EFFORTS TO IMPROVE LEARNING ACHIEVEMENT AND COLLABORATION USING A PROBLEM BASED LEARNING MODEL ON BUILDING SPACE MATERIAL IN CLASS IV

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Abstract: This study was motivated by the low learning achievement and collaboration skills of students in class IV SD Negeri 1 Bojongsari. This study aims to improve the low learning achievement and collaboration skills of students in the mathematics subject of building space material through the Problem Based Learning (PBL) learning model. This research is a type of Classroom Action Research conducted in two cycles, one cycle consists of 2 meetings, each cycle consists of planning, implementation, observation, and reflection. The subjects of this study were fourth grade students of SD Negeri 1 Bojongsari with a total of 20 students. Based on the results of the study, the application of the PBL model can improve the learning achievement of students can be seen in the completeness of students in cycle I is 47.5% increased to 82.5% in cycle II. Student collaboration skills in cycle I obtained a percentage of 55% with poor criteria, cycle II obtained a percentage of 80% with good criteria. This shows that the Problem Based Learning (PBL) learning model can improve learning achievement and collaboration skills of fourth grade students of SD Negeri 1 Bojongsari.

Keywords: Learning Achievement, Collaboration Skills, Problem Based Learning (PBL)

INTRODUCTION

Education is a learning process designed to improve knowledge, skills and shape human attitudes and behavior. Education in Indonesia is currently implementing the 2013 curriculum in 2023. Gradually, it has begun to implement the latest curriculum, namely a Merdeka curriculum, at every level of education, including primary education. Implementing the Merdeka curriculum at the basic education level, in this case, elementary school, began to be implemented for grades 1 and 4. One of the lessons in the Merdeka curriculum is learning mathematics.

Learning mathematics is very important to be carried out properly at every level of education, especially at the primary level. According to (Anggraini, 2021) learning mathematics is one of the exciting lessons to be developed in elementary schools because elementary school-age children are experiencing development in thinking and learning.

According to Piaget, this is by the stages of development, namely the concrete operational stage, where the definitely a significant turning point in children's cognitive development because this stage is the beginning of logical thinking. Learning math at elementary school benefits students in everyday life, such as solving problems, training ways of thinking, being more thorough and practicing patience.

Based on the observations made at SD Negeri 1 Bojongsari, preliminary data obtained that the percentage of student score completeness still needs to be higher in mathematics learning. Many students get low scores and must reach the Learning Objective Completeness Criteria in math subjects. Students have less curiosity; some students need more respect for friends; this can be seen when students present the results of discussions in group assignments; during the learning process, students still found who tend to chat with their classmates and not pay attention. The observations also showed that students lacked a sense of responsibility; this was evident when students were conducting group discussions; it was seen that only some students in the group worked on tasks and cooperated well.

Some of the problems above can be categorized as low student learning achievement. The issue of low mathematics learning achievement seen in the results of the End of Semester 1 Assessment of Class IV of SD Negeri 1 Bojongsari in the 2022/2023 academic year is one of them due to the impact of low student collaboration skills. Collaboration skills still need to improve, including the ability to work together in teams, respect for friends, and communication skills, which have not been owned by fourth-grade students of SD Negeri 1 Bojongsari.

These findings also complement the results of a study (Wahyu Hartina & Permana, 2022). Students with good collaboration skills can communicate ideas, exchange opinions, seek explanations, analyze problems, and discuss solutions to achieve the same goals. Teachers must improve students' collaboration skills to help them achieve their learning goals more successfully. The same is conveyed in the (Gerald & Allan, 2018) research, which finds that collaboration skills are positively related to learning outcomes. The higher students' collaboration skills, the more they are expected to participate in problem-solving, improving their learning outcomes actively.

Learning occurs through acquiring knowledge in the form of facts, concepts, and principles and through a process where learners can work together to solve everyday problems (Lase, 2019; Sari & Montessori, 2021). In addition to the explanations from the findings, teachers also reported that they had not found a suitable learning model to apply in SD Negeri 1

Bojongsar Class IV. Teachers need a learning model to improve students' learning and collaboration skills.

Previous studies (Badarudin et al., 2022) showed that teachers should apply Problem-Based Learning (PBL) in the classroom when presenting content learning of pedagogical knowledge. This action research offers PBL learning in the classroom through group learning to improve students' collaboration skills.

Problem-based learning (PBL) is a learning model that applies a learner-centered approach to authentic problems. It allows learners to build their knowledge, develop higher skills through collaboration, empower learners, and increase their self-confidence. This is supported by the advice that PBL provides learners with challenges and insights into learning and working in teams to find solutions to real-world problems (Fery et al., 2017; Zakeus, 2022).

