive in learning activities. c. Students are less active in asking and answering teacher questions. d. In addition, from the results of observations of student answer sheets, it can be seen that students' abilities to solve questions are lacking so that student learning outcomes are low.

Based on the background of the problem above, the problem that causes low student understanding can be formulated as follows: Can the experimental method improve the understanding of grade V students of SD Inpres Besakolka on the material on Human and Animal Organs, 2023/2024 school year.

METHOD

This action research was developed by applying the Classroom Action Research (CAR) method (Hastuti, 2022). The research design used is the research design conducted by Kemmis and Mc. Taggart consists of four components, namely planning, action, observation, and reflection. The four components are considered as one cycle. In this study, the author made the subjects of grade V students of SD Inpres Besakolka. The number of grade V students is 26 students. Consisting of 14 male students and 12 female students. The place or location of the research was carried out in grade V of SD Inpres Besakolka by complying with health protocols. The basis for choosing this class as a place for research is in the subject of science, especially the material on body organs. The research was conducted in semester I of the 2023/2024 academic year, in October 2023.

A. Design of Learning Improvement Procedures

1. Class/Students

In this study, the author used fifth-grade students of SD Inpres Besakolka. The number of fifth-grade students is 26 students. The reason for using fifth grade is because this class requires serious handling to improve students' understanding to face the first-semester exam. Fifth-grade material is the basics of material to move up to a higher level so that they have more mature preparation later.

B. Characteristics of Elementary School Students

- Enjoy Playing. Elementary school teachers should design learning models that allow for elements of play in them.
- Enjoy moving. Teachers should design learning models that allow children to move or move.
- Children enjoy working in groups. From their interactions with peer groups, children learn important aspects of the socialization process.
- Enjoy feeling doing or demonstrating something directly.

C. Description per cycle

In this section, the researcher describes the design of learning activities into two, namely: Cycle I Activities and Cycle II Activities.

D. Implementation of Cycle

a. Cycle I

1) Plan

The researcher prepared a learning plan to be implemented on Tuesday, October 11, 2023, at SD Inpres Besakolka Semester I. It turned out that in the implementation of this initial learning, there were still many students who could not understand the science material about human and animal organs. This may be due to the lack of appropriate learning media and methods that were less suitable for the material. For this reason, the researcher made improvements to learning at the cycle stage. To carry out initial learning, the teacher prepares a learning scenario as follows:

- Delivering learning objectives which are competencies that students must master today.
- Exploring students' initial knowledge in knowing human and animal organs.
- Students listen to the teacher's explanation about human and animal organs.
- Through pictures, students can recognize human and animal organs.
- Students take turns showing human and animal organs.

2) Implementation

Before the Pre-cycle was implemented, the author consulted with the supervisor first to design the learning process based on the difficulties the author faced and to design guidelines for experiencing the cycle learning. Realizing the learning plan that had been prepared, and observed by colleagues. She is Mrs. Frederika Tefa, S.Pd. The results of observations of student learning outcomes and implementation notes were consulted with the supervisor with the aim of not only clarifying existing problems but also reflecting on the implementation of learning. The author used the results of the reflection as a basis for planning improvements to cycle II learning. The learning steps that the author took were as follows:

- Providing apperception in the form of questions related to the material to be taught.
- Explaining the material by providing explanations and inviting students to compete in games prepared by the teacher.
- Summarizing the learning material
- Providing Reinforcement
- Providing Evaluation
- Analyzing evaluation results
- Providing follow-up (improvement and enrichment)

3) Observation/data collection

The observation conducted in this study was observing students and teachers during the learning process conducted by a colleague, Mrs. Frederika Tefa, S.Pd, a teacher at SD Inpres Besakolka by adjusting the instruments provided. The instruments used in this study are:

- Student assignment sheet or evaluation/Test

An evaluation sheet or formative test is done by the teacher. The results of the student evaluation are used to take corrective or enrichment actions. For scores less than 70, improvements are made. For scores greater than or equal to 70, enrichment is made. From the observation sheet above, it is caused by, among others:

- The instillation of the concept of identifying questions about human and animal organs is less acceptable.
- The method used is less appropriate.
- The teacher does not master the students in learning
- The teacher's explanation is too fast.

