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APPLICATION OF THE PROJECT BASED LEARNING MODEL TO IMPROVE STUDENT LEARNING OUTCOMES IN CLASS IIB FRACTIONAL MATERIAL OF SD NEGERI 4 BANDA ACEH

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Abstract

This study aims to describe student activities by applying the *Project Based Learning* learning model to improve student learning outcomes in class IIB fractional material SD Negeri 4 Banda Aceh. This type of research is Classroom Action Research (PTK) which aims to improve the quality of learning in the classroom. The subjects in this study amounted to 22 grade IIB students of SD Negeri 4 Banda Aceh City. Data collection techniques are carried out by observation and learning outcome tests. Based on the results of research in cycles I, II, and III obtained the following data: (1) the results of observations on student activities in learning observed for three cycles, increased each cycle, namely: student activity in cycle I reached 85.22%, cycle II reached 87.37%, and cycle III reached 93.45%. (2) the learning outcomes of students in fractional material have increased in cycle I of classical completeness criteria reaching 50% with an average value of 73.63, in cycle II classical completeness criteria of 81.81% with an average value of 85, while cycle III of classical completeness criteria 95.43% with an average value of 93.63. From the results of the study, it can be concluded that the application of the *Project Based Learning learning model* on fractional material can improve the learning outcomes of grade IIB students of SD Negeri 4 Banda Aceh.

Keywords: *Learning Outcomes, Project Based Learning Model, Fractions*

A. Introduction

Education is a long-term investment in human resources that has value for the survival of human civilization in the world. To create superior humans, of course, requires good quality education as well. Through quality education, children will more easily develop all their potential and will be more directed. This is in accordance with Law of the Republic of Indonesia Number 20 of 2003 concerning the national education system chapter I article 1 paragraph 1: "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state".

Thus, it means that education is not only a process of transferring knowledge from the messenger (teacher) to the recipient of the message (students), but education is also an effort to develop children's potential both in terms of spiritual, attitude, skills, and intellectual. One of the important components in education is the teacher. Teachers in the context of education have a large and strategic role. This is because it is the teacher who directly deals with students in obtaining knowledge and technology while educating with positive values through guidance and example.

Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines and develops human thinking. Therefore, mathematics subjects need to be given to all students from the basic education level to higher levels to equip students with the ability to think logically, analytically, systematically, critically and creatively as well as the ability to work together to survive in ever-changing, uncertain and comparative circumstances.

The success of the learning process is based on the learning outcomes of learners. The higher the understanding and mastery of the material and learning outcomes, the higher the learning success rate. But in reality, it can be seen that the learning outcomes of students are still low, including mathematics learning. One of the reasons is the way of presenting learning and the learning atmosphere is less interesting and fun.

Teachers in learning should be able to create a pleasant atmosphere, and allow students to be actively involved in the learning process, so that students can be motivated and student learning outcomes can increase. In supporting the

improvement of student learning outcomes, teachers need to develop learning models that are in accordance with the characteristics of students. The results of observations that have been made show that class IIB students are very happy with things related to crafts, which allows students to color, draw, cut and paste. Therefore, the *Project Based Learning* learning model may be able to be applied to mathematics subjects.

According to Joel L. Klein (in Rahmadhani, 2022: 10) the *Project Based Learning* learning model is a learning strategy that solidifies students to gain new knowledge and understanding based on their experience and provides learning experiences that involve students in a complex way and are designed to develop in the real world. So, the implementation of *Project Based Learning* will certainly make the teaching and learning atmosphere more enjoyable, where students and educators will be able to enjoy every learning process. Students will be actively involved in producing a work, product, other useful things, of course, still related to the competence or material being studied, while educators or teachers are only facilitators.

Based on observations at SD Negeri 4 Banda Aceh, it was found that many class IIB students did not understand the concept of fractions, so that many students' learning outcomes were not complete. Based on the background of the problem that has been described, researchers are interested in conducting classroom action research entitled "Application of *Project Based Learning* Learning Model to Improve Student Learning Outcomes in Class IIB Fractional Material SD Negeri 4 Banda Aceh".