Based on these aspects, the researcher is interested in conducting an action-research study on efforts to improve student's learning performance and collaboration skills in learning mathematics in spatial construction materials in Class IV B SD Negeri 1 Bojongsari. This study aims to determine whether the PBL learning model can improve students' learning performance and collaboration skills in learning mathematics in Class IV SD Negeri 1 Bojongsari.

RESEARCH METHODS

This study is an investigation of classroom actions according to the Kemmis and McTaggart model. Kemmis and McTaggart's model consists of 4 phases, namely: planning phase, action phase, observation phase and reflection phase. The study was conducted in 2 cycles, with each cycle taking place 2 times per meeting. The study was conducted in SD Negeri 1 Bojongsari in April-May 2023. The subjects of this study were the fourth grade students of SD Negeri 1 Bojongsari in the school year 2022/2023 with a total number of 20 students consisting of 13 male and 7 female students.

The data collection techniques used in this study were tests and non-tests. The instrument used for data collection through tests is an evaluation sheet. The evaluation sheet at the end of each meeting measured students' mastery of the material. Non-test data collection instruments were observation sheets and questionnaires. Collaborative observation sheets and questionnaires were used to determine the level of students' collective abilities.

After obtaining the research data, the researcher then analyzed the data that had been received. The data analysis used, namely, learning achievement analysis, is used to analyze the results of the evaluation sheet and whether it reaches the Learning Objective Achievement Criteria and the expected learning completeness, which is 80%. In addition, there is an analysis of the learning observation sheet and collaboration questionnaire sheet, which aims to determine students' level of collaboration skills.

The success indicators of the class action research conducted are: 1) Increased students' learning performance with the application of the Problem-Based Learning (PBL) model, at least students' learning performance reaches the Learning Objective Achievement Criteria set by the school, namely 70 and learning completeness reaches at least 80%. 2) Increased collaboration skills by applying the Problem-Based Learning (PBL) model; at least 80% of students' collaboration skills fall into the excellent student collaboration skills category.

RESULTS AND DISCUSSION

The results of the analysis of learning achievement for mathematics subjects in the material of building space have increased can be seen in Table 1.1 below:

No	Indicators	Cycle I	Cycle II
1	**Average Score**	53,63	75,13
2	**Learning Completeness**	47,5%	82,5%

Table 1.1 Improvement in Mathematics Learning Achievement

The average Math score from cycle I to cycle II increased by 21.5. Students learning completeness increased by 35%. The increase in learning achievement in cycles I and II occurred periodically and continuously. The results of the analysis of the student's scientific attitude observation sheet have increased, which can be seen in Table 1.2 below:

No	Achievements	Cycle I	Cycle II
1	**Percentage Per Cycle**	55%	80%
2	**Criteria Per Cycle**	Less	Good

Table 1.1 Recapitulation of Collaboration Skills Percentage

Based on table 1.2, it can be seen that the increase from cycle I to cycle II occurred by 25%. Researchers found findings during learning that teachers relate the material to examples of students' daily lives. The teacher refers to the fabric of building space with objects in everyday life around the student's environment. Students are very enthusiastic because the examples given by the teacher are around students' lives, making it easier to understand the material.

Researchers used the Problem-Based Learning (PBL) learning model for class IV SD Negeri 1 Bojongsari on the material of building space. At the beginning of the research, teachers and students were still adapting to the PBL learning model, but in the research at the next meeting the teacher better understood the steps of the PBL learning model. The histogram of the increase in student learning achievement in mathematics lessons on the material of building space can be seen in Figure 1.1 below:

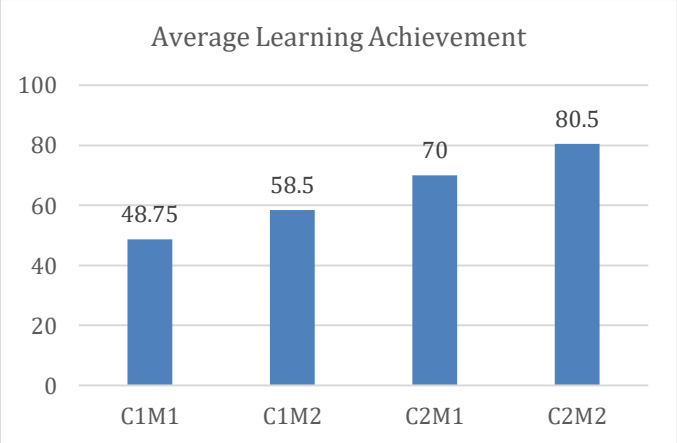

Figure 1.1 Histogram of Average Improvement in Learning Achievement

The researcher found that the teacher linked the material to students' daily lives, in this way making students better able to understand the material being taught. When the teacher conveys material about the characteristics of cubes, the teacher explains the various objects around that can be classified as cubes. Linking learning materials with everyday life and the surrounding environment gives students an accurate picture of a fabric/knowledge.

