A Improvement Of Science Learning Outcomes Electrical Circuits Materials Through Problem Based Learning Models

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Abstract. The goal of this study is to ascertain if the problem-based learning approach has improved the learning results for class VI students at SD Negeri Karangtalun 02 Cilacap. 34 students in grade 6 SD Negeri Karangtalun 02, including 16 male and 18 female students, participated in this sort of classroom action research study. The poor scientific learning outcomes in the subject of electrical circuits are what spurred this investigation. Observation, testing, and documenting were the approaches employed for data collecting. There were two cycles to this study. The findings demonstrated that using problem-based learning to teach students about basic electrical circuits might enhance their learning outcomes. Pre-cycle students' average learning achievements were just 66.07 After using the PBL model, the average value rose to 74.57 in cycle I and to 84.29 in cycle II. According to these findings, the Problem Based Learning (PBL) teaching approach may increase scientific learning outcomes in class VI students' first semester at SD Negeri Karangtalun 02 by 91%.

Keywords: Problem Based Learning, Learning Outcomes, Science.

1. Introduction

Learning is the process of developing long-lasting abilities, attitudes, and habits as a consequence of practice or experience. If a person's conduct has changed, it might be said that they have learnt something. Individuals learn in accordance with their surroundings and developmental stage. In order for the concepts taught to be properly understood and not easily lost, the learning process involves more than just memorization of facts or concepts. It also involves making connections between concepts to generate a comprehensive knowledge. As a result, the teacher seeks to identify and explore the concepts that pupils already have in order to combine them with the new information that will be given in order for learning to be relevant.

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Students will learn more effectively if they can put what they are learning into practice. The meaningful learning is a process of linking new information to relevant concepts contained in the cognitive structure of students who participate in learning[1]. As a result, teachers must organize and create learning opportunities for pupils by ensuring that they are taught the proper ideas. However, it is still challenging to implant conceptual knowledge in kids, particularly when it comes to studying information for science.

IPA is the study of the cosmos and all of its elements. The study of natural sciences in primary schools is crucial since they are a scientific and technology-based subject that stresses giving kids hands-on experience while also being future-focused. Learning about natural science involves pupils making their own discoveries as opposed to merely having teachers impart their knowledge to them. Additionally, students must possess abilities that may be used to solve issues in daily life in order to succeed in the study of natural science. In the life of a person, science is crucial. The study of factual natural phenomena, whether in the form of occurrences or actuality, as well as causal links, is one of IPA's particular qualities.

The results observations in elementary school, it was found that carried out for learning, especially in the content of science lessons, had been carried out using various models. However, in practice it is less meaningful for students because students have not been given a thorough opportunity to solve problems related to everyday life. Students only acquire knowledge directly from the teacher without discovering their own knowledge. Some students are less active in learning activities because the implementation of learning has not resulted in a two-way interaction as a whole. This condition causes low learning outcomes because the learning process is less meaningful for students. Teachers have not fully implemented innovative learning models to support the learning process so that students are less focused, get bored quickly and like to play alone. In learning activities, the teacher should apply a learning model that can place students as learning subjects.

The teacher only uses the handbook he has in conveying material to students, there is no variation in the use of student worksheets, especially in science content. In fact, in the content of science lessons there are several materials that require special guidance to carry out an experiment as a bridge for students to train students' process skills.

The scientific learning outcomes of class VI at SD Negeri Karangtalun 02 Cilacap Utara were known to have received an average score that had not surpassed the established KKM criterion of 75 based on the findings of the researchers' observations. Since 58.82% of class VI students were still performing below the KKM, an effort is made to improve student learning outcomes by implementing an engaging model that is appropriate for learning.

The use of an engaging learning paradigm might result in a friendly learning environment and active learning. Because the learning model encourages students' creative problem-solving and introduces them to the foundations of scientific thought, it has an impact on the efficiency of the teaching and learning process. According to Barrow, the problem-based learning model is an instructional strategy that equips students with an understanding of the challenges they will face as they learn[2].

Assisting students in developing their critical-thinking, problem-solving, and intellectual skills, the problem-based learning method[3]. Improve science learning outcomes researchers used problem-based learning strategies. Students can get their experience in the real world by

using the problem-based learning paradigm, a love of learning, and an increase in their science learning outcomes[4]. Based on the description above, the researcher will conduct classroom action research with the title “Improving Science Learning Outcomes in Electrical Circuit Materials Through a Problem Based Learning Model”

The research results that are relevant to the title taken by the researcher are increasing science learning outcomes through the Problem Based Learning model can be application, the first is the study,the Influence of PBL on Science Cognitive Learning Outcomes in Elementary School Students[5]. According to the results of this study, PBL considerably and favorably influences scientific learning outcomes and scientific process skills[6]. This study is similar to studies conducted by other researchers, which examines how cognitive science learning outcomes and process skills for elementary school students can be influenced by Problem Based Learning methods.

