

# Implementation of Problem-Based Learning to Improve Collaboration Skills in Grade 4 Elementary School Students

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**Abstract.** The learning model used by educators only transmits knowledge and does not provide opportunities for students to interact, causing them to lose time to develop their experience in the collaborative learning process. This research aims to improve collaboration skills by implementing a problem-based learning model in grade IV elementary school. The research method used is Classroom Action Research (CAR) using the Kemmis & McTaggart model. The results of the research are 1) how to improve collaboration skills with a problem-based learning model using stages; a) Provide orientation regarding problems; b) Organize students; c) Assist with investigations; d) present work results; e) Analyze and apply problem-solving processes. 2) Obstacles in improving collaboration skills with learning models are; a) Students are hampered in finding problems; b) the teacher is constrained in encouraging students to investigate learning tasks related to the problem. Efforts made to overcome this problem are by presenting the problem in the form of news, videos, and photos that illustrate the problem. Students are encouraged to investigate solutions by presenting more references on how to solve the problem accompanied by news, videos, and photos of related solutions.

**Keywords:** Collaboration Skills, Problem-Based Learning, 21st Century Skills, Elementary School

## 1. Introduction

21st century skills are now defined as an international need and project (Valtonen et al., 2021). It is a necessity for the state to be able to improve the quality of education in Indonesia, there are many challenges in facing it towards the industrial revolution 4.0 (Kardoyo et al., 2020). Human civilization currently plays a very important role which is guided by the knowledge available in the 21st century. To be able to develop with civilization, students today. In this era of modern learning, emphasis must be placed on skills that exist in the 21st century by being able to find solutions from existing or provided learning resources. Students must be able to formulate their own problems from observations, think analytically about problems and be able to work together to collaborate in solving existing problems (Nurhayati et al., 2019). It is clearly written about the national education system in Indonesia, namely in the Republic of Indonesia Law number 20 of 2003 in Article 1, namely that education is something that is carried out consciously and needs to be systematically planned so that learning activities can be realized that have a good atmosphere. active so that students can have religious spiritual strength, good, noble morals and skills that will later be useful for themselves, society, nation and state (Wibowo & Pardede, 2019). Supported by the opinion of Ciğerci (2020) students must be able to keep up with the times and the amazing progress and be able to adapt these skills to everyday life. Currently, the effort that can be made to deal with this situation is to develop 21st century skills. Therefore, students must be able to work together to collaborate in solving existing problems. Learning is much more relevant and interactive through collaborative joint activities because it provides wider opportunities for students to actively explore actual issues such as environmental issues, health and others to support the development of character and competency of the Profil Pelajar Pancasila in the Kurikulum Merdeka (Rahmadayanti & Hartoyo, 2022).

Collaboration is now an important skill to develop to achieve effective results. Collaboration skills are a stage of interaction that is used to facilitate collective cooperation. Through

collaboration skills, students will be able to carry out cooperation and social activities to achieve learning goals (Fitriyani et al., 2019). The direction of education that is worthy of development needs to be oriented towards efforts to increase students' competence and develop collaboration skills, this is important to control the rapid pace of technology used in education (Mahpudz et al., 2020). Although education today is always related to the basics of reading fluently and writing clearly, the demands of today's era also require broader and deeper collaboration skills to encourage joint learning (Trilling & Fadel, 2009:54). Research shows that collaboration has an influential effect on student learning and knowledge retention (Ulhusna et al., 2020). Students can have a greater conceptual understanding and can lead to effective learning activities by practicing collaborative cooperation so that students can solve problems, can think about problems. (Scoular et al., 2020).

The use of appropriate learning methods for useful learning is very important for creating success in learning activities. The system and quality of good education of course greatly influences the quality of human resources that will be produced, therefore the use of appropriate learning methods. For an educator, it is very important to be able to know the level of effectiveness of a learning method that will be used in a subject area or more specifically in certain teaching materials (Prayoga & Setyaningtyas, 2021). The problem-based learning model is learning that using various thinking abilities of students individually and in groups (Sanjaya, 2021). Students can solve problems collaboratively. Problem-based learning which is based on finding solutions related to problems that are close to students can help them to be active in discussion activities, with these activities students can be more responsible in overcoming problems that exist in learning activities (Monalisa et al., 2019).