- Observation Sheet

Intended to observe during the learning process, both teachers and students. Observations on student behavior are carried out by supervisors. The findings of observed behavior are used to make further improvements.

4) Reflection

With the help of colleagues by analyzing the recorded learning outcomes, it was identified that the problem was that the teacher explaining the material to students could not be understood by all students because the teacher was too fast in explaining the learning material and the methods given by the teacher to students were not appropriate so that some students did not understand about human and animal organs.

In implementing learning, it turns out that there are advantages and disadvantages in the learning process. Among them are:

a) Advantages:

- Teachers can use discussion and question-and-answer methods to provide a more learning atmosphere and provide opportunities for students to explore knowledge.

b) Weaknesses:

- Teachers do not provide good motivation to students
- Time allocation is not used well.
- In implementing learning, teachers do not use teaching aids.

b. Cycle II

1) Plan

With the help of colleagues, the researcher prepared a learning improvement plan II on Tuesday, October 18, 2023. The instruments prepared were in the form of a learning improvement plan II. Teaching aids, student worksheets, observation sheets, formative test result analysis sheets, and improvement and enrichment test sheets.

The learning improvement scenario implemented by the teacher to overcome the problem of learning science about human and animal organs is as follows:

- Prepare a Learning Improvement Plan
- The teacher makes the atmosphere more interesting
- The teacher uses pictures
- Students can name human and animal organs
- Students take turns competing to quickly name human organs.
- Students work on the evaluation sheet
- Discuss the evaluation sheet together and conclude the material.

2) Implementation

Before cycle II learning was carried out, the author consulted with the supervisor first to design the learning improvement process based on the difficulties experienced by the author and to design observation guidelines. Cycle II learning carried out improvements to the Learning Plan that had been prepared, and observed by a colleague. She is Mrs. Frederika Tefa, S.Pd, a teacher at SD Inpres Besakolka.

Based on observations of cycle II, the researcher discussed again with colleagues and tutors to implement improvements to learning II. The learning steps that the author took were as follows:

- Providing material apperception in the form of questions related to the material to be worked on.
- Explain the material by providing explanations and inviting students to pay attention to the pictures.
- Providing student worksheets
- Discussing student worksheets
- Summarizing learning materials
- Providing reinforcement
- Providing evaluation
- Analyzing evaluation results
- Providing follow-up (improvement and enrichment)

3) Observation/Data Collection

Data collection was carried out after the researcher completed learning II assisted by colleagues as observers in learning. The researcher and colleagues evaluated the observation sheet instruments, formative test results, and formative test result analysis. The results were recorded and consulted with the Tutor. The progress of students in learning that emerged was students' mastery of human and animal organs so that students could quickly solve questions about human and animal organs.

The observations that will be carried out in this study are observing students during the learning process. The instruments used in this study are:

- Student assignment sheets or evaluations/tests. The formative evaluation/test sheets are used by teachers to measure students' absorption after learning is carried out.
- Observation sheets are intended to observe during the learning process, both teachers and students.

4) Reflection

Conducted on Tuesday, October 18, 2023. The instruments evaluated are Observation sheet instruments, formative test results, and analysis of formative test results, assisted by peers from the problems that are the focus of learning to improve students' understanding of the material on human and animal organs. Students have been able to master it turns out that experimental methods and using appropriate media tools in the learning process can improve students' understanding. In the improvement of learning II, the scores achieved by students showed another increase. Here, many students have scored more than 70. So teachers no longer need to repeat the learning. In carrying out learning, it turns out that they found advantages/strengths and weaknesses in the learning process. Including:

a. Advantages

- With the experimental method, children are more focused on paying attention to the lessons being discussed.
- The classroom atmosphere is more enjoyable

b. Weaknesses

- For shy students, it will be difficult to express opinions or ask questions.

