



APPLICATION OF PROJECT BASED LEARNING MODEL TO IMPROVE STUDENT LEARNING OUTCOMES IN CLASS VB WATER CYCLE MATERIAL SD NEGERI 4 BANDA ACEH CITY

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Abstract

According to observations, one of the issues in SD Negeri 4 Kota Banda Aceh is pupils' low learning results in science disciplines. The use of the Project Based Learning paradigm may provide a pleasant environment for students to learn about the water cycle. Classroom Action Research (PTK) was employed in this study. The subjects of this study were 23 students from classes V-B SD Negeri 4 in Banda Aceh City. Data was collected by observation, recording, and learning outcomes exams. Data from observations of student activities are analyzed using percentage descriptive statistics and individual student learning outcomes data. Based on the findings of study in cycles I, II, and III, the following information was obtained: (1) The findings of observations on student actions in learning throughout three cycles rose in each cycle, with student activity in cycle I reaching 81.7% of the medium category, cycle II reaching 86.1% of the good category, and cycle III reaching 91.3% of the very good category. (2) Students' learning outcomes in the water cycle material improved in cycle I of classical completeness criteria, reaching 60.87% with an average value of 67, 78.26% with an average value of 82.6 in cycle II, and 91.3% with an average value of 91 in cycle III. It was determined that the Project Based Learning learning approach on water cycle content can increase grade level learning results.

Keywords: Learning Outcomes, Project Based Learning *Model*, Water cycle.

A. Introduction

Education is one of the main pillars of a country, where the quality of a country can be seen from the quality of education. Considering how important an education is.

Because education can support the progress of the country. In addition, education plays an important role in shaping individuals, namely individuals with character, insight, and professionals.

In the teaching and learning process, teachers try to convey information to students. But conveying information to students is not easy. Because it is influenced by various things, such as media, models, approaches, learning strategies used by teachers in the learning process.

The success of a learning process begins with careful planning. The planning includes determining strategies, models, sources and learning media. If the teacher can arrange it well, it can be said that success in learning has been half fulfilled, the next success is the teacher's ability to present the teaching material

According to Usman (2010: 2), science learning in elementary schools should open opportunities to foster students' curiosity scientifically. This will help them develop the ability to ask questions and seek answers based on evidence and develop a scientific way of thinking. Science learning has abstract concepts that demand students' understanding in learning it.

In improving student learning outcomes, teachers must develop learning models according to the characteristics of students. Based on observations at SD Negeri 4 Banda Aceh that teachers have applied various models in learning, but not optimally, especially in science learning. The learning outcomes of many students are below KKM, which is 72. Of the 23 students, only 5 students were completed. To solve this problem, a *Project Based Learning* (PjBL) learning model can be developed. According to the Buck Institute for Education BIE (1999) in Al-Tabany (2014: 41) explained that project-based learning is a learning model that involves students in problem-solving activities and provides opportunities for students to work autonomously constructing their own learning, and ultimately producing valuable and realistic student work.

Based on initial observations with class V B teachers conducted at SDN 4 Banda Aceh. Researchers collected some information, namely the problem faced in the learning process is that there are still many students who are not focused and lack in understanding the concept of water cycle material.

Based on the background of the problems that have been described, researchers are interested in conducting research entitled "Application of the Project Based Learning, *learning model* to improve the learning outcomes of grade V students of SD Negeri 4 Banda Aceh".

B. Methods

The type of research used in this study is Classroom Action Research (PTK). The subjects of this study are Among 23 students of class V-B SD Negeri 4 Banda Aceh, data collection techniques were carried out by observation, documentation, and learning outcome tests. Student ability test data was analyzed using the Minimum Completeness Criteria (KKM) reference level used in SD Negeri 4 Banda Aceh.

C. Results and Discussion

1. Research Results

Classroom Action Research (PTK) is conducted in three cycles. Each cycle consists of four stages: planning, implementation, observation, and reflection. This research uses the *Project Based Learning* (PjBL) model on 23 students of grade V-B SD Negeri 4 Banda Aceh.

