Collaboration Skills Improvement Using a Problem-Based Learning Model for Grade 4 Elementary School

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1.   Abstract

The background of this study is the collaborative skills of 4th-grade students who are still low. Collaborative skills are one of the 21st-century skills. The learning process carried out in the classroom is influenced by the models, methods, and approaches used by the teacher. The study applied a Problem-Based Learning model to improve the collaborative skills of 4th-grade students. This study uses Kemmis and McTaggart Class Action Research models. The subject of this study is a 4th-grade student with a total of 22 students. The object of this study is the collaborative skills of 4th-grade students. Data collection techniques use observation and documentation. Data is analyzed using qualitative and quantitative analysis. The results of this study were: collaborative skills of students of grade 4 on the pre-cycle of 59.09%, cycle I at 77.28%, and cycle II at 90.91%. Through the Problem-Based Learning model, the collaborative skills of grade 4 students have been improved.
Keywords: *Collaborative, Problem-Based Learning, The 21st-century*

2.   Introduction

Education is a conscious effort carried out by teachers to transfer science, add insights, and improve the skills of students. According to Ayu Wulandari et al., (2021) thateducation is an activity that is carried out consciously and planned as a realization of the atmosphere and learning process so that students actively develop their potential that is in them to have religious strength, intelligence, ability, as well as developing the skills that are in them.

Students of 21st century education need to have the skills to live and easily adapt to the developments of the present era. According to Kemdikbud in Fitriyani et al., (2019) stated that education in the present 21st century can develop participants to have skills to learn and innovate, use technology and information media, as well as be able to work, and survive by using skills to live (life skills).

One of the skills of the 21st century that is important to learners is collaborative skills. Through collaborative skills, learners practice for collaborative achievement of goals, practice discussions with their friends to solve problems faced, practice communicating their ideas in groups, and practice appreciating differences of opinion. Greenstain Octaviana et al. (2022) argue that collaboration is one of the learning processes carried out in groups to discuss some differences in views and knowledge through discussion activities such as giving advice, listening and listening to the course of the discussion, and appreciating existing differences of opinion.

Collaboration is the activity performed by a group of people to do something together and to facilitate work. Collaborative designs aim to share experiences, ideas, resources, and responsibilities (Reni et al., 2021). Collaborating with others means (1) working effectively and respecting different team members, (2) showing flexibility and a desire to work together to achieve common goals, and (3) taking responsibility for collaborative work and appreciating the contribution of each team member (Redhana, 2019). According to Mariamah et al. (2021) collaboration skills is the process of involving individuals, groups, and organizations working together to achieve the desired results, by working together, people can achieve a shared vision, benefit the people they serve, and build interrelated systems to solve problems and take advantage of opportunities.

The learning process carried out in the classroom is influenced by the models, methods, and approaches used by the teacher. Learning models, according to Rusman

(2014) in (Medan, 2022), are plans or patterns that can be used to create a curriculum, such as long-term learning plans, making learning materials, and directing learning in class. According to Sunbanu et al. (2019) that success in the process in teaching learning affects the improvement of the quality of education in elementary schools. The main components related to teachers, learners, and models used in the learning process affect learning in the classroom. According to Kemdikbud (2022) it is argued that learning of the 21st century is a transition of learning where the curriculum developed leads the school to change the approach of learning from teacher centered to student centered.

One model that can be done by teachers in the student-centered learning process is the Problem-Based Learning model (PBL). Problem-based learning, where in the learning process students are confronted with authentic problems so that students are actively involved in learning and can increase student learning motivation (Kurino, 2020). Through this model, students are trained to solve problems individually or in groups. According to Duch (2001) in (Taryono et al., 2019), some of the abilities that can be improved through problem-based learning are as follows: (1) Think critically, analyze, and be able to solve real-world problems (2) Search, evaluate, and use learning resources properly (3) Teamwork (4) Good at conveying and communicating effectively, both orally and in writing (5) Using learned knowledge and intellectual skills to continue learning.

Previous research related to improved collaboration using a Problem-Based Learning model entitled "The Impact of Problem-Based Learning to Improve Collaborative Skills in Thematic Learning" by Hartina et al. (2022) showed that the average collaboration between students in cycles I and II increased by 5.45. The average collaboration between students in cycle I was initially at 78.38, then increased in cycle II to 83.83. The Problem-Based Learning (PBL) model can enhance the participant's collaborative skills. The results of this study show that Problem Based Learning (PBL) learning can improve collaborative

skills by looking at improved observation outcomes of collaboration skills on pre-cycles, cycles I, and cycles II. The similarities with this research are that both use the Problem-Based Learning (PBL) learning model as an action to improve collaboration skills. The difference with research conducted by researchers is that this research uses the Class Action Research model from Stringer E.T. P, while the Class Action Research model uses the Kemmis & McTaggart model.

