Improving Collaborative Ability and Learning Achievement in Mathematics Through the Project-Based Learning (PjBL) Model Using Diagram Image Media for Class VI Students of SD Negeri Purwoharjo Academic Year 2021/2022

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ABSTRACT: This research aims to improve students' collaboration skills and learning achievement in class VI mathematics, SD Negeri Purwoharjo for the 2021/2022 academic year through the application of the project-based learning (PjBL) learning model. This type of research is Classroom Action Research which was conducted over two cycles with each cycle consisting of 2 meetings. The subjects in this study were fifth-grade students at SD Negeri Purwoharjo, which consisted of 5 students. Data collection techniques in this study through observation. The study results showed an increase in students' collaboration skills, where in cycle I, an average score was obtained of 3.18 with a percentage of 79.44% and in cycle II an average value was obtained of 3.47 with a percentage of 86.81%. While the results of student learning achievement data also showed an increase, this is evident in the first cycle of students who fulfilled the Minimum Completeness Criteria obtained an average value of 60%, and in the second cycle students who fulfilled the Minimum Completeness Criteria obtained an average value of 100%. Therefore, the application of the project-based learning (PjBL) learning model can increase the collaboration abilities and learning achievements of students in mathematics class VI at SD Negeri Purwoharjo for the 2021/2022 academic year.

Keywords: Collaboration, Ability, Learning Achievement, Project Based Learning (PjBL)

INTRODUCTION

Along with the development of the existing curriculum in Indonesia, starting from the Computer-Based Curriculum to the Education Unit Level Curriculum which requires teachers to be able to create a learning process that emphasizes students to be active, creative, and innovative [1]. Learning activities in Elementary Schools (SD) are the initial stages for students at the formal education level because in Elementary Schools students will develop initial concepts related to science [2]. One of the sciences studied at the elementary school (SD) level is mathematics.

Mathematics education is an important requirement for each individual student to develop their potential, where mathematics education itself aims so that each student has provisions in the process of achieving their goals. Mathematics education has indirectly increased students' ability to solve problems, think logically, think creatively, and think critically [3]. One characteristic of abstract mathematics education is the cause of many students experiencing difficulties in learning mathematics. In addition, students' paradigm of mathematics education, which is material that is difficult to learn, is the cause of students' difficulties and even laziness in working on the material [4].

The teaching and learning process that occurs in class VI of SD Negeri Purwoharjo is dominated by the role of the teacher using the lecture method and giving assignments to students which causes students to be more silent, listen to the teacher's explanations, record important things and do assignments ordered by the teacher. Teachers also rarely use visual aids that can support the learning process. So that students tend to be passive and the material being taught becomes verbal or rote. students do not get the opportunity to actively ask questions about the material being taught. In the formative test repetitions that have been carried out, the acquisition of scores for most students is still

below the Minimum Completeness Criteria (mathematics: 65), with only 2 students out of 5 students who meet the Minimum Completeness Criteria. In addition to the students' paradigm of mathematics which is a material that is difficult to understand, the phenomenon of the way the teacher teaches also causes several problems that occur in SD Negeri Purwoharjo such as the low learning achievement of students and the ability to collaborate among students, especially in class VI.

To overcome this problem, the next step is that the teacher must use the right way of conveying material by improving his learning practices by using the right learning model. One of the learning models that is suitable to be applied is the Project Based Learning (PjBL) learning model. Rusman [5] argues that the Project Based Learning (PjBL) learning model is able to improve collaboration skills and student learning achievement. The Project Based Learning (PjBL) learning model itself is a project-based learning model as a substitute for a learning model that is still teacher-centered or teacher oriented which tends to create a passive learning atmosphere [6].

Learning achievement is the result of the impact of learning as evidenced by the value in the form of understanding the subject matter and achieving the goals that have been determined [7]. Learning achievement is not something that stands alone but is the result of accumulation caused by various factors that affect students [8]. The factors that affect student learning achievement include internal factors such as physical, psychological, and physical and psychological maturity. Other factors are external factors such as social factors, cultural factors, and physical environmental factors [9].

Collaboration is an important skill aspect for achieving effective learning outcomes [10]. From this statement, we can see that collaboration skills are skills that must be possessed by students in the 21st century [11]. Taryono [12] explained that collaboration skills have six components consisting of responsibility, helping the team, respecting others, making and following agreements, managing work, and working as a team. Redhana [13] also argues that collaboration skills need to be demonstrated with abilities consisting of working appropriately and respecting group members, showing flexibility and the desire to be useful people in carrying out discussions for common goals, and being responsible for the tasks that have been assigned. determined.