Learning outcome tests are used to determine student improvement data after the PjBL model is applied. For the presentation of data in this study, researchers grouped into 4 (four) stages, namely the pre-cycle stage, cycle I, cycle II and cycle III. The following is a description of the results of stage research in each cycle carried out in learning, namely:

a. Pre-Cycle

This pre-cycle activity is an activity carried out before carrying out cycle I, cycle II and cycle III. The activities carried out by researchers are collecting preliminary data through *pre-tests*. Pre-test is given to students in the form of objective questions as many as 10 questions. Based on the results of the pre-test, it is known that there are several problems behind the low science scores of students, including learning science the material is too much reading and monotonous, the number of using scientific terms that cause students difficulty in remembering, and lack of motivation in learning.

Number of students present: 23 students

Complete : 0 learners

Incomplete : 23 learners

To find the average grade point and the percentage of classical completeness obtained by students can be calculated by the following formula:

$$\text{Class Average} = \frac{\text{Student score}}{\text{count of students}}$$

$$= \frac{810}{23}$$

$$= 35.2$$

$$\text{Percentage of completeness} = \frac{\text{students completed}}{\text{count of students}} \times 100 \%$$

$$= \times 100 \% \frac{0}{25}$$

$$= 0 \%$$

Based on the percentage of completeness of students, no students have reached the Minimum Completeness Criteria (KKM) on the water cycle material in classes V-B determined by the school. The results of the data that have been obtained show that there is a need for corrective actions in learning so that student learning outcomes increase.

b. Cycle I

Cycle-I has 4 stages, namely planning, action, observation, and reflection which will be described as follows:

1) Planning Phase

At this stage carry out the following activities:

- 1) Compile RPP adjusted to KD and Indicators on water cycle material using the PjBL model. The RPP designed was then validated by Mrs. Ernawati, S.Pd as a validator.
- 2) At this stage, researchers design student worksheets in accordance with the indicators compiled in the RPP in the form of a written test, namely 10 water cycle questions.
- 3) Prepare and compile validated student activity observation sheets.

2) Action

At this stage researchers carry out the process of learning activities in accordance with the planning stage that has been prepared before. This activity will be held on March 14, 2023 at 08.00 – 09.45 WIB. The implementation of these actions includes preliminary activities, core activities and closing activities.

3) Observation

Observations or observations in this study were made to determine the extent to which the application of the *Project Based Learning* (PjBL) model can be implemented properly. In addition, it is also to determine changes in learning outcomes that occur in class V-B students on water cycle material. The observation data that will be presented

in this study includes, student observation data and student learning outcome test data with the following results:

a) Student Activities

To find the percentage of student activity can be calculated as follows:

$$\begin{aligned} \text{Average} &= \frac{\text{count of earned}}{\text{count of aspect}} \\ &= \frac{300}{23} \\ &= 18.75 \end{aligned}$$

$$\begin{aligned} P &= \frac{f}{n} \times 100 \\ &= \frac{13,75}{23} \times 100 \\ &= 81,5 \% \end{aligned}$$

Based on observation data made by observers on student activities, the number of scores obtained was 300 and an average of 18.75. Thus, the percentage of average marks is 81.5%. This means that the level of success of student activities based on observation is included in the good category.

b) Student Learning Outcomes

To find the average grade point and the percentage of classical completeness obtained by students in the table can be calculated by the following formula:

$$\begin{aligned} \text{Class Average} &= \frac{\text{student score}}{\text{count of students}} \\ &= \frac{1560}{23} \\ &= 67,8 \end{aligned}$$

$$\begin{aligned} \text{Percentage of completeness} &= \frac{\text{students completed}}{\text{count of students}} \times 100 \% \\ &= \times 100 \% \frac{14}{23} \\ &= 60.87 \% \end{aligned}$$

To find out the learning outcomes of students, it is tested with 10 multiple-choice questions. A total of 14 students completed the post-test questions while the remaining 9 students did not complete the learning with the *Project Based Learning* (PjBL) model on the water cycle material. The percentage of overall student learning outcomes in the first cycle was 60.87%. Based on this fact, it can be concluded that the *Project Based Learning* (PjBL) model is not active, because the completeness results obtained by students classically are less than the

predetermined criteria, which is 80%. In the next stage, it is hoped that students can be better at answering questions so that the percentage of learning achievement can increase.