The article was written by Halimah. et al. (2019), with the title " Improving Collaboration Skills in Grade 4 Mathematics Subject of SD N Gendongan 03 Through the Application of the Teams Games Tournament (TGT) Learning Model". This research was conducted at SD N Gendongan 03 in the 2019/2020 academic year. The subjects of this research were 20 grade 4 students. This study used classroom action research. Data collection was through observation and field notes. Data were analyzed descriptively by comparing meaningfulness and learning in Cycle I and Cycle II. The results of this study show the average completeness of collaboration skills increased from pre-cycle to cycle II. In pre-cycle, it was 65% increasing in cycle 1 by 75% with a very high category. The similarity with this research is the focus of research on improving collaboration skills. The difference is that this study applies the Teams Games Tournament (TGT) learning model, while the researcher applies the Problem-Based Learning model.

The article was written by Avisca et al. (2018) with the title " Enhancement Critical Thinking and Collaborative Skill Mathematics Through Models Group Investigation Help Magic Ball". This type of research is Classroom Action Research (CAR). The subjects of this study were fourth-grade students with a total of 38 students. Data collection was carried out by observation, questionnaire sheets, and tests. The results of this study indicate that the application of the Cooperative learning model type Group Investigation (GI) assisted by Magic Ball media can improve the Critical Thinking and Collaborative

Mathematics skills of Grade 4 students at SD Negeri Panjang 03 semester II in the 2017/2018 academic year. Percentage of improvement in Critical Thinking skills from pre-cycle to Cycle I. The similarity with this research is the focus of research on improving collaboration skills. The difference is that this study applies the Models Group Investigation, while the researcher applies the Problem-Based Learning model.

Based on the results of 4th-grade observations on April 2023, showed that students are not maximum in collaboration when learning activities are carried out in groups. Students in 4th grade tend to enjoy collaborating with friends that are considered fun for students. While working on group tasks, some students focus on something else. Some students rarely engage in discussion and lack coordination. Some 4th-grade students are less active during group discussions and have not given opinions regarding the completion of tasks. Some students have not contributed to the task of the group. It became the focus of researchers to enhance class 4 collaborative skills through the Problem-Based Learning model (PBL).

3. Methods

3.1. Participants and context

This study uses Kemmis and McTaggart Class Action Research models. Classroom Action Research was carried out in semester 2 of the 2022/2023 school year April-May 2023. The subjects of this research were Grade 4 students, totaling 22 students. The object of this research is students' collaboration skills.

3.2. Material

The researchers used the collaboration indicator according to Greenstein (2012) (Indrawan et al., 2021), which is to contribute actively within a group, work productively,

show strong flexibility and compromise within the group, responsibility, and attitude of appreciation to other group members. Observation sheets are used by researchers to record the results of observations of the learning process during group activities in applying collaboration skills. The results of the observations can be used to assess the involvement of students in collaboration. The following is an observation sheet for collaboration skills.

Table 1. Indicators of Student Collaboration Skills

No.	Collaboration Indicator	Score			
		4	3	2	1
1.	Contribute actively				
2.	Work productively				
3.	Responsible				
4.	Shows flexibility				
5.	Appreciate others				

3.3. Data Collection and analysis

Data collection techniques in this study used observation and documentation. Observations were made in the learning process to determine the collaboration skills of students implemented during learning. Observation is the activity of direct observation of an object that is in the environment, both currently occurring and ongoing. Observations were made by observing students' actions during the learning process in collaboration skills using models Problem-Based Learning (PBL) in grade 4. The instrument for observing the attitude of cooperation is in the appendix. Observation results are written in the observation sheet. Documentation is a data collection technique from a document containing research information. The documents used in this study are teaching modules, teaching materials, evaluation questions, LKPD, assessment rubrics, student work results, results of lesson study, and photos of activities during the lesson.

This study qualitatively used data analysis techniques including analysis of student's collaboration skills. The stages in the data analysis technique include the results of data collection, data reduction, data presentation, data presentation, and data conclusion. Data obtained from observing the learning process in improving collaboration skills through the Problem-Based Learning (PBL) model were analyzed descriptively. Qualitative data were obtained from observation sheets of teacher activities. In this study, qualitative data is used to describe the learning process based on the actions taken.

Quantitative data were obtained from scores on the collaboration skills observation instrument through the model Problem-Based Learning (PBL) and analyzed by percentage and categorization. Quantitative data is used to determine the increase that occurs in the learning process. The following formula determines the average value of collaboration skills:

$$\text{Mark:} \frac{Achievement\ score}{Maximum\ score} \times 100\%$$

Data analysis techniques in this study used descriptive analysis and the percentage of observations of collaboration skills in the learning process. In determining the assessment criteria regarding students' cooperative abilities, they are grouped into four criteria from the percentage, through the data that has been analyzed, namely very good, good, sufficient, and lacking. The following is the classification of percentage criteria: a) It is said to be "very good" when the percentage is between 81-100%. b) It is said to be "good" when the percentage is between 61-80%. c) It is said to be "enough" when the percentage is between 41-60%. d) It is said to be "less" when the percentage is between 20-40%.

3.4.   Ethical Considerations

According to Knottnerus & Tugwell (Hasan et al., 2021), the study technique will not be finished unless ethical considerations are considered. The study approach must be honest in all aspects, including data reporting, data privacy, data confidentiality, and outcomes reporting. We must always follow ethical guidelines during the research procedure. If the research's design, sample methodologies, data collection methodology, equipment, materials, and data analysis techniques are carried out ethically, the results are more likely to be accurate and fair.