C. Data Analysis Techniques

1. Data Collection Techniques

Qualitative data collection techniques are taken through documentation and tests. While quantitative data collection is taken through tests. Explanation of data collection techniques as follows:

a. Documentation

The documentation method is to find data on things or variables in the form of field notes, transcripts, books, newspapers, magazines, inscriptions, meeting minutes, agendas, and so on (Ngafifi, 2014). Documentation studies are conducted to strengthen the data obtained in observations. The documents used in this study are LKS and student grade lists.

b. Test

A test is a series of questions or exercises and other tools used to measure skills, knowledge, intelligence, abilities, or talents possessed by individuals or groups (Arikunto. 2002:127). Tests can be used to measure basic abilities and learning achievements or accomplishments. Tests are given to students to determine students' cognitive abilities. This test is done by students individually after studying a material. This test is carried out during the learning process through LKS and final learning tests in cycles I and II.

2) Data Analysis

The data required in this study were obtained through observation of the processing of discussion learning methods, observation of student and teacher activities, and formative tests. To determine the effectiveness of a method in learning activities, data analysis is needed. This study used quantitative descriptive analysis techniques, namely a research method that describes reality or facts according to the data obtained with the aim of determining the learning achievements achieved by students and also obtaining student responses to learning activities and student activities during the learning process. To analyze the level of success or percentage of student success after the teaching and learning process, each round is carried out by providing an evaluation in the form of written test questions at the end of each round. This analysis is calculated using simple statistics, namely:

a) Assessing formative tests

The researcher adds up the scores obtained by students, which are then divided by the number of students in the class so that the average formative test can be formulated:

Average student score

$$\text{Average} = \frac{\sum x}{\sum n}$$

Description $\sum x$ = Total student scores

$\sum n$ = Number of students

RESULT AND DISCUSSION

A. Description of Learning Improvement Research Results

1. Cycle I

The implementation of learning activities in cycle I for grade V students of SD Inpres Besakolka can be seen in the following table.

Table 1. Data on student learning outcomes in cycle I

No	Student Name	Results achieved	
		Value	Value Description
1.	Aderty M. Faot	55	Not Completed
2.	Agusto Neolaka	50	Not Completed
3.	Charly Oktofiana Dethan	50	Not Completed
4.	Darling Juwita Boimau	65	Not Completed
5.	Delsi Faot	40	Not Completed
6.	Devis Zakarias Leobisa	70	Completed
7.	Erlin Marsela Selan	75	Completed
8.	Gabriel A. Tnines	65	Not Completed
9.	Immanuel Tauho	55	Not Completed
10.	Ines Hawila Isu	55	Not Completed
11.	Jekson Hariel Selan	40	Not Completed
12.	Jhanuardi Arios Nenotek	45	Not Completed
13.	Jimmy M. Liunokas	40	Not Completed
14.	Jorisno P. Kenjam	55	Not Completed
15.	Kelpisius S. Klau Tauho	50	Not Completed
16.	Marfel Aprian Selan	65	Not Completed
17.	Maria Jihana Banunaek	75	Completed
18.	Maria Sestilia Selan	75	Completed
19.	Merianty S. Lake	70	Completed
20.	Nadila Tlonaen	70	Completed
21.	Onisius Selan	60	Not Completed
22.	Osni Neolaka	55	Not Completed
23.	Sindi Yunika Sakan	60	Not Completed
24.	Stenly Petrason Talan	45	Not Completed
25.	Yolana Lasboy	60	Not Completed
26.	Yonas Ketut Boimau	40	Not Completed
	Average	5,67	KKM = 70
	Completion Percentage	0,3%	

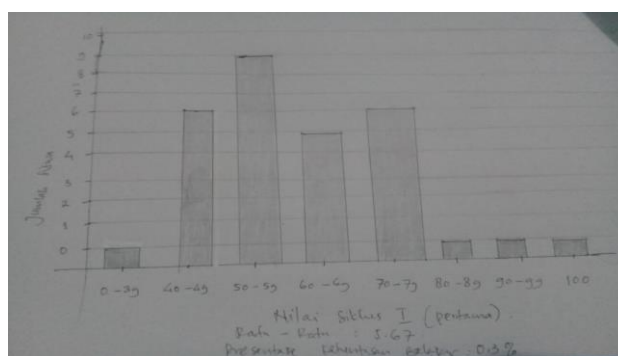
Table 2. Recapitulation of Formative Test Results for Cycle I Learning

