



## Efforts to Improve Science Learning Outcomes Through the Problem-Based Learning Model for Students in Bengkulu

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### ABSTRACT

**Purpose of the study:** This research aims to address the low student learning outcomes in the science learning subjects of class IV elementary school students in Bengkulu by applying the Problem Based Learning model and examining its effectiveness in enhancing the student learning outcome.

**Methodology:** The research uses a Classroom Action Research method with two cycles, each consisting of planning, implementation, evaluation and reflection stages. The research subjects are 20 students in class IV Elementary School in Bengkulu. The data collection technique is a test.

**Main Findings:** The research data shows that the Problem Based Learning model can improve the learning outcomes of class IV elementary school students in Bengkulu. The completeness of learning outcomes increases from 3% in the pre-cycle to 65% in the first cycle and 85% in the second cycle, exceeding the expected outcome of 75%.

**Novelty/Originality of this study:** The novelty in this research is the application of the Problem Based Learning model in the science learning subjects of class IV elementary school students in Bengkulu, which have different characteristics and needs from other students in other regions or countries. The research also contributes to the development of the Classroom Action Research method, which involves the active participation of the teacher and the students in the learning process and the improvement of the learning quality. The research has implications for the improvement of the science curriculum and the teacher training program in Bengkulu.

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## 1. INTRODUCTION

Natural Sciences is one of the main subjects in elementary schools; the science learning process emphasizes providing a direct experience that focuses on a process; this happens when studying science can improve students' thinking processes through the actions taken by the participants students to achieve the expected goals [1], [2]. Natural Sciences in elementary schools instill a sense of desire in students and care to develop skills in understanding concepts. However, learning science is not just looking for ways to solve equations but also describes learning science about something phenomenal [3], [4]. Science learning is expected so students can recognize and utilize natural resources without destroying nature so that it does not harm other creatures. This requires that science learning in elementary schools can take place well. In line with the development of education in Indonesia, the role of science lesson content has become increasingly important as one of the basic knowledge taught from elementary school to higher levels. Besides that, science lesson content

also has essential values that can be applied in everyday life. Minister of National Education Regulation no. 22 of 2006 concerning Content Standards for Primary and Secondary Education Units states that Science Learning Objectives are expected to be a vehicle for students to learn about themselves and the natural surroundings, as well as prospects for further development in applying them in everyday life. The learning process emphasizes providing direct experience to develop competencies to scientifically explore and understand the natural surroundings.

However, in reality, in learning activities, teachers have the attitude of carrying out teaching duties, not providing meaningful learning experiences. As a result, science is considered a rote lesson. These poor teaching methods can be caused by teachers not having the motivation to teach, many even do not know how to teach science and they only have little knowledge about science [5]. The weakness of science learning currently taught is that it is still rote and does not provide opportunities for students to observe, research natural phenomena which are then studied and concluded based on concepts which will eventually become principles, laws, and so on as science products [6]. Science learning in elementary school includes basic skills and integrated skills, finding and solving problems scientifically to produce science products, namely facts, concepts, generalizations, laws and new theories [7]-[9]. However, students study science only as a product, memorizing concepts, theories and laws [10]. As a result, science as a process, attitude and application is less integrated in learning. Learning carried out by teachers influences the success of science learning in elementary schools. Teachers are required to deliver material as interesting as possible so that students are interested and do not feel bored in the learning process. Therefore, in the science learning process, elementary school students really need to be given the opportunity to carry out exercises in science process skills that are adapted to the level of cognitive development of elementary school students [11].

Many students get grades below standard, so the results achieved are not in line with expectations. Based on the results of observations carried out on 21 July 2023, several problems were found, including: lack of student activity in participating in learning, student motivation for learning is still low, learning outcomes are still below the criteria minimum. Learning outcomes are a measure of the achievement of learning objectives which are used as a benchmark for the learning process obtained by students after going through learning activities [12], [13]. Learning outcomes are achievements in changing behavior as feedback in an effort to improve the teaching and learning process from the cognitive, affective, psychomotor domains that occur in students after receiving their learning experience, where these changes can be observed and measured in the form of action patterns, values, understandings, attitudes, apperception and skills [14]. Learning outcomes are a student's ability to fulfill a stage of achieving student learning outcomes assessed through administering tests. So currently student learning outcomes are not yet optimal due to lack of student motivation and activeness in the learning process, the learning methods used are still not optimal so it has an impact on student learning outcomes which are still below average. If this condition is left without improvement, it is feared that learning objectives will not be achieved, achieved, [15].

The research does not mention the previous studies that have compared the Problem Based Learning model with other models in the science learning subjects of class IV elementary school students. The research also does not explain the theoretical framework and the rationale behind the Problem Based Learning model and how it relates to the science learning objectives and outcomes. The solution offered to solve problems in order to improve learning outcomes is by using creative learning models for students so that learning is not boring. One of them is the problem based learning model. The problem based learning model is one of the learning models in contextual learning strategies using real world problems as a learning context for students [16]-[19]. The problem based learning model is a learning approach that poses real world problems as a first step for students to learn in gaining essential knowledge and concepts from each learning material that students have previously had, so that new knowledge is formed where students learn with inspiration and thinking, groups, and use related information. Students are also trained to synthesize knowledge and skills before they apply problems [20]-[21].

