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IMPLEMENTATION OF THE PROJECT BASED LEARNING (PJBL) LEARNING MODEL TO IMPROVE ELEMENTARY SCHOOL STUDENTS' SCIENCE LEARNING OUTCOMES

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Abstract: *Science learning in elementary schools often faces challenges related to low student engagement and suboptimal learning outcomes, particularly when instruction relies on teacher-cantered approaches. Therefore, innovative learning models that actively involve students are required. This classroom action research aims to determine whether the Project-Based Learning (PjBL) model can improve science learning outcomes in fifth-grade students at SDN 6 Srikaton. The study was conducted using a classroom action research design consisting of two cycles. Data were collected through observation, learning outcome tests, and documentation. The results indicate that the implementation of the PjBL model effectively improved students' science learning outcomes. Student mastery increased from 28.5% in the pre-cycle stage to 50% in Cycle I, and further rose to 78% of students achieving mastery in Cycle II. These findings demonstrate a consistent improvement in learning outcomes across cycles. This study concludes that the Project-Based Learning model is effective in enhancing science learning outcomes among fifth-grade elementary school students. The findings imply that teachers are encouraged to integrate PjBL into science instruction to promote active learning and deeper understanding. Future research is recommended to apply the PjBL model in different subjects, grade levels, or longer implementation periods to examine its broader impact on students' skills and learning achievement.*
Keywords: *Project-Based Learning, Science Learn*

INTRODUCTION

Education plays a vital role in shaping human knowledge, skills, and behaviour, which are transmitted from one generation to the next through structured learning processes. In the context of national development, education is a key instrument for producing qualified human resources capable of responding to future challenges and global competition. According to Andriani (2017), education is a fundamental need that must be fulfilled by every citizen to support individual, social, and national development.

Science education is an essential component of the school curriculum because it enables students to understand natural phenomena through observation, experimentation, and logical

reasoning. Science is defined as a human effort to comprehend the universe through systematic and accurate observation, resulting in scientific theories and concepts (Yuliana et al., 2020). At the elementary school level, science learning is expected to foster curiosity, critical thinking, and meaningful understanding of natural processes rather than rote memorization.

However, many elementary school students experience difficulties in mastering science concepts due to low learning engagement and the dominance of teacher-centered instructional methods. Based on observations conducted at SDN 6 Srikaton during the 2025/2026 academic year, students showed low interest in science learning and tended to focus only on textbook images without understanding the underlying concepts. Classroom instruction was dominated by lectures, causing students to become passive, bored, and less motivated to participate actively in learning activities.

Further findings from interviews with the fifth-grade homeroom teacher revealed that students struggled to understand science material when learning lacked hands-on activities. As a result, student learning outcomes were relatively low. Only 42.86% (6 out of 14 students) achieved the minimum mastery criterion of 75.00, while 57.14% (8 students) did not. These findings indicate that students had not yet fully mastered the water cycle topic, highlighting an urgent need for instructional improvement.

This condition is significant because ineffective science instruction at the elementary level may hinder students' conceptual understanding and long-term academic development. Therefore, improving learning strategies is crucial to enhance student engagement and learning outcomes. Learning outcomes reflect the final results of the learning process and contribute to students' cognitive and behavioral development (Sari, 2017).

To address these challenges, this study offers the Project-Based Learning (PjBL) model as an instructional solution. According to Sani (2014), PjBL is a learning model that engages students in designing, creating, and presenting projects to solve real-world problems. By involving students actively in the learning process, PjBL is expected to improve students' understanding of science concepts and enhance their learning outcomes. Therefore, this study aims to investigate whether the implementation of the Project-Based Learning model can improve elementary school students' science learning outcomes.