The main distinction is that, in contrast which uses a quasi-experimental research design with a pretest-posttest control group design to examine the effects of PBL on process skills and science cognitive learning outcomes in elementary school students, research is carried out using a type of classroom action research that is used to enhance student learning outcomes. Secondly is "Efforts to Improve Students' Science Process Skills with the Problem Based Learning Model in Elementary Science Learning". This research conducted becauce this study suggests that implementing the Problem Based Learning paradigm in science teaching may benefit students' acquisition of process skills because cycle I and cycle II saw an increase in the value of scientific process skills[7]. This form of classroom action research is used in both the conducted research and Agustina's research to improve students' processing skills by utilizing the Problem Based Learning paradigm. The research being done is unique in that it examines scientific learning outcomes generally rather of only utilizing the paradigm of problem-based learning.

2. Research Methods

This type of research is classroom action research (CAR). The research subjects were all six grade of Karangtalun 02 Public Elementary School in the North Cilacap sub-district. The number of male students is 16 and female students are 18, the total number of students is 34 children. The study was conducted in phases during the first semester of the 2022–2023 academic year, and it was then improved throughout the course of two cycles with two meetings in each cycle[8]. Planning (planning), action (acting), observation (observing), and reflection (reflecting) make up each cycle[9] .

3. Result and Discussion

3.1 Result of Cycle 1

Based on the execution of cycle I and the results of the students' learning exams, it was determined that the average score for cycle 1 science improved from 66.07 to 74.57. This result was achieved after the instructor implemented the problem-based learning approach. The maximum grade pupils may receive ranges from 80 to 90. The lowest score that students get

goes up from 40 to 50. The percentage of completeness that students get goes up from 41% to 62%.

Table 1. Result of The Student Assessment Cycle One Recapitulation

Number	Student Name	Pretest	Cycle I
1	Akfiyan	70	80
2	Alifian	50	70
3	Amelya	80	80
4	Anistria	80	80
5	Arlan	50	60
6	Arlanda	50	60
7	Ashar	60	60
8	Askara	60	80
9	Aumufid	50	60
10	Aura	80	80
11	Avif	60	80
12	Azriel	60	80
13	Despa	50	60
14	Dwi	60	70
15	Elfina	40	50
16	Ertiji	80	80
17	Fathur	80	80
18	Fatimah	80	90
19	Fian	70	80
20	Flanjes	60	80
21	Lintang	80	80
22	Mayla	80	80
23	Meida	80	80
24	M.Snefi	80	90
25	Nadiyah	60	80
26	Ramisitha	60	60
27	Rizka	40	50
28	Rizzky	80	80
29	Sebastian	50	68
30	Syifa	80	90
31	Tistan	80	80
32	Vania	50	70
33	Violitha	60	70
34	Yuniar	80	80
Number of students		**34**	**34**
Sum of Values		**1850**	**2088**
Average		**66,07**	**74,57**
Highest Score		**80**	**90**
Lowest Score		**40**	**50**
Students complete		**14**	**21**
Not complete		**20**	**13**
Completeness(%)		**41,18**	**61,76**

Table 2. Distribution of the Frequency of Loading Daily Deuteronomy Results Science lesson Cycle I

No	Category	Student Frequency	Percentage	Means
1	≥ 75	21	61,76%	74,57
2	≤ 75	13	38,24%	
3	Total	34	100%	

Based on tables 1 and 2, it can be concluded that in carrying out the actions in cycle 1, the teacher has implemented the Problem Based Learning model very well with a percentage of 61.76%. There are aspects that have not been implemented, namely, the teacher has not guided students in presenting the results of the discussion, the teacher has not provided opportunities for students to respond to other group presentations and the teacher has not evaluated the presentation of the results of student discussions[10]. The percentage of student responses in implementing the Problem Based Learning model was good with a percentage of 61.76%.

Students pay less attention to the media shown by the teacher. Some students have not conducted discussions in an orderly manner. In addition, students have not given their responses about the results of other group discussions and have not paid attention to the evaluation of the presentation of the results of the discussions conducted by the teacher.

Figure 1. Assessment of results in cycle I can be seen in Graph 1. Completeness of Students in Cycle 1

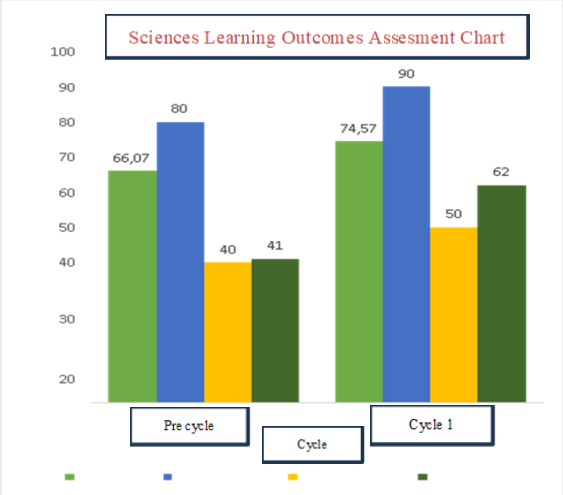

Fig. 1. Assessment of results in cycle I

From the graph above, it can be average IPA value in cycle 1 has increased from 66.07 to 74.57. Then the highest score that students get from 80 goes up to 90. The lowest score that students get goes up from 40 to 50. The percentage of completeness that students get goes up from 41% to 62%. The percentage of students with the science learning affects in cycle I still has not reached the performance indicators that have been planned, namely ≥75% with KKM 75.