4) Reflection

The successes that have been achieved in the first cycle are as follows:

- a) The activities of students who are already good are answering greetings and showing enthusiasm, listening to teacher explanations, forming study groups, answering teacher questions, working, conducting discussions, collaborating in making discussion reports, conducting group presentations and doing final tests.
- b) The learning outcomes of students have been completed as many as 14 of the 23 students present with a percentage of 100%.

c. Cycle-II

The results of reflection in cycle I show several obstacles that cause learning to take place less optimally. Therefore, corrective steps will be taken to the learning process that will be carried out in cycle II. The implementation of research to be carried out in cycle II is the same as the previous cycle, which consists of four stages which include, planning, implementing actions, observation and reflection. The following is an explanation of each stage carried out in cycle-II.

1) Planning Phase

To improve learning outcomes in cycle II, researchers use the results of reflection as a consideration to determine corrective steps, which researchers do at the planning stage of cycle II are as follows:

- a) Improve the Learning Implementation Plan (RPP) in accordance with the results of reflection in cycle I. Overall RPP has not changed much, changes only lie in the steps of learning activities, for the evaluation questions given are almost the same as the evaluation questions in cycle I, it's just that the numbers are different.
- b) Prepare instruments to analyze data related to processes and action results. The instruments used include, observation sheets of student activities, and test questions on student learning outcomes.

2) Action

The implementation of cycle II actions on May 8, 2023 at 08.00 – 09.45 WIB. The learning process carried out refers to the lesson plans that have been prepared at the planning stage with improvements in accordance with the results of reflection in cycle II. The implementation of these actions includes preliminary activities, core activities and closing activities.

3) Observation

Observations or observations in this study were made to determine the extent to which the application of the *Project Based Learning* (PjBL) model can be implemented properly. In addition, it is also to determine changes in learning outcomes that occur in class V-B students on water cycle material. The observation data that will be presented in this study includes, student observation data and student learning outcome test data with the following results:

a) Student Activities

To find the percentage of student activity can be calculated as follows:

$$\begin{aligned} \text{Average} &= \frac{\text{count of earned}}{\text{count of aspect}} \\ &= \frac{317}{23} \\ &= 19,81 \\ P &= \frac{f}{n} \times 100 \\ &= \frac{19,81}{23} \times 100 \\ &= 86,14 \% \end{aligned}$$

Based on observation data made by observers on student activities, the number of scores obtained was 317 and the average was 19.81. Thus, the percentage of average value is 86%. This means that the level of success of student activities based on observation is included in the good category.

b) Student Learning Outcomes

To find the average grade point and the percentage of classical completeness obtained by students can be calculated by the following formula:

$$\begin{aligned} \text{Class Average} &= \frac{\text{student score}}{\text{count of students}} \\ &= \frac{1900}{23} \\ &= 82,6 \\ \text{Percentage of completeness} &= \frac{\text{students completed}}{\text{count of students}} \times 100 \% \end{aligned}$$

$$= x 100 \% \frac{18}{23}$$
$$= 78.26 \%$$

To find out the learning outcomes of students, tested with 10 multiple-choice questions. A total of 18 students completed the post-test questions while the remaining 5 students did not complete the learning with the *Project Based Learning* (PjBL) model on the water cycle material. The percentage of overall student learning outcomes in cycle II is 78%. From the results of the second cycle test, it can be seen that the learning outcomes of students have increased by 17% which is complete from cycle I. Thus, cycle II has not reached the expected performance indicators, the percentage of student success increases to 80%. With that, it is necessary to make improvements and improve in the next cycle.