The increase was also seen when the teacher taught using the Problem-Based Learning (PBL) learning model, which provides real problems to students; this finding is the opinion (Siagian et al., 2019; Widayanti et al., 2020) which says that Problem-Based Learning (PBL) is learning that provides problems to students to find solutions and answers.

The researcher found that the increase in learning achievement occurred because students responded better to the teacher when the teacher provided a link between the beam jarring-netting material and students' real life. In addition, when the teacher gives the task to find out the difference between cuboid and beam objects, students first make observations with objects around them, and with examples displayed in the PowerPoint to observe the difference; after observation, students discuss to find out the difference. During the group discussion process, students work with group friends to solve the problems in the student worksheet. The histogram of the increase in scientific attitudes from the scientific attitude observation sheet can be seen in Figure 1.2 below:

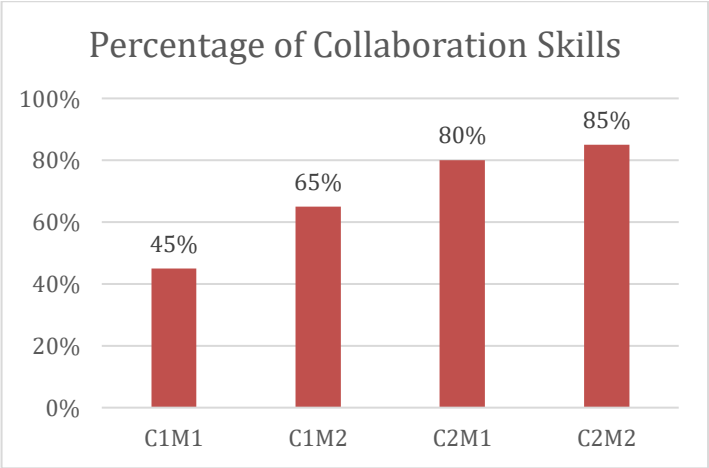

Figure 1.2 Histogram of Percentage Increase in Collaboration Skills

When conducting observations in cycle II, the researcher found that when students came forward to present the results of the discussion on the characteristics of blocks, other students were able to calm down and respect the students who presented the results of the discussion. In addition, when doing group work and determining the characteristics of blocks, students have been able to discuss and work together, this progress cannot be separated from the role of the class teacher. This finding is in accordance with the opinion that collaboration skills need to be trained to increase students' respect for others and students' courage in answering questions, discussing, and expressing their opinions (Mawaddah et al., 2022; Nahar et al., 2022).

The researchers' findings show that improving academic achievement is influenced by students' cooperation skills. This is in line with 21st century skills, there are 4 skills needed in the development of the 21st century, and one of them is collaboration skills. Aspects of collaboration skills that can be developed in elementary school children, increased collaboration skills are in line with increasing the development of student cooperation, independence, and the ability to communicate their thoughts, which can improve student understanding of the material, so as to improve student learning outcomes (Andersen & Rustad, 2022).

The training process was carried out in accordance with the module and training plan that had been prepared. Researchers found during the study that students seemed to follow the training well, students' scores increased in each episode and session, this result is in accordance with the opinion (Faizah, 2017) that learning is a process in which a person tries to obtain a new change in behavior as a whole, as a result of the student's own experience in interacting with the environment.

Higher learning outcomes are attributed to students gaining knowledge; when they gain knowledge, they can answer assessment questions. This is consistent with the findings of (Ahamad et al., 2018; Nurlaily et al., 2019) that PBL can improve thinking skills, apply knowledge to problem-solving, and encourage student collaboration.

CONCLUSION

Based on the results of research conducted for 2 cycles in order to improve learning achievement and students' cooperation skills by using the Problem Based Learning (PBL) learning model on the material of building space in class IV SD Negeri 1 Bojongsari, the

results are in accordance with the expectations of researchers. The research results found are as follows: 1) The use of the Problem-Based Learning (PBL) model of learning mathematics in the material of building space can improve the learning achievement of students in class IV. The increase in the learning achievement of students in the mathematics subject of building space material in cycle I got an average score of 53.63 with a percentage of learning completeness of 47.5%, and cycle II got an average score of 75.13 with a percentage of learning completeness of 82.5%. 2) Using the Problem-Based Learning (PBL) model of learning mathematics subject matter of building space can improve student collaboration skills in class IV. The results of the average percentage of the collaboration skills questionnaire are supported by the results of the observation sheet in cycle I am getting a percentage of 55% which includes unfavorable criteria, and then increasing in cycle II, getting a percentage of 80% which includes good criteria. Learning is said to be successful because it has reached the success indicator of learning completeness of at least 80%. The explanation of the research results and conclusions may still have shortcomings. Researchers realize that during the research there were limitations, so researchers suggest that if you want to research something similar, you should reconsider the research time during learning using the PBL model, so that the results obtained are maximized.

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