No	Value Range	Many Students
1.	0-39	0
2.	40-49	6
3.	50-59	9
4.	60-69	5
5.	70-79	6
6.	80-89	0
7.	90-99	0
8.	100	0
	Amount	26

Table 3. Presentation of Results of Formative Learning Test Cycle I

Value	0-3	4	5	6	7	8	9	10	Number of Students	Completed		Not yet finished		Total Value	Average
	Many Students	0,3	20	0,76											
Many Students	0	6	9	5	6	0	0	0	26	6	0,3	20	0,76	1.475	5.70

Graph 4. Data on students who obtained grades in Cycle I



Based on table 4. and Graph 4, shows that the learning outcomes of grade V students of SD Inpres Besakolka in cycle I reached an average of 5.67 with details of 26 students, whose scores were complete were only 3 students who got a score of 75, and 3 students got a score of 70, then those who did not complete were 3 students who got a score of 65, there were 2 students who got a score of 60, there were 4 students who got a score of 55, there were 4 students who got a score of 50, there were 2 students who got a score of 45, there were 5 students who got a score of 40, So the percentage of student completion was 0.3% of students, and those who did not complete were 0.76% of students, so it can be categorized as still not satisfactory.

2. Cycle II

The implementation of learning activities in cycle II for grade V students of SD Inpres Besakolka can be seen in the following table.

Table 5. Student Learning Outcomes Data Cycle II

No	Student Name	Results achieved	
		Value	Value Description
1.	Aderty M. Faot	75	Completed
2.	Agusto Neolaka	70	Completed
3.	Charly Oktofiana Dethan	75	Completed
4.	Darling Juwita Boimau	100	Completed
5.	Delsi Faot	65	Not Completed
6.	Devis Zakarias Leobisa	85	Completed
7.	Erlin Marsela Selan	100	Completed
8.	Gabriel A. Tnines	95	Completed
9.	Imanuel Tauho	80	Completed
10.	Ines Hawila Isu	100	Completed
11.	Jekson Hariel Selan	85	Completed
12.	Jhanuardi Arios Nenotek	90	Completed
13.	Jimmy M. Liunokas	85	Completed
14.	Jorisno P. Kenjam	80	Completed
15.	Kelpisius S. Klau Tauho	85	Completed
16.	Marfel Aprian Selan	90	Completed
17.	Maria Jihana Banunaek	95	Completed

18.	Maria Sestilia Selan	100	Completed
19.	Merianty S. Lake	100	Completed
20.	Nadila Tlonaen	100	Completed
21.	Onisius Selan	70	Completed
22.	Osni Neolaka	75	Completed
23.	Sindi Yunika Sakan	95	Completed
24.	Stenly Petrason Talan	65	Not Completed
25.	Yolana Lasboy	95	Completed
26.	Yonas Ketut Boimau	65	Not Completed
	Average	85	KKM=70
	Completion Percentage	88%	

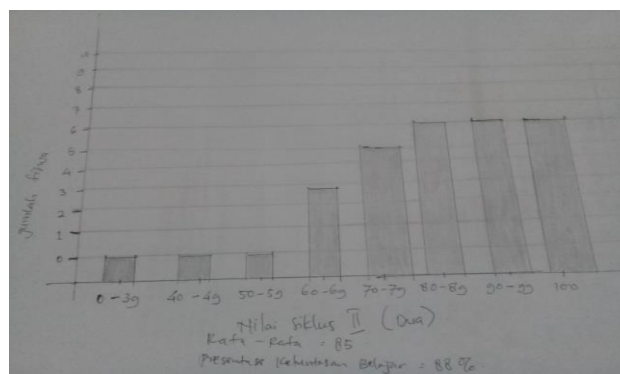
Table 6. Recapitulation of Results of Formative Learning Test Cycle II

No	Value Range	Many Students
1.	0-39	0
2.	40-49	0
3.	50-59	0
4.	60-69	3
5.	70-79	5
6.	80-89	6
7.	90-99	6
8.	100	6
	Amount	26