METODOLOGI

Research Design

This study used the classroom action research (PK) model. This study used the classroom action research model proposed by Kemmis and Mc. Taggart. This type of research was used because if the results in the first cycle are less than optimal, improvements can be made in subsequent cycles until the desired target is achieved. The subjects of this study were 14 fifth-grade students at Srikaton 6 Public Elementary School. The object of this study was student learning outcomes. Data collection used observation. The Kemmis and Me Taggartter model consists of four stages, namely the planning stage, (plan), the action implementation stage (action), the observation stage (observing), and the reflection stage (reflection).

Figure 3.1 Steps of the Kemmis & Mc Taggaart PTK Model

Research Subject

This research was conducted in the ood semester of the 2025 academic year. The subjects were five -grade students at Srikaton State Elementary School . The third-grade students served as the research subjects, the third-grade teacher as the observer, one of the researchers as the documentation team, and the author as the instructor.

Data Collecting

The data collection techniques for this research used observation, interviews, test results, and documentation. These techniques are as follows:

1. **Observation**

   In general, observation is a method of collecting written materials (data) by systematically observing and recording the phenomena being observed (Sudjiono, 2009). Essentially, this

observation contains the background information on the teacher's actions during science lessons in grade 5 of Srikaton 6 Public Elementary School.

2. **Test**

Tests are used to strengthen observational data used in the classroom, particularly on learning outcomes with science learning materials that researchers deliberately selected for knowledge and understanding. Tests are administered at the end of each cycle. The tests are used by researchers to measure student learning outcomes related to science learning after implementing the Project-Based Learning (PjBL) model.

3. **Documentation**

Documentation involves collecting data on variables in the form of notes, books, and other materials. Documentation is carried out by taking photographs of students during the learning process.

Data Analysis

This study employed simple data analysis techniques calculated based on the number of observations. The analysis used pre-action, cycle I research results, and cycle II assessment results. The success of the action can be seen in increased student activity and learning outcomes. Student activity was measured using the student activity observation sheet, while assessment was carried out using the observation sheet to determine the percentage of each student's activity.

1. **Quantitative Data Analysis**

Qualitative data was obtained through observation during the learning process in each cycle. The data obtained was recorded on a provided observation sheet, then analyzed and presented as a percentage. The percentage of activeness was obtained using the following formula (Wulandari, 2020) :

$$\text{Achievement} = \frac{total\ student\ assessment\ scores}{maximum\ score} \times 100$$

2. **Individual student completion**

The formula used is as follows (Mustakim, et al. 2023)

$$PK = \frac{SP}{ST} \times 100$$

Description:

PK : Percentage of individual completion in the test.

SP : Scores obtained by students

ST : Total number of students

3. Classical learning completion

The completeness formula used is:

$$PK = \frac{N}{ST} \times 100\%$$

PK : Individual completion percentage

N : Number of students who completed

ST : Total number of students

RESEARCH RESULT

Finding

This research was conducted at Srikaton 6 Elementary School, which is equipped with adequate learning facilities, including comfortable classrooms and seating arrangements that support a conducive learning atmosphere. The study involved 14 fifth-grade students, consisting of 7 male and 7 female students. The focus of this research was science learning on the Water Cycle topic. This study employed Classroom Action Research (CAR), conducted in two cycles. Cycle I consisted of three stages: administering a pre-test, implementing the Project-Based Learning treatment, and administering a post-test. Cycle II consisted of treatment and post-test activities only.

Based on the data presented in Table 4.1, the results indicate a gradual improvement in students' science learning outcomes across the research cycles. In the pre-cycle stage, only 4 students (28.5%) achieved learning mastery, while 10 students (71.4%) did not meet the minimum mastery criterion. After the implementation of the Project-Based Learning model in Cycle I, the number of students achieving mastery increased to 7 students (50%). Furthermore, in Cycle II, mastery increased significantly to 11 students (78.5%), with only 3 students (21%) remaining incomplete.

These findings clearly indicate that the implementation of the Project-Based Learning (PjBL) model resulted in a consistent and meaningful improvement in students' science learning outcomes.