4) Reflection

The successes that have been achieved in cycle II are as follows:

- a) The activities of students who are already good are answering greetings and showing enthusiasm, listening to teacher explanations, listening to learning videos, conducting discussions, collaborating in making discussion reports, conducting group presentations and doing final tests.
- b) The learning outcomes of students have been completed as many as 18 of the 23 students present with a percentage of 100%.

d. Cycle-III

The results of reflection in cycle II show several obstacles that cause learning to take place less optimally. Therefore, corrective steps will be taken to the learning process that will be carried out in cycle III. The implementation of research to be carried out in cycle III is the same as the previous cycle, which consists of four stages which include, planning, implementing actions, observation and reflection. The following is an explanation of each stage carried out in cycle III.

1) Planning Phase

To improve learning outcomes in cycle III, researchers use the results of reflection as a consideration to determine corrective steps, which researchers do at the planning stage of cycle III are as follows:

1. Improve the Learning Implementation Plan (RPP) in accordance with the results of reflection in cycle II. Overall, RPP has not changed much, changes only lie in

the steps of learning activities, for the evaluation questions given are almost the same as the evaluation questions in cycle II, it's just that the difficulty level of the questions is at C3.

2. Prepare instruments to analyze data related to processes and action results. The instruments used include, observation sheets of student activities, and test questions on student learning outcomes.

2) Action

The implementation of cycle II actions on May 19, 2023 at 08.00 – 09.45 WIB. The learning process carried out refers to the lesson plans that have been prepared at the planning stage with improvements in accordance with the results of reflection in cycle II. The implementation of these actions includes preliminary activities, core activities and closing activities.

3) Observation

Observations or observations in this study were made to determine the extent to which the application of the *Project Based Learning* (PjBL) model can be implemented properly. In addition, it is also to determine changes in learning outcomes that occur in class V-B students on water cycle material. The observation data that will be presented in this study includes, student observation data and student learning outcome test data with the following results:

a) Student Activities

To find the percentage of student activity can be calculated as follows:

$$\begin{aligned} \text{Average} &= \frac{\text{count of earned}}{\text{count of aspect}} \\ &= \frac{336}{23} \\ &= 21 \\ P &= \frac{f}{n} \times 100 \\ &= \frac{21}{23} \times 100 \\ &= 91,3\% \end{aligned}$$

Based on observation data made by observers on student activities on the number of scores obtained 336 and an average of 21. Thus, the percentage of average marks is 91.3%. This means that the level of success of student activities based on observation is included in the very good category.

b) Student Learning Outcomes

To find the average grade point and the percentage of classical completeness obtained by students in the table can be calculated by the following formula:

$$\begin{aligned} \text{Class Average} &= \frac{\text{student score}}{\text{count of students}} \\ &= \frac{2090}{23} \\ &= 91 \end{aligned}$$

$$\begin{aligned} \text{Percentage of completeness} &= \frac{\text{students completes}}{\text{count of students}} \times 100 \% \\ &= \times 100 \% \frac{21}{23} \\ &= 91 \% \end{aligned}$$

To find out the learning outcomes of students, tested with 10 multiple-choice questions. as many as 21 students completed the post-test questions while the remaining 2 students did not complete the learning with the *Project Based Learning* (PjBL) model on the Cycle material. The percentage of overall student learning outcomes in cycle III is 91%. From the results of the cycle III test, it can be seen that the learning outcomes of students have increased by 13% which is complete from cycle II. Thus, cycle III has reached the expected performance indicator that the percentage of student success increases to 80%.

4) Reflection

The successes that have been achieved in cycle III are as follows:

- Students of grade V / SD Negeri 4 Banda Aceh are said to be successful if the learning outcomes of water cycle material increase by reaching KKM 72, in cycle III as many as 21 out of 23 students have achieved scores above KKM.
- The percentage of learning completeness with a good category reaches 80% of the number of students, in cycle III it obtained 91% which is included in the very good category.
- The percentage of student activity with the very good category reached 91 in cycle III which was included in the very good category.

Based on these results, it can be seen that all performance indicators are achieved in cycle III. Researchers concluded there was no need to make improvements in the next cycle.

2. Discussion

This research was conducted to improve student learning outcomes by using the *Project Based Learning* (PjBL) model on water cycle material. From the results of classroom actions, it shows that the use of the *Project Based Learning* (PjBL) model can improve student learning outcomes on water cycle material. To find out the activities of students during the study, observation sheets and learning outcomes were used using learning evaluation sheets.

