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Problem-Based Learning Model for Increase Cooperation on Science Lesson Content for Class V Students

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Abstract

This study was motivated by the low cooperative ability of Class V students. The purpose of this study was to improve the cooperative ability of Class V students in science class through the problem-based learning model. The research type used in this study is collaborative action research in the classroom (PTKK) with Kemmis and Mc Taggart's model in two cycles with each cycle consisting of planning, action, observation, and reflecion. The subjects of the study were 26 class V participants. This research was conducted during the even semester of the 2022/2023 academic year. Data collection was done through observation, interviews, and documentation. The data analysis techniques used were qualitative and quantitative. The results of this study show that the problem-based learning model can improve the cooperation skills in science classrooms of grade V students. This can be seen from the students' collaboration skills that improved from the pre-cycle stage to cycle 2. The average collaboration skills of students in the pre-cycle stage are 47.5%, 63.75% in cycle 1, and 78.75% in cycle II.

***Keywords**: Cooperation, Problem-Based Learning, Science*

Introduction

One of the most important subjects in elementary school is natural science (Science). Science is a subject that provides learners with structured knowledge, ideas, and

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concepts about the environment that are gained through the process of discovery (Kaligis in Musyaddad. V.F., et al. 2019; Astuti, T.P., 2019).

According to Dapiha (Dewi, et al., 2021), the science learning process emphasizes direct experience that focuses on the process. Consequently, science learning can enhance students' thinking process through the actions they take to achieve the expected goals. Science learning is about students learning from each other's experiences and knowledge in cooperative activities. In cooperative activities, students adapt to the different learning styles, abilities, and personalities of their classmates. In this way, they learn to work with different people and appreciate each other.

Science education in elementary school not only helps students better understand scientific concepts, but also prepares them with valuable social skills for their future. One of these social skills is cooperation as an asset that helps them understand how to interact with peers, appreciate differences, and work in teams. Instruction that fosters collaboration among students can increase learning effectiveness while improving their understanding and skills. In an increasingly interconnected and collaborative world, the ability to work in teams will become the benchmark for learners' future personal and professional success. Strengthening these skills early on will help learners meet later challenges.

Cooperation is one of the social skills that need to be developed, like Susan's opinion (Hartati, S., et al., 2020) that cooperation needs to be mastered by students because it is a life skill. Cooperation is a way people interact and talk with others to achieve desired goals and benefits together using different rules and procedures (Susanti in Kurniasih, P.D., et al., 2020; Burton in Rahayu, D., et al., 2020; Sarwono in Anwar et al., 2021).

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Cooperative activities cannot be separated from education, especially in group activities. According to Johnson (Maulida, Y.N., et al., 2020), cooperation allows people to overcome challenges, act independently and responsibly, rely on each group's skills, express opinions, make decisions, and trust others. According to Roestiyah (Nasution, 2021), the use of group work in the classroom aims to enable participants to work together to achieve common goals. The statement explains that collaboration is an important interaction carried out by two or more people to achieve a common goal.

One of the benefits of science learning is to develop scientific skills, attitudes, and values. As studied by Rahmawati, U.S., et al. (2023) entitled "Problem-Based Learning Model to Improve Student Cooperation and Learning Outcomes in Mathematics Learning." The results showed that learning and collaboration outcomes in mathematics learning were low. It was known that the teacher provided materials with a lecture and a question and answer model, then the teacher gave students sample questions, discussed the sample questions, and continued with practice questions. In the learning process, students are reluctant to pay attention to the material provided by the teacher and hesitant to ask the teacher, so most students are not engaged in the learning process.

Based on these problems, learning problems also arise in the context of science education. Based on the data from the preliminary investigation, the results of the interviews, and the observations in Class V, several problems in learning were identified. The problem is that learning is still teacher-centred, the learning model used by teachers is not very innovative, monotonous learning methods such as lectures, questions and answers bore students, and the level of student activity in discussion activities is still low, as evidenced by only one or two group members working in groups on tasks.

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Using these problems, researchers will explore the use of the problem-based learning model to improve student collaboration. Because the application of this model can engage all students in learning, as Rahmawati, U.S., et al. (2023) argue that the application of the model of problem-based learning can relate all learning to everyday problems. This is an alternative to encourage learners to actively engage in learning and improve their thinking skills. The problem-based learning model is learning that focuses on students by putting them at the center of learning and having them work together in groups to solve real-world problems using all their knowledge (Dewi, W.P., et al., 2021; Noviati, W., 2022; Nandita (Kristiana, T.F., &; Elvira H.R., 2021). In problem-solving learning, students work together to solve life problems, as argued by Ritonga, H.S., et al. (2022). In the problem-based learning model, students are divided into small groups and asked to work together to solve problems related to subject matter agreed upon by the teacher and students.