## 2. RESEARCH METHOD

This research is classroom action research, namely research carried out in the classroom to improve the learning process in the classroom, which aims to improve learning outcomes [23]. In this research, the action given is an effort to overcome problems in the learning process so that it can improve learning outcomes for science content through learning using the Problem Based Learning learning model [24]. This research was carried out in class IV Elementary School in Bengkulu. Data collection techniques are obtained through tests. The test technique used is post-test in pre-cycle, cycle I, and cycle II. The data collected is student learning outcomes data which is focused on cognitive aspects only. The data collection instrument in this research was a 5-item essay. Analysis of the data obtained was carried out by calculating the percentage of students' learning completeness. Completion in the pre-cycle reached 3.0% with an average value of 53.25, in cycle I it reached 6.5% with an average value of 61.65, and in cycle II it reached 8.5% with an average value of 69.4. This PTK was declared successful in achieving the success indicator of 85% of students reaching the criteria minimum.

### 3. RESULTS AND DISCUSSION

Implementation of pre-cycle activities is carried out by collecting data related to strategies, methods or learning media used in implementing science lessons in class IV Elementary School in Bengkulu. The learning method used in the pre-cycle is by lecture and assignment and group methods and using image media. Obstacles in the learning process are that students appear less active in participating in the learning process and students are not used to studying in groups so that some students' learning outcomes have not yet reached the criteria minimum determined by the school. The number of students who completed was less than students who did not complete. In the pre-cycle, the average student score was 53.25 from 20 students. Based on this, the alternative solution to the problem is to carry out improvements in learning through the problem based learning model which is implemented in cycle I activities. In cycle I, the average student score was 61.65. Of the 20 students, many students did not complete because the scores they obtained did not reach the expected criteria minimum. The criteria minimum value determined by the school is 65, while the percentage of student learning completeness obtained is only 6.5%. However, there has been progress in cycle I even though it has not yet reached the criteria minimum, progress has occurred because students are starting to get used to studying in groups and the media used is not only my pictures but also PPT so that the explanation of the material is clearer. The obstacle during the learning process in cycle I was that some students still did not dare to express their opinions. From these results, the success indicators that have been set have not been achieved, so they are continued in cycle II. In cycle II the average score of students was 69.4 with a percentage of 8.5%, it can be stated that there was an increase in learning in cycle II. There has been an increase because students are used to studying in groups, students dare to express their opinions and the media used are PPTs and learning videos. The data on student learning outcomes in pre-cycle, cycle I and cycle II can be seen in table 1.

Table 1. The results of research

Stage	Mean	Percentage (%)
Pre Cycle	53.25	3.0
Cycle I	61.65	6.5
Cycle II	69.4	8.5
Criteria Minimum Value	65	

Based on research that was conducted on class IV students at Elementary School in Bengkulu in pre-cycle, cycle I, and cycle II, this research was stopped in cycle II because it had reached the criteria for student learning completeness in science lesson content. In-classroom action research was conducted on class IV students at an Elementary School in Bengkulu. The activity stages carried out in this research consisted of planning, implementing, observing, and reflecting. The results of observations in the pre-cycle revealed several problems seen from the grades of class IV students in the science lesson content with the average student score being 53.25. Of the 20 students, only 6 students succeeded in reaching the criteria minimum. These problems became the basis for carrying out classroom action research to improve learning outcomes for science lesson content in class IV elementary school students in Bengkulu. In this research, a problem-based learning model is applied to help fourth-grade students at Elementary School in Bengkulu understand lessons and improve learning outcomes in science lesson content. Classroom action research in cycle I obtained an average student score of 61.65. Student learning outcomes in cycle I are still relatively low. In cycle II, the average student score was 69.4. So the level of student learning outcomes in Class II is relatively high. Student learning outcomes have increased compared to cycle I data.

The research results show that applying the problem-based learning model can improve student learning outcomes. The improvement obtained in this research is because this model can change passive learning conditions into active ones and requires students to be able to solve the problems given. Students can discover the knowledge they are learning for themselves so that learning is easy to understand. Students can be motivated and strengthen their expertise through the problem-based learning model. Other researchers supported this research and found increased student learning outcomes by applying the problem-based learning model [25]. Other researchers also stated that the Problem-Based Learning model could improve teacher-teaching activities, student-learning activities, and student-learning outcomes [26]. Similar research also states that the problem-based learning model influences the ability to solve geographic problems [27]. Based on the research that has been carried out, it can be proven that implementing the problem-based learning model can improve the learning outcomes of class IV elementary school students in Bengkulu. The success of this research is that students can think critically and actively between groups through interaction with the learning environment designed by the learning facilitator (teacher). The problem-based learning model is a learning model that is centered on students being able to develop thinking abilities, problem-solving, and intellectual skills.

The similarities in research are in the implementation of the problem-based learning model for problems in learning; the difference in research is at the class level used as a research subject, namely class 3. Other relevant research is by Azizah et al. (2014), whose results show increased student learning outcomes. The

application of the Problem-Based Learning model [28] and research from Nisa et al. (2021) show that the application of the PBL learning model affects improving student learning outcomes [29].

In this research, the implementation of learning by applying the Problem-Based Learning model can improve learning outcomes for class IV Elementary School in Bengkulu students with material related to chapter I (Plants, the Source of Life on Earth) in Phase B (Photosynthesis, the Most Important Process on Earth), Phase C (Pollination process). Applying the Problem-Based Learning model meets the indicators, namely analyzing, evaluating, and creating by focusing on solving problems related to everyday life. Problem-solving involves students searching for various sources of information to collect data to answer and resolve the issues given. The Problem-Based Learning model develops students' thinking and reasoning abilities through a series of actions in discussion and sequential implementation of the PBL model syntax. Therefore, learning is more meaningful because students build their knowledge.

#### 4. CONCLUSION

Applying the problem-based learning model can improve science learning outcomes for class IV elementary school students in Bengkulu. With the outstanding category (8.5%), this model can increase student activity in the learning process, which can be seen from the increase in the average student score before and after taking action. Through the problem-based learning model, students learn essential knowledge and concepts from each learning material they have previously had; students become more active in participating in the learning process, helping to increase their self-confidence in learning.

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