Research criteria for student activity observation sheets by filling in the number of students who carry out activities in the column provided. Data processing in this study was carried out by examining all data obtained through student learning outcomes as well as student activities and teacher activities. The results of this study are as follows:

a. Application of the *Project Based Learning* (PjBL) model to improve student activities in the water cycle material of class V-B SD Negeri 4 Banda Aceh

The use of the *Project Based Learning* (PjBL) model is suitable to be applied in the Water Cycle material in classes V-B SD Negeri 4 Banda Aceh for the three cycles, because this strategy makes students think more actively, independently and creatively in solving problems. So that students are enthusiastic to learn because it is supported by a fun approach. The *Project Based Learning* (PjBL) model has been proven to increase in cycle I to cycle III. With existing constraints, it becomes an improvement in the next cycle.

In observation, student activity for three cycles increased in cycle III. Student activity increased from cycle I obtained a value of 81.7, in cycle II obtained a value of 86.1 and cycle III obtained a value of 91.3. Based on existing data, the application of project-based learning models is proven to increase student learning activities.

b. Improving Student Learning Outcomes on *Project Based Learning* (PjBL) Model Water Cycle Material in Class V-B SD Negeri 4 Banda Aceh

Based on the results of research from pre-cycle data, cycle-I, cycle-II and cycle-III in class V-B, it is known that each action has increased. The results of pre-cycle data can be known in advance from 23 students, none of the students obtained scores reaching KKM.

So, it can be concluded that with a completeness percentage of 0%, it is included in the category of incomplete learning outcomes obtained by students. The results of pre-cycle data on water cycle material obtained are still very low, therefore researchers take action so that student learning outcomes can increase. It is known that there is an increase in learning outcomes on water cycle material after applying the *Project Based Learning* (PjBL) model.

Based on the data above, it can be seen that the results obtained there is a percentage of completeness of students increasing every cycle. This is supported by reflections on each cycle and the results of discussions with the pamong teacher. The results of pre-cycle data values are very low, this is because students still do not understand the concept of the water cycle.

In the first cycle, there was an increase of 23 students, 14 students who were completed and 9 students who were still said to be incomplete with a percentage of 60.87%. This is due to the lack of strengthening of the water cycle material. So, the researchers again followed up to cycle II.

At the percentage level of learning outcomes in cycle II has increased from cycle-I by 17% with a percentage gain in cycle II which is 78.26%. Despite the increase, the criteria indicators are still sufficient so that researchers continue to cycle III.

After doing cycle III saw a significant improvement with a success percentage of 91% which is included in the very good category. This is due to improvements made both from teacher activities using smart board media and student activities that are active in playing water cycle games using the *Project Based Learning* (PjBL) model well.

Therefore, the third cycle action carried out can improve learning outcomes on water cycle material in class V-B SD Negeri 4 Banda Aceh by applying the *Project Based Learning* (PjBL) model has succeeded in achieving excellent performance indicators and researchers do not need to do the next cycle.

D. Conclusion

Based on the results of research and discussions that have been carried out at PTK regarding improving learning outcomes on water cycle material using the *Project Based Learning* (PjBL) model. In students of grade V-B SD Negeri 4 Banda Aceh, it can be concluded as follows that the use of the *Project Based Learning* (PjBL) model on water cycle material in class V / B SD Negeri 4 Banda Aceh has been implemented well. This is evident in the results of cycle I observation of student activity cycle I gets a percentage of value 81.7% (good), in cycle II observation of student activity gets a value of 86.1% (good), and in cycle III observation of student activity gets a value of 91.3% (Very Good).

The learning outcomes of students in grades V-B SD Negeri 4 Banda Aceh on the water cycle material have improved after using the *Project Based Learning* (PjBL) model. This is proven by the results of cycle I completion percentage of 60.87% (less), cycle II

results of completeness percentage of 78.26% (sufficient) and cycle III results of completeness percentage of 91.3% (very good).

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