The increase in both the average scores and the percentage of students achieving mastery demonstrates that PjBL effectively addressed the learning difficulties identified in the initial condition. Judging from the results of Cycle I and Cycle II, learning Natural Sciences using the Project-Based Learning model was able to reduce student boredom and increase active participation during the learning process. Students were more involved in observing, discussing, and completing project-based tasks related to the water cycle material.

TABLE 4.1
PRESENTATION OF PRE-CYCLE SCIENCE LEARNING OUTCOME COMPLETENESS SUMMARY
CYCLE I CYCLE II

No	Siklus	Treatment	Nilai Rata-rata	Tidak Tuntas		Tuntas		Jumlah	
				F	Persen (%)	F	Persen (%)	F	Persen (%)
1	Pra-Siklus	*Pre-Test*	69, 00	10	71,4%	4	28,5%	14	100%
2	Siklus 1	*Post-Test*	73,2	7	50%	7	50%	14	100%
3	Siklus 2	*Post-Test*	78,6	3	21%	11	78,5%	14	100%

Judging from the results of Cycle 1 and Cycle II, it can be concluded that learning Natural Sciences (IPA) using the Project Based Learning learning model can be a solution to overcome students who feel bored and less conducive during the learning process. In Cycle I and Cycle II, there was an increase in student learning outcomes from the initial number of students who could achieve completeness in Cycle 1, which was only 7 students (50%), while in Cycle II it became 11 students (78%) with a total of 14 students

Discussion

The findings of this study demonstrate that the implementation of the Project-Based Learning (PjBL) model significantly improved fifth-grade students' science learning outcomes on the water cycle topic. The gradual increase in learning mastery from 28.5% in the pre-cycle stage to 78.5% in Cycle II indicates that PjBL effectively enhanced students' understanding of science concepts. This improvement aligns with the core principles of PjBL, which emphasize student-centered learning, active inquiry, and meaningful engagement with real-world problems.

According to Thomas (2000), Project-Based Learning enables students to construct knowledge through sustained investigation and problem-solving activities. In this study, students were actively involved in observing, discussing, and completing projects related to the water cycle, which helped them move beyond rote memorization toward conceptual understanding. This finding supports Bell (2010), who argues that PjBL promotes deeper learning by engaging students in authentic tasks that require critical thinking, collaboration, and reflection.

Furthermore, the increased student participation and reduced boredom observed during Cycle I and Cycle II are consistent with the views of Sani (2014), who states that PjBL encourages active learning by positioning students as problem solvers and decision makers. When students are given opportunities to design and present their work, they become more motivated and responsible for their own learning. This active involvement was evident in the improved learning outcomes achieved in Cycle II.

In addition, the improvement in students' science learning outcomes supports constructivist learning theory, which emphasizes that knowledge is actively constructed by learners through experience (Piaget, 1970; Vygotsky, 1978). Through project-based activities, students were able to connect abstract science concepts with real-life phenomena, thereby strengthening their understanding of the water cycle.

Overall, the findings confirm that Project-Based Learning is an effective instructional model for improving elementary school students' science learning outcomes. The results of this study are consistent with previous research indicating that PjBL not only enhances academic achievement but also increases student engagement and motivation in science learning contexts.

CONCLUSION

The results of this study indicate an improvement in science learning outcomes for fifth-grade students at SD N 6 Srikaton using the Project-Based Learning Model. This is demonstrated by an increase in the completion rate of fifth-grade science learning outcomes. In the pre-cycle, the average student score was 69.0, with a completion rate of 28.5%, or 4 students. In cycle 1, the average student score was 73.2, with a completion rate of 50%, or 7 students. This means that out of 14 students, 7 students were able to absorb the activities carried out in cycle I. Meanwhile, in cycle II, the average student score was 78.6, with a completion rate of 78.57, or 11 students who completed the activities. This means that out of 14 students, 11 students were able to absorb the activities implemented in cycle II. Therefore, it can be concluded that the Project-Based Learning Model can improve student learning outcomes.

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