### **1.1. Problem Statement**

After researchers observed students in class; 1) The lack of innovation in designing activities in learning activities used by teacher to train and improve collaboration-based skills makes it difficult for students to collaborate in learning. With a lack of learning innovation, teacher have not designed learning that uses group activities so that it runs effectively. In the end, group activities waste a lot of time without any benefits for students. Group activities are only used by students to exchange stories, chat, joke with friends or just play with group friends without focusing on completing the tasks given by the teacher. Group activities that are not conducive mean that some members do not play a role in group activities so that only a few members try to complete the task. Students' lack of focus makes learning ineffective because many students also do not know the instructions given by the teacher. In interaction activities for discussion, students only copy answers from friends and do not participate in group discussions; 2) learning activities look passive by just listening to the explanation given by the teacher and using worksheets and student books as a learning flow. Learning activities are still ongoing students centered. Learning activities that ask students to collaborate, students will usually divide their work, complete assignments individually, and then collect their respective contributions. So it can be said that the learning activities carried out are passive and there are no collaborative activities; the collaborative process is still carried out individually and the coordination of thinking is still not in a group (Evans, 2020).

The urgency of this research regarding collaboration skills is also relevant to the characteristics of the Kurikulum Merdeka, namely the support and interest in being able to develop students' skills and character (Maulana & Mediatati, 2024). Teacher usually use conventional learning activities with learning that is still teacher-centered and have not tried to innovate. Learning activities must gradually prioritize the role of students by creating student-centered learning activities by prioritizing critical thinking, problem solving, creativity, communication and collaboration skills (Mutohari et al., 2021). Students' collaboration skills can be used using several learning methods, but the most effective way to use them is by collaborating directly with other people. According to Ulhusna et al. (2020) groups of students working collaboratively will produce more knowledge. Effective application of collaboration skills to students in elementary schools is by dividing tasks fairly, motivating members to be responsible for their tasks, and using social skills well.

Implementation of student centered learning makes educators need to be innovative in designing learning so that students become qualified. Innovation in learning models is very important to improve teaching and learning activities in an era that continues to change, where technological changes and the demands of complex life are increasing. However, so far the implementation and learning processes that take place in schools have tended to ignore educational and educational elements as if they have been replaced with activities that place more emphasis on aspects that are brain-sharpening exercises. In reality, teacher have not prepared innovative learning models that can prepare students for a dynamic and interesting future (Wardani, 2023). The learning model used by educators only transmits knowledge and does not provide opportunities for students to interact, causing them to lose time to develop their experience in the process of collaboration in learning (Fitriyani et al., 2019). The classroom management style applied by teacher today is still authoritative and indifferent (Serkan Aslan, 2022).

Learning is still often done teacher-centered and not training collaboration skills in students is not in accordance with the government's demands in Law no. 20 of 2013 which places emphasis on the learning process, in the learning process, students need to be actively involved to be able to explore greater potential or skills within themselves. Lack of interaction between teacher and students, lack of problem-solving skills, standards, and principles are not set by educators (Campbel, 2020). In other words, a learning teacher is centered not in accordance with the paradigm in learning, because learning is a continuous activity that is used to gain knowledge and knowledge, develop personality, and strengthen personality to improve attitudes and behavior. If learning is of a nature teacher-centered It is feared that if it continues to be implemented it will reduce the meaningfulness of learning which includes several elements including having high-level thinking or what is often called HOTS, having character and having 21st century skills (Prayoga & Setyaningtyas, 2021).

There are efforts that we can make to solve existing problems, teacher need to innovate learning activities with appropriate and effective learning models to improve students' collaboration skills. Carry out innovations with a learner-centred approach to learning activities. Many opinions have been expressed by experts regarding innovative learning models that can facilitate students to be able to play a direct role in teaching and learning activities, namely those that can be carried out with learning models that start from looking for problems (Afifah et al., 2019). Learning with models Problem Based Learning (PBL) has many advantages, including being able to involve students actively in learning activities so that knowledge can be well received, providing new knowledge to students so that they can consolidate the concepts they have acquired, students are trained to work together, can encourage cooperation skills in a groups, and students can practice skills in conveying their opinions or arguments with the group (Putri et al., 2021). Educators can define tasks and create designs such as a series of questions or problems, and approaches Problem Based Learning (PBL) will of course be able to direct students to the right answer (Dring, 2019). Learning models that are based on problems that are close to students can train how to search for information and check the truth of information from other sources. Problem-based learning is expected to provide changes in students' thinking patterns so that they pay attention and are able to analyze a problem which can then be solved well in groups. Problem-finding-based learning is an innovative learning model that is centered and makes students active in joint activities or collaborative activities (Mustofa & Hidayah, 2020).