3.5.   Limitations to the Study

This research has several limitations, among others: 1) The limitation of the literature of the previous research, thus resulting in a lack of literature on this research. 2) The limitation of knowledge in drawing up this article. 3) The limitations of the data used in this study.

4.   Results and Discussion

4.1.   Pre-Cycle

Pre-cycle action data based on observations in class 4. Based on observations of the learning process, one problem was obtained, one of which was students' collaboration skills when working on group assignments. There are still students in grade 4 who have not contributed actively when working on group assignments, some students seem to be focused on other things. Some students do not coordinate the distribution of turns to work on assignments. Based on these conditions, the researcher reflected on observations during the learning process and coordinated with class teachers and tutors to plan actions to be taken. The researcher designed an observation sheet that was used

to observe student's collaboration skills. Based on the observation sheet, the following data is obtained:

Table 1. Number of participants according to the category in the pre-cycle

No.	Category	Frequency	Student Presentation
1	Very well	5	22.73%
2	Good	8	36.36%
3	Enough	8	36.36%
4	Less	1	4.55%
	Amount	22	100%

This is evident from the results of observations of group activities in the pre-cycle learning process showing that the skills in the "very good" category were 22.73% for a total of 5 children, the "good" category was 36.36% for a total of 8 children, the "adequate" category was 36.36% for a total of 8 children, and the "less" category was 4.55% for 1 child. The table showed that the collaborative skills of students in 4th grade were 59,09%. These results belong to the category "enough".

4.2. Cycle I

Actions in cycle I were designed based on the results of pre-cycle observations. Researchers use models Problem-Based Learning (PBL) given group activities in the learning process. Observation of the learning process is carried out by tutors, colleagues, and researchers. The observation results obtained are as follows:

Table 2. Number of Participants According to the category in the cycle I

No.	Category	Frequency	Student Presentation
1	Very well	5	22.73%
2	Good	12	65.55%
3	Enough	5	22.73%
4	Less	0	0%
	Amount	22	100%

Based on the table, it was obtained data from the observation of the first cycle of students with the criteria of "very good" there were 22.73% totaling 5 children. Students in the "good" category were 54.55% totaling 12 children. In Cycle I collaboration skills were 77.28%, being in the "good" category. According to Ulhusna et al. (2020), the advantages of learning with the ultimate goal of collaboration are as follows: effective division of labor training; increasing the nature of the responsibility of learners; combining information from various sources of knowledge, perspectives, and experience; and improving the quality of solutions and creativity driven by the ideas of members in each group. In conclusion, the less effective division of group tasks is caused by the students' collaboration skills that are less than optimal.

4.3. Cycle II

In cycle II the learning process uses a model Problem-Based Learning (PBL). The group activity given to students is in the form of making bar charts where data is searched with dice. Researchers also motivate students to solve problems by collaborating with group mates. The results of observing the collaboration skills of grade 4 students are presented in tabular form as follows:

Table 3.Number of Participants According to the category in the cycle II

No.	Category	Frequency	Student Presentation
1	Very well	9	40.91%
2	Good	11	50.00%
3	Enough	2	9.09%
4	Less	0	0%
	Amount	22	100%

Based on the table, it was obtained data from the observation of the first cycle of students with the criteria of "very good" there were 40.91% totaling 9 children. Students in the "good" category were 50.00% totaling 11 children. In Cycle I collaboration skills were 90.91%, being in the "very good" category.

The observation results obtained during the pre-cycle are reflected and used to design actions. In cycle I, researchers used the Problem-Based Learning (PBL) learning model to improve collaboration skills in grade 4 students. According to researchers, the results of cycle I were not optimal, there were still students who focused on other things and did not contribute and gave their opinions when working on group assignments. Some students have not been organized when dividing tasks into groups. So that researchers reflect and plan activities in cycle II with the Problem-Based Learning learning model. In cycle II students are motivated to collaborate, use concrete media and technology in group activities, and use games as group activities. According to Duch (2001) in Taryono et al. (2019), some of the abilities that can be improved through problem-based learning are as follows: (1) Think critically, analyze, and be able to solve real-world problems (2) Search, evaluate, and use learning resources properly (3) Teamwork (4) Good at conveying and communicating effectively, both orally and in writing (5) Using learned knowledge and intellectual skills to continue learning. So, one of the skills that can be improved through the Problem-Based Learning learning model is team collaboration skills.

5. Conclusion

Collaboration is a skill in doing something together to achieve a goal. Collaboration is carried out to achieve a shared vision. Through collaboration, students can share experiences, and ideas, effectively division of tasks, and increase students sense of responsibility. The Problem-Based Learning model is learning designed to develop the ability to solve problems with the creativity of students. Through the Problem-Based

Learning model, students practice thinking critically in finding solutions to problems. In addition, the Problem-Based Learning learning model is used to improve teamwork. One of the skills that can be improved through the Problem-Based Learning model is team collaboration skills.

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