Based on the above description, the researcher conducted collaborative action research in the classroom to improve students' cooperation skills, entitled "Problem-Based Learning Model to Improve Cooperation on Science Lesson Content of Class V Students".

Methods

The type of research used is collaborative classroom action research (PTKK) using Kemmis and McTaggart's models. The working procedure in this study is a cycle of activities conducted for two cycles of two sessions each. According to Arikunto (2013: 132), there are four phases used, namely planning, action, observation, and reflection. The subjects of the study were Grade V students with a total of 26 students consisting of 10 male and 16 female learners. This research was conducted in the second semester of the academic year

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2022/2023. The research period until the reporting of the research findings is about 2 months, from May 2023 to June 2023.

The data collection techniques used are observation, interviews, and documentation. Data were obtained through observation methods in the form of student learning activities in the learning process and implementation activities conducted by teachers in learning using the Problem-Based Learning (PBL) model.

Two data analyses are used, namely quantitative data analysis and qualitative data analysis. This study refers to Miles and Huberman's interactive analysis model (in Sugiyono, 2015: 338), which is a model of data analysis technique that includes four phases, including the phases of data collection, data reduction, data presentation, and conclusion. This research can be said to be successful if the use of the PBL model can improve the collaboration skills of Grade V students in science subjects, so that ultimately 75% of the students improve their collaboration skills.

Results and Discussion

Results

Based on the observations, students' collaboration skills improved before the cycle, in Cycle 1, and in Cycle 2, as shown in Table 1.

Table 1. Data Analysis Cooperation Skills

Cycle	Cooperation Skills	Category
Pre-Cycle	47,50%	Low
Cycle 1	63,75%	Enough
Cycle 2	78,75%	High

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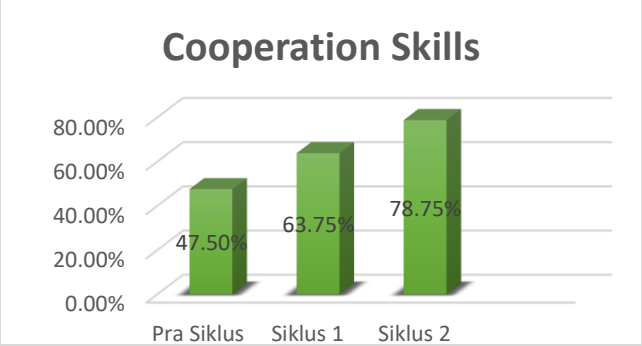
From the above table, it can be seen that the cooperation skills of learners in the preliminary stage average 47.50%, which is a low qualification. The percentage of 47.5% is in the interval of 25% - 49% for low qualification. Cycle I showed an increase from the Pre cycle, which was 63.75% in the sufficient category with an interval of 50% - 74%, and then increased again in the cycle II with 78.75% in the high category with an interval of 75% - 100%.

Graph 1. Data Analysis Cooperation Skills



On graph 1. you can see the comparison of the percentage and the increase of the percentage of students' cooperativeness from pre-cycle to cycle 2. In pre-cycle to cycle 1 the percentage increased by 16.25%, in cycle 1 to cycle 2 the percentage increased by 15%.

Discussion

The use of the PBL model in the Grade V science classroom occurs in two cycles. Each cycle consists of two meetings and each meeting lasts 2 x 35 minutes or two class periods. The learning conducted in cycle I to cycle II consists of 5 learning steps, namely,

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(a) orienting students to problems, (b) organizing learning, (c) guiding individual or group investigations, (d) developing and presenting work, (e) analyzing (Maqbullah, et al., 2018).

The application of the Problem-Based Learning model in the grade V science classroom is appropriate because, as Wulandari, et al. (2023) argue, in implementing the learning, students' thinking skills are not only trained, but also their willingness to engage in discussion in order to improve collaboration among students. Problem-Based Learning aims to improve students' ability to think critically, creatively, and cooperatively in solving problems.

In the first cycle of session 1, learning was not optimally implemented. In the phase of orienting students to problems, the teacher does not make questions and answers about the material to be learned; he only makes questions and answers as a form of problem generation at the beginning of learning and does not fully relate to the material to be taught. The teacher briefly explains the material to be learned. Learners still tend to be silent and not ask questions when the teacher explains something. The organization of the learners and the teacher in teaching the material is not systematic. When dividing groups, some students do not like to be in a group with their group mates. Some students are unfocused and do not respond to the teacher's questions. The lead phase of an individual or group investigation. Students gathering information still stick to only one source of learning. Teachers are still unclear on guidance. In the developing and presenting work phase, students are less clear in presenting their work and when it is their turn to present the work, there is a group that is not ready because they have not finished their work. In the phase of analyzing and evaluating the problem-solving process, teachers still lack depth and detail when conducting the analysis with students.