B. Methods

The type of research used in this study is Classroom Action Research (PTK). According to Arikunto (2015: 1) class action research is research that describes the occurrence of causation of treatment, as well as explaining what occurs when given treatment to the impact of the treatment. The subjects in this study amounted to 22 grade IIB students of SD Negeri 4 Banda Aceh, data collection techniques were carried out by observation, and learning outcomes tests. Analysis of research data was carried out qualitatively and quantitatively. Qualitative data in the form of filling in observation data on the implementation of learning carried out by teachers and researchers. Quantitative data are obtained by conducting tests.

a. Individual Student Learning Outcomes

To calculate the assessment of individual student learning outcomes, the Benchmark Reference Assessment (PAP) formula is used according to Gronlund and Linn (in Purwanto 2011, p. 207) which is as follows:

$$PHB = \frac{Earned\ Score}{Maximum\ Score}\ x\ 100$$

Information:

PHB = Learning Outcomes Assessment

With Minimum Completeness Criteria (KKM) = 72, where if the data

Score < 72: students have not completed learning

Score > 72: students have completed learning

b. Classically average score

The average value can be calculated using the formula:

$$\bar{X} = \frac{\sum X}{\sum N}$$

Information:

X = average value

∑ X = Number of marks of all students

∑ N = Number of students

c. Determining the Completeness of Learning Classically

To determine the percentage of learning outcomes of students classically used the formula:

$$PKK = \frac{\sum Students\ who's\ completed\ studies}{\sum students}\ x\ 100\%$$

Information:

PKK = Classical Completeness Percentage

Student learning completeness refers to the minimum completeness criterion value applied by the school, namely KKM ≥ 72 of the total test score. As for classical learning completeness, it is achieved when ≥ 80% of students in the class have completed learning.

d. Analyze student activity data

To analyze and calculate the percentage of student activity, which is as follows:

$$P = \frac{f}{n} \, x \, 100 \, \%$$

Information:

P = Percentage rate achieved

f = number of activity scores earned by students

n = total overall score

C. Results and Discussion

1. Research Results

The implementation of this class action research is carried out in three cycles. Each cycle consists of four steps, namely *planning*, acting, *observing, and* reflecting. This research uses a *project-based learning* model in learning fractional material mathematics for grade IIB students of SD Negeri 4 Banda Aceh.

The results of the study were obtained through observation and conducting learning outcome tests. The observation activities are carried out to observe the activities of students when applying the *project-based learning* model. Learning outcome tests are used to determine data on improving student learning outcomes before and after applying the *project-based learning* model. In this study, the data is presented by grouping it into 4 (four) stages, namely pre-cycle, cycle I, cycle II and cycle III, as follows.

a. Pre-Cycle

Pre-cycle activities are activities carried out before carrying out actions. In this activity, the teacher collects initial data in the form of student learning outcomes on fractional material by providing a pre-test. From the results of the pre-test, it is known that the learning outcomes of students on fractional material are still low, and this is also the background of classroom action research to improve the quality of learning so that student learning outcomes can increase.

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

$$\bar{x} = \frac{\sum X \text{ (Sum of all students' grades)}}{\sum N \text{ (sum of all students)}}$$

$$= \frac{890}{22}$$

$$= 40.45$$

PKK = $\frac{\sum students\ who\imath s\ completed\ studies}{\sum students}\ x\ 100\%$

= 0%$\frac{0}{22}$

Based on the results of the percentage of completeness of class IIB students on fractional material, no one has reached the KKM of 72 as determined by the school. From the pre-test result data, it shows that the percentage of student learning completeness is 0%, so action research is needed to improve the learning process so that student learning outcomes can increase.

b. Cycle I

In the implementation of Cycle, I there are 4 (four) stages, namely *planning*, acting, observing and reflecting which will be described as follows.

a) Planning

At this stage carry out the following activities:

1) Prepare a Learning Implementation Plan (RPP) for Fractional Mathematics with a *project-based learning model that* is adjusted to the basic competencies and learning indicators that have been set.
2) Set up fractional drawing media and sharded power point
3) Prepare Student Worksheets (LKPD)
4) Create an observation sheet format for the implementation of the *Project Based Learning learning model*
5) Create or compile a question test (post test I) to see the results of learning Mathematics fractional material.

b) Implementation

At the implementation stage, researchers carry out learning activities according to the action scenario that has been prepared, namely on March 17, 2023. The implementation of these actions includes preliminary activities, core activities and closing activities.

c) Observation

Observations or observations in this study were made to find out whether the application of the *project-based learning model* went well. In addition, observations were made to determine changes in the learning outcomes of class IIB students on

fractional material. The following observations will be presented in the form of data from observations of student activities and test data on student learning outcomes.