According to the reflection results, teachers and students did not apply the Problem Based Learning paradigm as effectively as they could have in cycle I. The fact that teachers and students continue to underutilize the potential of the problem-based learning method serves as evidence of this. Additionally, science learning results fall short of the benchmarks for successful research. As a result, there are still some challenges in the first learning cycle. As a result, the next meeting has to be strengthened and improved.

3.2 Results of Cycle 2

Cycle II research was conducted at a single meeting. The Problem Based Learning methodology is used to implement learning activities and enhance science learning results[11]. The following is a detailed overview of the findings from the data analysis of student learning activities:

Table 3. Result of The Student Assessment Cycle One Recapitulation

Number	Student Name	Cycle I	Cycle II
1	Akfiyan	80	90
2	Alifian	70	80
3	Amelya	80	90
4	Anistria	80	90
5	Arlan	60	80
6	Arlanda	60	80
7	Ashar	60	80
8	Askara	80	80
9	Aumufid	60	70
10	Aura	80	80
11	Avif	80	80
12	Azriel	80	80
13	Despa	60	80
14	Dwi	70	80
15	Elfina	50	80
16	Ertiji	80	100
17	Fathur	80	90
18	Fatimah	90	100
19	Fian	80	90
20	Flanjes	80	80
21	Lintang	80	90
22	Mayla	80	90
23	Meida	80	90
24	M.Snefi	90	100
25	Nadiyah	80	80
26	Ramisitha	60	80
27	Rizka	50	70
28	Rizzky	80	80
29	Sebastian	68	80
30	Syifa	90	100
31	Tistan	80	90
32	Vania	70	70
33	Violitha	70	80
34	Yuniar	80	90

Number of students	34	34
Sum of Values	2088	2360
Average	74,57	84,29
Highest Score	90	100
Lowest Score	50	70
Students complete	21	31
Not complete	13	3
Completeness(%)	61,76	91,18

Table 4. Frequency Distribution of Cycle Two Results

No	Category	Student Frequency	Percentage	Means
1	**≥ 75**	**31**	**91,18%**	**84,29**
2	**≤ 75**	**3**	**8,82%**	
3	**Total**	**34**	**100%**	

Based on Tables 3 and 4, it can be concluded that the teacher has implemented the Problem Based Learning model very well with a percentage of 91.18%. With a percentage of 91.18%, the student replies in using the Problem Based Learning paradigm were good. The teacher's media presentations get more of the students' attention, and they conduct conversations more politely. Assessment results are made based on learning indicators in cycle II. Assessment results in cycle II can be seen in figure 2:

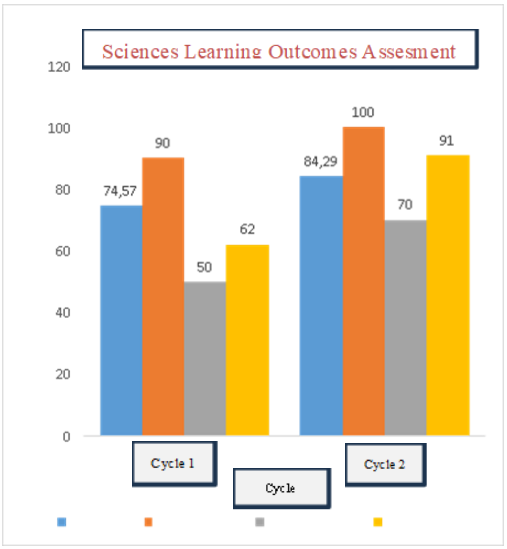

Fig. 2. Assessment of results in cycle II

Based on the graph above, it can be concluded that the average value of cycle 2 science in the material "Electric circuit" class VI SD N Karangtalun 02 for the 2022/2023 academic year has increased from 74.57 to 84.29. Based on the graph above, it can be concluded that the

average value of cycle 2 science in the material "Electric circuit" class VI SD N Karangtalun 02 for the 2022/2023 academic year has increased from 74.57 to 84.29.

4. Conclusions

Based on the outcomes of the actions and discussions regarding the application of the Problem Based Learning model in improving science learning outcomes in class VI students in semester 1 of SD Negeri Karangtalun 02 Cilacap, this research concluded that the science learning outcomes of students in grade VI semester 1 of SD Negeri Karangtalun 02 Cilacap can improve with the problem-based learning model. Results of observations of instructors and students who saw an increase in cycles I and II demonstrate this. Cycle I had a 62% improvement in scientific learning outcomes, with an average score of 74.57. It also grew during cycle II, reaching 91% with an average value of 84.29.

5. Acknowledgements

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