RESEARCH METHODS

This type of research is a type of Classroom Action Research. This research was carried out from January to March 2022. The subjects of this study were class VI students at SD Negeri Purwoharjo Samigaluh for the 2021/2022 academic year, with a total of 5 students. Data collection techniques in this study used observation techniques, where data were analyzed descriptively and presented in tabular form. The research framework is presented in Figure 1.
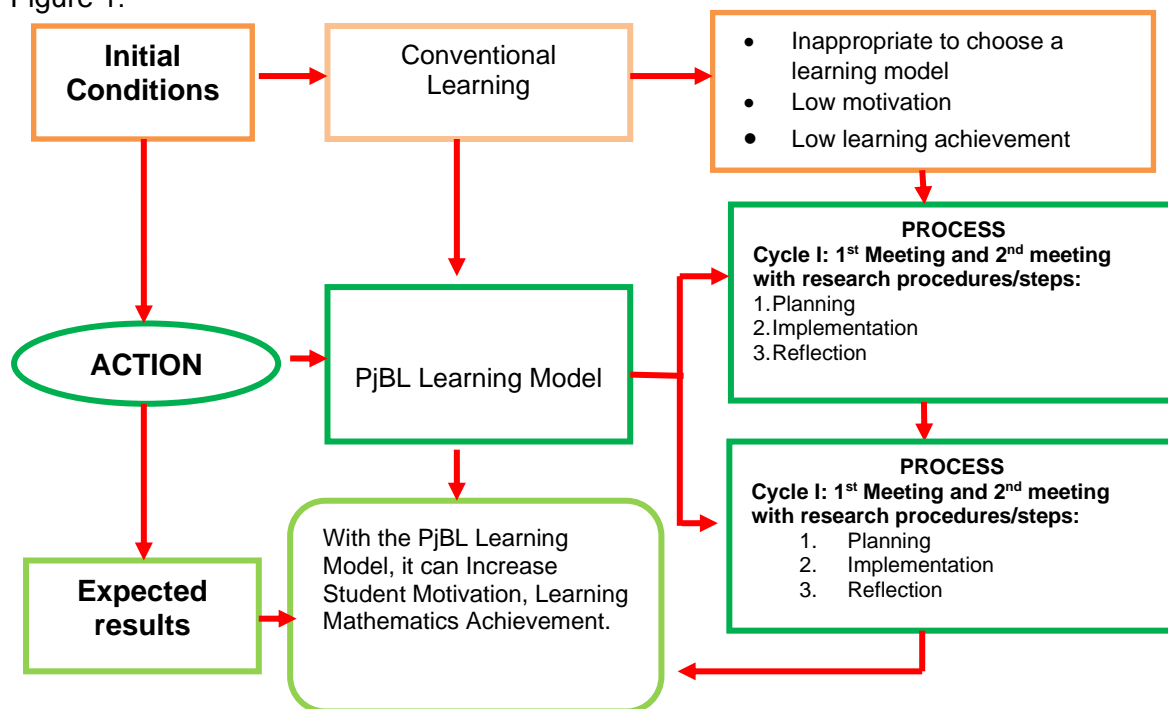

FIGURE 1. Research Design with the PjBL learning model

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RESULT AND DISCUSSION

Based on the results of research conducted for 2 cycles of 4 meetings, data was obtained that the learning achievement of students had increased. This can be known based on the results of observations for 2 cycles on the application of the Project Based Learning (PjBL) learning model in mathematics subjects which can be seen in Table 1.

TABLE 1. The Average Number of Student Learning Achievements

No	Value Intervals	Cycle I		Cycle II	
		Total Average Score of Students	Total Average Percent (%)	Total Average Score of Students	Total Average Percent (%)
1	89 – 100	0.5	10	1.5	30
2	77 – 88	1.5	30	2	40
3	65 – 76	1	20	1	20
4	< 65	2	40	0.5	10
	Amount	**5**	**100**	**5**	**100**

Based on Table 1 above, it shows that in cycle I as many as 3 students scored above the Minimum Completeness Criteria with an average number of students who met the Minimum Completeness Criteria score of 60%. While in cycle II students who meet the Minimum Completeness Criteria score are 100%. This shows that the increase in student learning outcomes in cycle I to cycle II is 40%, which means that the application of the Project Based Learning (PjBL) learning model can improve the learning achievement of class VI students at SD Negeri Purwoharjo Samigaluh in mathematics.