## 1.2. Related Research

Below are several previous studies that have been compared in order to identify the relationship between collaboration skills and treatment using problem based learning. The first study discusses improving communication and collaboration skills by studying problem-based teaching materials (Nurhayati et al., 2019). From the results of the study, it was found that teaching materials designed with a learning model that focuses on problem finding have a level of feasibility in use and have a good level of readability. This study shows that teaching materials can be used to improve the skills possessed by students, namely collaboration and communication. What is new about the research carried out is to be able to improve

collaboration skills which are focused on grade 4 students in one of the elementary schools in Yogyakarta.

The second study discusses the importance of the problem-based learning model in providing opportunities for collaboration and developing relevant skills for students in the millennial education era (Wardani, 2023). From the results of the study, it was found that problem-based learning is a learning approach that allows students to be directly involved in solving real problems around them, and can open up opportunities for students to collaborate and develop students' skills. What is new from the research carried out is the use of problem-based learning in improving the collaboration skills of grade 4 students in science subjects.

Another effort made to support this research is the use of a learning model based on problem acquisition which starts from searching for problems and then solving them which aims to train collaboration skills in students (Fitriyani et al., 2019). The results of this research show that problem-based learning models can improve students' collaboration skills. Although previous research has explored the variables of problem-based learning models, and collaboration skills, there is a significant gap in research specifically in the fourth grade of elementary school. Therefore, researchers are motivated to investigate this further.

### **1.3. Research Objectives**

This research aims to produce new knowledge and outline future possibilities and challenges in the 21st century in training and improving collaboration skills using problem-based learning models in elementary schools. This research will answer the following questions:

1. How to improve collaboration skills with a problem-based learning model in grade IV elementary school?
2. What are the obstacles and efforts to improve collaboration skills with a problem-based learning model in grade IV elementary school?

## **2. Theoretical Framework**

The following concepts form the theoretical basis in this research regarding collaboration skills and problem-based learning models:

Education needs to raise awareness to develop students' understanding of information and communication technology to be able to prepare students to face the world of work (Ratama et al., 2021). This opinion is also supported by Handayani et al., (2023) which states that people living in the 21st century will certainly experience developments in the field of life sciences, including in the field of education, in the era of globalization with science and technology developing very rapidly. 21st century skills are currently a particular concern for education globally. The reality of global education makes 21st century skills important because they do not yet fully accommodate the educational needs of the digital era. This reality requires educators to be able to provide collaborative learning materials to students to truly face the realities of the 21st century. Currently, the term 4C (Communication, Collaboration, Critical Thinking and Problem Solving, and Creativity and Innovation) is very well known, which is a skill that must be used as learning material in the 21st century (Prayogi & Estetika, 2019).

Collaboration skills are a general skill that is important for students to be able to survive in socialization in society by interacting in work and life in society (Evans, 2020). Collaboration skills are skills that can be used to collaborate effectively, actively, efficiently, and can show respect for different friends in order to achieve common goals (Greenstein, 2019). According to Nuzalifa (2021) several indicators for assessing collaboration skills are; 1) aspects of working productively; 2) show a respectful attitude; 3) compromise and; 4) share responsibility. Supported by opinions from by Trilling & Fadel (2009:55) who support that The characteristics of effective collaboration skills are; 1) can demonstrate the ability to work actively and effectively in groups and respect the diversity of friends; 2) can collaborate flexibly, showing a willingness to contribute to the compromise activities necessary for the group to achieve common goals;

3) can share responsibilities with the group and appreciate the contributions of other friends. Students have weak collaboration skills as indicated by the lack of ability of students to be able to carry out group learning and appear to be low in having an attitude of mutual respect for differences of opinion from other friends (Nahar et al., 2022).