Table 4.6 Percentage of Results of Formative Learning Test Cycle II

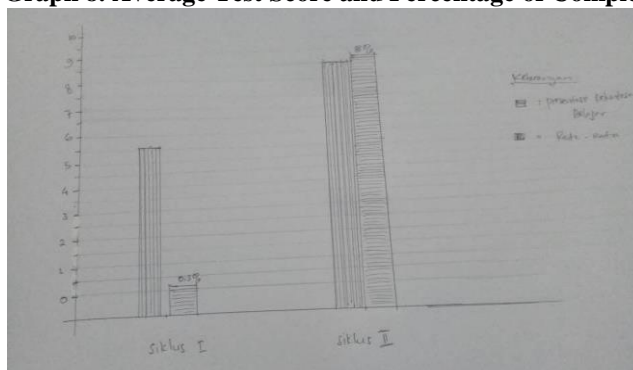
Value	0-3	4	5	6	7	8	9	10	Number of Students	Completed		Not yet Completed		Total Value	Average
										Many Students	%	Many Students	%		
Many Students	0	0	0	3	5	6	6	6	26	23	88%	3	0.11%	2.210	85

Graph 7. Data on students who obtained grades in Cycle II



Based on table 7 and Graph 7 show that the learning outcomes of grade V students of SD Inpres Besakolka in cycle II reached an average of 85, with details of 26 students, who achieved a complete score 6 students who got a score of 100, and 4 students who got a score of 95, there were 2 students who got a score of 90, there were 4 students who got a score of 85, there were 2 students who got a score of 80, there were 3 students who got a score of 75, there were 2 students who got a score of 70, there were also incomplete scores, namely 3 students who got a score of 65, so overall from the results of learning improvements in cycle II, the percentage of student completion reached 88%, so it can be categorized as very satisfactory.

Graph 8. Average Test Score and Percentage of Completion



3. Cycle I (first), and Cycle II (two)

Average Value Completion Percentage, From the diagram it can be seen that in cycle I the average value is 5.67, and the percentage of completion is 0.3%, with a bad category, in cycle II the average value is 85, and the percentage of completion is 88%, can be categorized as very good.

B. Discussion of Research Results and Learning Improvement

Classroom Action Research (CAR) is research conducted by teachers in their own classes through self-reflection with the aim of improving their performance as teachers so that student learning outcomes increase. In learning Natural Sciences, especially human and animal organs, the problem arises that students do not understand human and animal organs.

This is in accordance with the opinion of experts that the use of learning media or teaching aids is very helpful for students in the learning process. Likewise, the experimental method can help students understand human and animal organs.

In the first cycle of initial learning, the evaluation results showed the teacher's failure in implementing learning. The average class score was only 5.67, only 6 students completed and 20 students had not completed. The completion rate was only 0.3%. Therefore, the teacher needs to take action to improve learning.

In cycle II, in improving learning, the teacher directed the understanding of the material on human and animal organs. With teacher guidance, it turned out that students were able to achieve learning objectives. This is shown by the results of the formative value which increased from an average of 5.67 in cycle I, rising to 85. Meanwhile, 23 students completed the learning. The completion rate reached 88%.

So after the improvements were made, the shortcomings could be overcome and learning could achieve the desired goals.

The unique things that emerged during Natural Science learning are as follows:

- Students are accustomed to seeing visible human organs (outside the human body) but do not fully understand other organs (inside the human body).
- There are some students who are still wrong in naming and distinguishing human organs.

CONCLUSIONS

a. Conclusion

With the completion of this improvement activity, based on the implementation stage starting from cycle I to cycle II. The author draws a conclusion:

- Learning using the experimental method can make it easier for children to absorb learning materials so that there is an increase in learning outcomes.
- With the experimental method, there is a significant increase in learning outcomes, as evidenced by an average of 5.67 or a learning completion percentage of 0.33% to an average of 85 with a learning completion percentage of 88%.

b. Suggestions

Based on the conclusions above, the suggestions that the author can put forward are as follows:

- Teachers should collaborate on several learning methods so that learning is more attractive and able to make students feel the flow. Especially on boring learning materials.
- Teachers should use the experimental method so that the learning situation becomes more conducive and enjoyable.

- In order for learning outcomes to increase significantly, teachers should use the experimental method.

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