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In Cycle I, Session 2, there was an increase from the first session. In the phase of orienting students to problems, teachers conduct not only question-answer activities about an emerging problem, but also question-answer activities about the subject matter. Students begin to actively ask and answer questions, even if they are not thorough. At the stage when students are organized to learn, the teacher clearly and systematically communicates the activities to be done. When the groups were divided, there were some restless groups. In the phase of guiding individual or group investigations, the teacher thoroughly guided the other group members and did not focus only on one group. There were students in the group who did not play an active role in conducting experiments during the discussion. Most students can already relate well to the various information they received. In the stage of developing and presenting work, students develop the presentation of work in groups. Students with groups read the work promptly, even if it is still unclear. In the analysis and evaluation phase of the problem-solving process, learners begin to express their opinions about the work of other groups.

In the second cycle of Session 1, learning activities have begun to go well. The phase of student orientation to problems, question and answer activities between teachers and students went well and some students began to actively answer and ask questions. In the organizing learning phase, the teacher provides a variety of activities by playing the game "Happy Jump" and then explaining how to do it. Students actively work together to prepare strategies by dividing each group member to do the "Happy Jump" game. During the instructional phase of individual or group investigations, teachers provide maximum assistance or answer learners' questions about the activities. When gathering information, students do not stick to only one source of learning. Learners may work together to

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complete tasks in the "Happy Jump" game. In the stage of developing and presenting the work, students read the work with groups, namely the answer to the "Happy Jump" game well and the results of the questions asked, although there are some groups whose answers are not quite correct. In the phase of analysis and evaluation of the problem solving process, learners and teachers jointly draw conclusions from the results of the discussion.

In the second cycle of session 2, it was found that the learning activities were going very well. In the phase of orienting students to problems, the teacher provides problems in the students' environment, they are very enthusiastic in answering the questions posed by the teacher. In the phase of organizing learning, the teacher prepares learning strategies to improve cooperation between groups by providing the game "Jellyfish Quiz" and then explaining the process of the game. All students in the group actively answer each question in the game. During the guidance phase of individual or group investigations, learners are confident to ask questions if they do not yet understand something. Teachers provide as much guidance as possible and answer learners' questions about the activities. As they complete the game, learners gather information from a variety of relevant sources. They share their opinions with each other, process different information, and analyze it well with the results of the answers from the game. In the stage of developing and presenting the results of work, the whole group presents the results of their work well and on time. The results of the work in the form of answers from the quiz are correct. At the stage of analysis and evaluation of the problem-solving process, students actively express their opinions about the work of other groups and are able to draw conclusions and convey information clearly and systematically.

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Overall, the learning in the cycle II went well, so the researcher decided to end the study because the learning had reached the performance indicators of the research. In this study, the researchers concluded that achieving learning objectives through the use of PBL models can improve students' collaboration skills.

The results of this study are relevant to the research of Wulandari (2023), whose findings show that the use of the problem-based learning model can increase cooperativeness in science subjects, especially in the food chain materials for the 2022/2023 school year. Warsono and Hariyanto (Sari, B. T.W. & Firosalia K., 2020) confirm that the problem-based learning model can promote cooperation and solidarity because there are discussions in groups and with classmates.

By teaching students a cooperative attitude, they can teach them to feel, understand, and perform collaborative activities to achieve common goals (Rukiyati in Rahayu, D., et al., 2020). Moreover, PBL enables students to think optimally through a systematic process of group collaboration so that students can continuously develop their thinking skills (Sari, B.T.W., &; Firosalia, K., 2020). Therefore, using the PBL model is an appropriate step to improve students' collaboration skills.

Conclusion

The results of the study suggest that the use of the problem-based learning model can improve collaboration skills in science class content. This can be seen in the students' cooperation skills, which increased from the pre-cycle phase to cycle 2. Initially, the average cooperation ability of students was 47.50% in pre- cycle, then 63.75% in cycle 1, and 78.75% in cycle II. The learning model of problem-based learning can improve the

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cooperation skills in science class because there are discussion activities to analyze the presented problems and then find solutions to those problems. The syntax of learning with the Problem-Based Learning model is 1) orienting students to problems, 2) organizing students to learn, 3) leading individual or group investigations, 4) developing and presenting work, and 5) analyzing and evaluating the problem-solving process. Based on the final study, it can be said that the PBL model is suitable to overcome the problem of low cooperation. This is because the PBL model is a learning model that presents a problem to find a solution together through discussion activities that activate students' cooperation ability.

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