Collaborative problem solving requires cognitive processing skills, social sensitivity, emotional resilience, reflection skills, and understanding diversity. Cooperating and collaborating with others effectively includes a person's ability to interact effectively with others including knowing when to contribute, listening, and respecting different values (Winaryati & Munsarif, 2021). There are three basic indicators that differentiate between collaboration skills and cooperation and coordination, namely; 1) collaboration requires two or more students working interdependently; 2) in collaborative activities participating in joint activities such as solving problems and completing tasks; 3) collaborate by combining their knowledge, skills and efforts (Evans, 2020).

Using innovative learning models means presenting fun activities to support learning to be more meaningful for students (Nurlaily et al., 2019). The learning model can be used to train collaboration skills which are very necessary in the 21st century education era (Kardoyo et al., 2020). The learning model functions as a conceptual framework that systematically plays a role in organizing learning experiences that should be able to achieve learning goals (Wulandari, 2023). The learning model acts as a supporter of learning activities and can influence students' success in learning (Arifah et al., 2021). A learning model that is prepared according to student needs is a planning activity that is used as a guide in carrying out learning activities in class (Sanjaya, 2021).

To be able to play a role in helping students develop critical thinking skills, solve problems and make students independent in learning, it is necessary to develop a problem-based learning model (Ariyani & Tego, 2021). Learning models that are based on problems that are close to students can train how to search for information and check the truth of information from other sources. Problem-based learning is expected to provide changes in students' thinking patterns so that they pay attention and are able to analyze a problem which can then be solved well. Learning that is based on problem finding is one of the innovations in learning models that are student-centred and student-oriented. Problem-based learning makes students practice solving problems that are close to students, such as problems in the surrounding environment, using a constructivist approach (Mustofa & Hidayah, 2020). Problem-based learning which is based on finding solutions related to problems that are close to students can help them to be active in discussion activities, with these activities students can be more responsible in overcoming problems that exist in learning activities (Monalisa et al., 2019).

To be able to improve students' ability to think critically, it is related to the importance of the teacher's role in designing learning that emphasizes problem finding so that there is a problem solving process and learning independence (Tiyasrini, 2021). The problem-based learning model is considered suitable for solving learning problems because it trains how to think and reason in drawing conclusions, and develops the ability to solve problems by conveying information (Ariyani & Tego, 2021). Problems can be found in the environment to be investigated, assessed and analyzed further until a solution is reached. To be able to solve problems, students in group discussions must be able to follow the stages of the process that require them to have collaboration skills (Mardi et al., 2021).

In an effort to innovate in learning, educators are exploring methodologies that emphasize aspects of real-world challenges and teamwork. The PBL approach appears promising in addressing most of these needs. More importantly, PBL is able to overcome this problem holistically (Tan, 2021:27). To encourage the application of previous knowledge, students can use learning that is based on problem solving with the principles of constructivism, collaborative learning and active involvement (Seibert, 2021). Problem-based learning is the activity of discovering new problems and finding drastic new solutions to existing problems. The problem solving process also requires the teacher's role to transform knowledge and then check the results of students' work to successfully acquire knowledge (Kassymova et al., 2020). In the world of education, the role of teacher is very important to be able to continue to innovate so that

they can design and implement the stages that have been designed in learning activities. The innovations carried out need to prioritize student-centred activities so that they can practice collaboration skills. Learning based on finding problems that are close to students is one learning model that can be used by teacher in schools to develop students' collaboration skills (Desyarti Safarini, 2019).

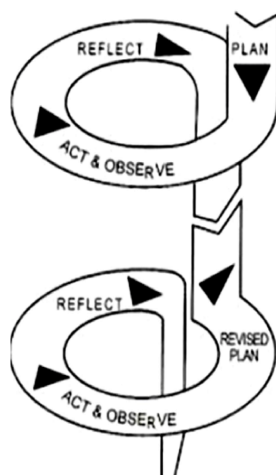
Learning activities at elementary school level students can be taught Social Sciences (IPS) because there is basic knowledge about how to socialize and interact with other people because humans are basically social creatures who cannot live alone (Krisna Dewi & Parmiti, 2022). Through social studies learning, students can practice the 4C skills that students must have (Yusnaldi et al., 2023). Things that can be done to develop character values in the social studies learning process are preparing teaching modules, determining learning methods and learning models that can facilitate students to achieve the knowledge, skills and character development that have been planned (Oktaviani, 2022). Social Sciences (IPS) is a subject that focuses on studying interactions with the environment (Meyanti & Lasmawan, 2023).