1) Student Activities

To find the percentage of student activity can be calculated by the following formula:

$$\text{Average} = \frac{earned\ amount}{number\ of\ aspect}$$
$$= \frac{300}{16}$$
$$= 18.75$$

$$P = \frac{f}{n} \text{ x } 100\%$$
$$= \text{ x } 100\% \frac{18,75}{22}$$
$$= 85,\ 22\ \%$$

Based on student activity observation data, the number of scores obtained was 300 and the average was 18.75. Thus, the average score percentage is 85.22% with the category of excellent. Based on the results of the analysis of observational data on students, it can be concluded that student activities in learning are good and as planned.

2) Student Learning Outcomes

To find the percentage of student learning completeness can be calculated by the following formula:

$$\bar{x} = \frac{\sum X \text{ (Sum of all students' grades)}}{\sum N \text{ (sum of all students)}}$$
$$= \frac{1620}{22}$$
$$= 73,63$$

$$PKK = \frac{\sum students\ who's\ completed\ studies}{\sum students}\ x\ 100\%$$
$$= = 50\% \frac{11}{22}$$

Based on data on student learning outcomes, information was obtained as many as 11 out of 22 students completed learning with a *project-based learning* model on fractional material. The percentage of completeness of student learning outcomes is 50%. Based on this fact, it can be concluded that *the project-based*

learning model is not active, because the completeness results obtained by students classically are less than the predetermined criteria, which is 85%.

d) Reflection

The implementation of learning in cycle I with the use of the *project-based learning model* has run smoothly and can improve learning outcomes on fractional material in class IIB even though the improvement has not been maximized. For this reason, researchers try to look back at the obstacles during the implementation of cycle I learning with a project-based learning model such as there are activities that are not carried out optimally by the teacher so that student activity is low at that stage, there are no discussion activities that encourage students to better understand the material better and the use of short fill-in questions that are less effective for students who have difficulties read. Seeing these conditions, the teacher then made improvements to learning in cycle II.

c. Cycle II

From the results of reflection in cycle I shows the need for improvement in the learning process of cycle II so that student learning outcomes can be maximized. The implementation of cycle II is the same as the previous cycle which consists of 4 (four) stages, namely planning, acting, *observing*, *and reflecting which will be described as follows.*

a) Planning

In the planning stage of cycle II, researchers carry out the following activities:

1) Improve the Learning Implementation Plan (RPP) for Fractional Mathematics material that is adjusted to the basic competencies and learning indicators that have been determined and also adjusted to the results of reflection in Cycle I. overall RPP has not changed much, where changes only lie in the steps of learning activities and learning media used
2) Prepare media puzzles, fractions, and learning videos
3) Prepare Student Worksheets (LKPD)
4) Prepare the format of the observation sheet for the implementation of the *Project Based Learning learning model*

5) Create or compile a question test (post test II) to see the results of learning Mathematics fractional material.

b) Implementation

The implementation phase of cycle II will be carried out on May 4, 2023. The learning process is carried out in accordance with the action scenario that has been prepared by considering the results of reflection in cycle I. The implementation of this action includes preliminary activities, core activities and closing activities.

c) Observation

Observation activities in this study were carried out to determine whether the application of the *project-based learning model* went well, as well as to find out changes in the learning outcomes of class IIB students on fractional material. The following observations will be presented in the form of data from observations of student activities and test data on student learning outcomes.