As for the results of observations on students' collaborative abilities in mathematics subjects using the Project Based Learning (PjBL) learning model also experienced a significant increase. In more detail explained in Table 2.

TABLE 2. Observation Results of Students' Learning Motivation Cycles I and II

No	Aspect	Cycle I		Cycle II	
		Average score	Percent (%)	Average score	Percent (%)
1	The basic question is what students should do about the problem	3.45	86.25	3.65	91.25
2	Discussion on the preparation of a project plan	3.25	81.25	3.50	87.50
3	Students compile a project completion schedule	3.15	78.75	3.35	83.75
4	Learners are active in making projects and record each stage	3.20	80.00	3.65	91.25
5	Students actively solve problems	3.10	77.5	3.40	85.00
6	Students make product/work reports	3.15	78.75	3.55	88.75
7	Students present reports/projects that have been made	2.95	73.75	3.35	83.75
8	Students provide feedback on the presentation	3.05	76.25	3.30	82.50
9	Students make conclusions	3.30	82.50	3.50	87.50
	Amount	**3.18**	**79.44**	**3.47**	**86.81**

Based on Table 2 above, shows that the results of observing the collaboration abilities of students in cycle I obtained an average value of 3.18 with a percentage of 79.44%. While the results of observing the collaboration abilities of students in cycle II obtained an average value of 3.47 with a percentage of 86.81%. This shows that the increase in student collaboration in cycle I to cycle II is 7.37%, which means that the application of the Project Based Learning (PjBL) learning model can improve the collaboration skills of class VI students at SD Negeri Purwoharjo Samigaluh in mathematics.

As for the results of observations on improving the quality of learning practices in cycle I to cycle II through the Project Based Learning (PjBL) learning model in mathematics subjects carried out by colleagues with 9 aspects of assessment described in Table 3.

TABLE 3. Assessment Results of the Teaching and Learning Process

No	Aspect	Cycle I		Cycle II	
		Average score	Percent (%)	Average score	Percent (%)
1.	Apperception and motivation	3.35	83.75	3.65	91.25
2.	Submission of competencies and activity/learning plans	2.95	73.75	3.45	86.25
3.	Mastery of learning materials	3.05	76.25	3.55	88.75
4.	Application of educational learning strategies	2.95	73.75	3.55	88.75
5.	Implementation of the Project Based Learning (PjBL) Model	2.75	68.75	3.30	82.50
6.	Utilization of learning resources/media in learning	3.10	77.5	3.50	87.50
7.	Involvement of Learners in learning	2.85	71.25	3.35	83.75
8.	The use of correct and appropriate language in learning	3.10	77.50	3.45	86.25
9.	Reflection and feedback	3.25	81.25	3.60	90.00
	Amount	**3.04**	**75.97**	**3.49**	**87.22**

The results showed that the teacher's ability to carry out the process of improving the quality of mathematics learning practices through the Project Based Learning (PjBL) learning model in cycle I obtained an average score of 3.04 with a percentage of 75.97%, while in cycle II an average score of 3.49 was obtained with the percentage of 87.22%. Based on the results of this study, shows that through the application of the Project Based Learning (PjBL) learning model in mathematics, subjects can improve the ability of teachers to carry out Teaching and Learning Activities.

Based on the results of research that has been carried out using the Project Based Learning (PjBL) learning model which is carried out in 2 cycles for class VI students at SD Negeri Purwoharjo Samigaluh in the 2021/2022 academic year. The application of this learning model is proven to be able to create learning that is more interesting, fun, motivated, and provides benefits for students. The project-based learning allows students to try, explore abilities, construct knowledge, and experience everyday life. In addition, the Project Based Learning (PjBL) learning model can build cooperation, self-confidence, courage, tenacity, activeness, and creativity in students in making projects and presenting the work that has been made, and can help students understand concepts and apply them. data presentation material.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that the application of the Project Based Learning (PjBL) model in mathematics subjects can improve collaboration skills and learning achievement of class VI students at SD Negeri Purwoharjo in the 2021/2022 academic year.

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