### **3. Method**

#### **3.1. Research Design**

Classroom Action Research was chosen as the research method. Classroom Action Research was chosen because it aims to take action for improvement and aims to form new knowledge or theories about action (Sugiyono, 2021:816). Classroom action research is a scientific activity carried out by teacher and has the aim of solving problems experienced during the learning process that has been implemented so that in the future the problems can be corrected (Gonzaga & Kase, 2020). This research requires seriousness from teacher to be able to carry out the preparation, implementation and evaluation stages of learning. The problem in the classroom is the students' weak collaboration skills. This problem can be overcome by conducting research in the classroom. Classroom action research is carried out in order to take action (make improvements) to overcome problems in the classroom. Of course, so that the implementation of Classroom Action Research can provide benefits as expected, teacher need to 1) identify the problems faced; 2) determine the problem to be solved; 3) prepare a research design; 4) carry out research; and 5) what follow-up needs to be done after research is conducted (Haryati et al., 2022).

The research model used in classroom action research is the theory of the Kemmis & McTaggart model which is a development of Kurt Lewin's model. Kemmis & McTaggart has components in the form of acting (action) and observing (observation) into one package. This is based on the fact that the implementation of actions and observations cannot be separated. According to the Kemmis and Mc-Taggart model, implementing classroom action research includes four steps, namely; 1) planning; 2) action; 3) observation; 4) reflection. The steps of classroom action research are; 1) Plan, researchers carry out planning to prove the hypothesis; 2) Action, the plan that is carried out is then implemented; 3) Observe, researchers make observations with colleagues during the learning process using the instruments that have been created; 4) Reflect, reflect by reviewing what has been done and the results obtained. The four stages in CAR form a comprehensive cycle. In order for improvement to occur, there needs to be continuous activities in the cycles carried out. The cycle is carried out continuously by forming a spiral flow (see Figure 1). In the end, a cycle will be declared complete if the researcher feels it is sufficient to carry out CAR with the appropriate number of cycles (Susilo et al., 2011:12-16).



**Figure 1.** Kemmis and Mc-Taggart Model Flow

### 3.2. Participant

This research was conducted at an elementary school in Yogyakarta City, Yogyakarta Special Region. Source of data resulting from interviews with school principals and class IV teacher who have knowledge of collaboration skills and problem-based learning models. The selected class teacher already knows the character and skills possessed by the students. Participants consisted of 28 grade IV students. Participants consisted of 28 class IV students. Researchers used all students in the class. The observation results detail learning activities that train collaboration skills using a problem-based learning model to complement data collection. The research was conducted in the first and second weeks of February 2023. The research was conducted for 3 months from the start to the end of the research. Data sources were selected based on information and competencies related to collaboration skills with problem-based learning models. Data collection continues until no new information emerges (Sugiyono, 2021).

### 3.3. Data Collection

This research uses data collection techniques using interviews, observation and documentation. Collaboration skills assessment rubrics are used to measure the improvement of collaboration skills in students. Structured and semi-structured interviews were conducted to collect data from sources who have knowledge of collaboration skills and problem-based learning models. The observation activities were carried out well, the researcher used assessment guidelines to complete the design of the observation sheet, the sheet that had been created had been validated by experts or experts so that good observation criteria were obtained. The instrument used is an observation sheet containing collaboration skills items. Each indicator put forward by students produces a score and is calculated into a final score and becomes an indicator of student success using observation sheet data processing techniques expressed in percentages. The researcher as a practitioner and his colleagues become observers using the observation instruments that have been prepared. Collaboration is recommended in classroom action research (Rukminingsih et al., 2020). Reference material in the form of documentation is also used to increase the validity of the findings. Documentation is also used to increase the validity of findings in the form of learning modules, learning media, and other relevant documents to complement the data.

### 3.4. Data Analysis

The data analysis used uses initial data processing stages that are still raw for analysis. The data analysis process begins before the researcher enters the field. Data analysis continued while the researcher was in the field until the researcher completed activities in the field. Before researchers begin research in the field, analysis is carried out by means of interviews and observations. Data analysis is then directed at determining the focus of the research (Salim et al., 2019:60).