1) Student Activities

To find the percentage of student activity can be calculated by the following formula:

$$\text{Average} = \frac{earned\ amount}{number\ of\ aspect}$$
$$= \frac{346}{18}$$
$$= 19.22$$

$$P = \frac{f}{n} \text{ x } 100\%$$
$$= \text{x } 100\% \frac{19{,}22}{22}$$
$$= 87,\ 37\ \%$$

Based on student activity observation data, the number of scores obtained was 346 and the average was 19.22. Thus, the average score percentage is 87.37% in the excellent category. Based on the results of the analysis of observation data on students, it can be concluded that student activity in learning is very good.

2) Student Learning Outcomes

To find the percentage of student learning completeness can be calculated by the following formula:

$$\bar{x} = \frac{\sum X \text{ (Sum of all students' grades)}}{\sum N \text{ (sum of all students)}}$$

$$= \frac{1870}{22}$$

$$= 85$$

$$\text{PKK} = \frac{\sum students\ who's\ completed\ studies}{\sum students}\ x\ 100\%$$

$$= = 81.81\% \frac{18}{22}$$

Based on data on student learning outcomes, information was obtained as many as 18 out of 22 students completed learning with a *project-based learning* model on fractional material. The percentage of completeness of student learning outcomes is 81.81% and has increased by 31% from the previous cycle. Based on this fact, it can be concluded that the *project-based learning* model is active, but has not reached the set completeness criterion of 85%.

e) Reflection

The implementation of learning in cycle II with the use of *a project-based learning model* has been running well and can improve learning outcomes on fractional material in class IIB. However, there is still a slight obstacle, namely the existence of students who have not completed learning because of the formation of groups that are still ineffective, besides that some students also do not bring tools and materials for making projects so that the results of student projects are still not optimal. Seeing these conditions, the teacher then made improvements to learning in cycle III.

d. Cycle III

From the results of reflection in cycle II shows the need for improvement in the learning process of cycle III so that student learning outcomes can be maximized. The implementation of cycle II is the same as the previous cycle which consists of 4 (four) stages, namely planning, acting, *observing*, *and reflecting which will be described as follows.*

a) Planning

In the planning stage of cycle III, researchers carry out the following activities:

1) Improve the Learning Implementation Plan (RPP) for Fractional Mathematics material that is adjusted to the basic competencies and learning indicators that have been determined and also adjusted to the

results of reflection in Cycle II. Overall, RPP has not changed much, where changes only lie in the steps of learning activities and learning media used, as well as the way of group division that is more tailored to students.

2) Set up power point media about fractions.
3) Prepare Student Worksheets (LKPD)
4) Prepare the format of the observation sheet for the implementation of the *Project Based Learning learning model*
5) Create or compile a question test (post test III) to see the results of learning Mathematics fractional material.

b) Implementation

At the stage of implementing Cycle III, researchers carry out learning activities in accordance with the action scenarios that have been prepared. This activity will be held on May 11, 2023. The implementation of these actions includes preliminary activities, core activities and closing activities.

c) Observation

Observation activities in this study were carried out to determine whether the application of the *project-based learning model* went well, as well as to find out changes in the learning outcomes of class IIB students on fractional material. The following observations will be presented in the form of data from observations of student activities and test data on student learning outcomes.

1) Student Activities

To find the percentage of student activity can be calculated by the following formula:

$$\text{Average} = \frac{earned\ amount}{number\ of\ aspect}$$
$$= \frac{313}{15}$$
$$= 20.86$$

$$P = \frac{f}{n} \text{ x } 100\%$$
$$= \text{x } 100\% \frac{20,86}{22}$$
$$= 93,45\ \%$$

Based on student activity observation data, the number of scores obtained was 313 and the average was 19.22. Thus, the average score percentage is 93.45% with the excellent category. Based on the results of the analysis of observation data on students, it can be concluded that student activity in learning is very good.