Observation sheets are used to carry out assessments in the implementation of learning based on problem finding. The instrument used is an observation sheet which contains indicators of collaboration skills. Each item raised by the student produces points and is calculated to become the final score and becomes an indicator of the student's success using data processing techniques for observation sheets expressed in percentages. To be able to measure collaboration skills in the observation sheet, researchers used a Likert scale. The collaboration skills measured are then translated into variable indicators using a Likert scale. The data analysis technique uses data triangulation by grouping data, data analysis, and conclusions. Interviews and observations were carried out by researchers to analyze problems before starting the research (Sugiyono, 2021:167-168).

The data analysis technique used is a percentage technique linked to categories and comparisons. The percentage technique is used to obtain student score data which is divided into 5 qualifications according to (Sugiyono, 2021:170) that is; incapable (0-20), less capable (21-40), quite capable (41-60), capable (61-80), very capable (81-100). Determining the increase in students' collaboration skills is analyzed using percentage, category and comparison techniques if students in the capable and very capable categories reach > 70% as an indicator of successful collaboration skills.

### **3.5. Validity and Reliability**

The quality of the instrument needs to be measured by measuring the validity of the instrument. The validity of the instrument uses content validity, which then needs to be consulted with two instrument experts. After validation is complete, the next research instrument needs to be tested on students from other schools for further analysis. The instrument is declared valid or valid because the validity value for each item is greater than the table value, namely greater than 0.79. The instrument reliability results were  $0.88 > 0.6$ , which means the instrument can be declared reliable.

## **4. Findings**

### **4.1. Implementation of the Learning Process Using a Problem-based Learning Model with Collaboration Skills in Class IV**

Classroom action research was carried out at four meetings or the equivalent of two cycles, one cycle was carried out 2 times. Cycle I consists of two learning activity meetings and cycle two consists of two learning activity meetings. Planning activities related to organizing and preparing activities to fulfill requirements before carrying out learning activities are called learning planning. In planning innovations in learning activities, teacher are very responsible for understanding the objectives of the subjects they teach.

In this research, interview activities were carried out on two people, namely the fourth grade teacher and the school principal to ensure that the learning objectives were aimed at practicing collaboration skills in fourth grade. The results of interviews with school principals regarding objectives must relate to skill attainment because in essence, learning activities need to train students' skills, especially collaboration skills. Follow-up interviews were carried out with class teacher to strengthen the results of the research data used. Using the results of interviews with teacher produces awareness to innovate in learning activities through learning models used to train students' collaboration skills.

As the next step in this research, the researcher conducted observations first to find out clearly the problems faced by students during the ongoing interaction process between students. The observation stage is carried out during the implementation of learning. Observation activities have been carried out by referring to the relevant observation guidelines and have been prepared and validated. From the observation results, it was found that there were still many students who did not have collaboration skills and teacher who still carried out teacher-centered learning.



Implementation of actions for each cycle with IPAS content. The teacher carries out planning by compiling teaching modules for theme 8 Indonesia is Rich in Culture, Subthemes 1 and 2 learning, and making observation guidelines for collaboration skills. In its implementation, students pay attention to the learning material presented by the teacher, students form heterogeneous groups at the direction of the teacher consisting of 4 group members, after that students are invited to find problems in learning activities. Students try to formulate problems, analyze problems, discuss problems and find solutions.

This research was conducted over 2 cycles, where each cycle consisted of 2 meetings. In the second cycle, students showed significant improvement during the learning process. The assessment which is the instrument in this research is an observation sheet carried out by peer teacher by checking the indicators that appear to students during the learning process.

In the implementation in cycle I of the observation activity stage, researchers coordinated and were assisted by colleagues to help observe indicators that emerged in students' collaboration skills during learning activities based on problem-finding learning. Based on the data, the percentage obtained is 49% in the deficient criteria. The following are the results of collaboration skills using a problem-based learning model in cycle I which can be presented in Table 1.