2) Student Learning Outcomes

To find the percentage of student learning completeness can be calculated by the following formula:

$$\bar{x} = \frac{\sum X \text{ (Sum of all students' grades)}}{\sum N \text{ (sum of all students)}}$$

$$= \frac{2060}{22}$$

$$= 93{,}63$$

$$\text{PKK} = \frac{\sum students\ who's\ completed\ studies}{\sum students}\ x\ 100\%$$

$$= = 95.45\%\frac{21}{22}$$

Based on data on student learning outcomes, information was obtained as many as 21 out of 22 students completed learning with a *project-based learning* model on fractional material. The percentage of completeness of student learning outcomes is 95.45% and has increased by 14% from the previous cycle. Based on this fact, it can be concluded that the *project-based learning* model is active and reaches the set completeness criterion of 85%.

d) Reflection

The implementation of learning in cycle III with the use of the *project-based learning model* has run well and can improve learning outcomes on fractional material in class IIB to the maximum. The implementation of cycle III is said to have succeeded in achieving all established performance indicators, namely in cycle III d as many as 21 out of 22 students have been completed, namely achieving scores above KKM 72.

2. Discussion

Based on the results of research that has been done, the application of the Project Based Learning learning model on fractional material from cycle I, cycle II and cycle III can be described as follows:

a. Application of *Project Based Learning* Model to Increase Student Activities in Class IIB Fractional Material SD Negeri 4 Banda Aceh

The application of the *Project Based Learning* model is very appropriate to be applied to fractional material in class IIB SD Negeri 4 Banda Aceh, because this learning model allows students to be more actively involved in the learning process, able to construct their own knowledge, and creative in making products or works as an effort to better understand or apply learning material. Students are also more enthusiastic to learn because learning is more fun and not monotonous. Based on the results of the study, the *Project Based Learning* learning model has been proven to increase student learning activities as seen from the increase in each cycle, namely: student activity in cycle I reached 85.22% of the very high category, cycle II reached 87.37% of the very high category, and cycle III reached 91.45% of the very high category

b. Improving Student Learning Outcomes on Fractional Material Using Project *Based Learning Model* in Class IIB SD Negeri 4 Banda Aceh

Based on the results of research from pre-cycle data, it can be known that previously from 22 students there were no students whose scores reached KKM 72. So that the percentage of completeness obtained is 0% and is included in the very low category. The results of the pre-cycle data of fractional material obtained are still very low, therefore researchers take action so that student learning outcomes can increase. After taking action, namely applying the *Project Based Learning learning model,* it can be seen that there is an increase in the learning outcomes of class IIB students on fractional material.

In the implementation of the first cycle, student learning outcomes have increased from 22 students, 11 students who are complete, and 11 other students who have not been completed with a percentage of completeness of 50%. This is because there is still a lack of reinforcement of fractional material and students are still confused about the concept of fractions, especially those about the story. So the researchers again followed up to cycle II.

The results obtained in cycle I, become material for making improvements in cycle II. At the percentage level of learning outcomes in cycle II also increased from 22 students, 18 students completed and 4 students incomplete. Increased learning completeness from cycle I to cycle II by 31% with a percentage gain in cycle II of

81.81%. Although there was an increase, it did not meet the success indicator of 85%, so the researchers continued to cycle III.

After doing cycle III saw a significant improvement with a success percentage of 95.43% which is included in the very good or very high category. This is due to improvements made both from teacher activities and student activities and the application of the *Project Based Learning* model well. Therefore, the third cycle action carried out can improve learning outcomes on fractional material in class IIB SD Negeri 4 Banda Aceh by applying the *Project Based Learning model* has succeeded in achieving performance indicators and researchers do not need to do the next cycle.

D. Conclusion

Based on the results of classroom action research conducted to improve learning outcomes on fractional material by applying the *Project Based Learning* (PjBL) model to grade IIB students of SD Negeri 4 Banda Aceh, it can be concluded as that the application of the *Project Based Learning* learning model on fractional material in class IIB SD Negeri 4 Banda Aceh has been implemented well. This is evident in the results of observations in cycle I student activity get a value of 85.22% (very good), in cycle II observation of student activity gets a value of 87.37% (very good), and in cycle III observation of student activity gets a value of 93.45% (very good).

The learning outcomes of grade IIB students of SD Negeri 4 Banda Aceh on fractional material have increased after applying the *Project Based Learning* model. This is proven by the results of cycle I completion percentage of 50% (medium), cycle II results of completeness percentage of 81.81% (high) and cycle III results of completeness percentage of 95.43% (very high).

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