Table 1. Cycle I Student Collaboration Skills

Aspect	Meeting 1					Meeting 2				
	5	4	3	2	1	5	4	3	2	1
Work productively	0	0	2	12	0	0	2	8	5	0
Show respect	0	0	6	8	0	0	2	8	4	0
Compromise	0	0	5	10	0	0	0	9	6	0
Share responsibilities	0	0	7	8	0	0	0	9	3	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>38</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>18</b>	<b>0</b>
<b>Total score</b>	<b>184</b>					<b>197</b>				
<b>Average Value</b>	<b>47</b>					<b>51</b>				
<b>Percentage</b>	<b>47%</b>					<b>51%</b>				
<b>Criteria</b>	<b>Enough</b>					<b>Enough</b>				
<b>Cycle II percentage</b>	<b>49%</b>									
<b>Criteria</b>	<b>Enough</b>									

Based on the data presented in Table 1, we can see that there is clearly an increase at each meeting. It is known that the first meeting got 47% and the second meeting got 51%. These results show an increase of 4%. A percentage of 51% means that it has not met the success indicators. Research planning in cycle II refers to considering the results of reflection from cycle I. Next, several preparations are carried out, including compiling teaching modules, preparing learning resources, observation sheets and assessment rubrics.

Table 2. Collaboration Skills of Cycle II Students

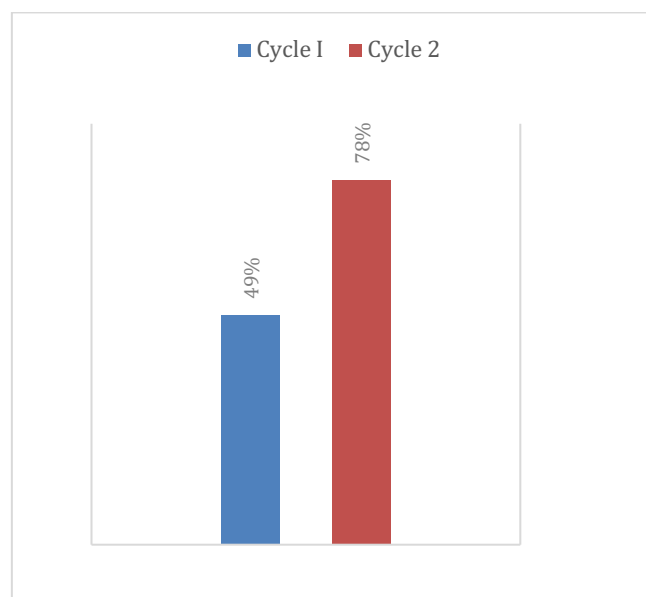
Aspect	Meeting 1					Meeting 2				
	5	4	3	2	1	5	4	3	2	1
Work productively	1	0	5	9	0	3	10	2	0	0
Show respect	2	7	6	0	0	2	11	2	0	0
Compromise	1	9	5	0	0	2	11	2	0	0
Share responsibilities	0	7	8	0	0	4	10	1	0	0
<b>Total</b>	<b>4</b>	<b>2</b>	<b>24</b>	<b>9</b>	<b>0</b>	<b>11</b>	<b>42</b>	<b>7</b>	<b>0</b>	<b>0</b>
<b>Total score</b>	<b>310</b>					<b>337</b>				
<b>Average Value</b>	<b>73</b>					<b>82</b>				
<b>Percentage</b>	<b>73%</b>					<b>82%</b>				
<b>Criteria</b>	<b>Good</b>					<b>Very good</b>				
<b>Cycle II percentage</b>	<b>78%</b>									
<b>Criteria</b>	<b>Good</b>									

Based on this table, it is known that there is an increase at each meeting. From Table 2, it is known that cycle II experienced an increase in each meeting. Next, meetings 1 and 2 are accumulated. So you get a result of 78%, which means the learning was successful because it met the success indicators of more than 70%. In cycle II, we got better results than cycle I, so that between cycles I and II there was an increase.

Based on the results of the data produced and presented in tables 1 and 2 (data produced after the actions of Cycle I and Cycle II), it can be seen that the ability to collaborate using a problem-based learning model can be implemented well by students and has shown that there is progress. It can be seen from the results of the second cycle meeting data that there has been an improvement, namely 73% which is in the good category. This gives an indication that students have begun to increase their collaboration skills by using the problem-based learning model. Furthermore, at the second meeting in cycle II the percentage there was very significant compared to the previous meeting, namely 82% which was in the very good category. Previously, in cycle I, the percentage was only 49% included in the (poor category) and for cycle II the average reached 78% (good category).

Based on the acquisition value of collaboration skills, of course there will be an increase if implemented appropriately using a problem-based learning model. Each increase occurs at each meeting. So there is also an increase in each cycle. After the observation activities are carried out, the teacher then reflects. The results of the first cycle reflection found several obstacles related to students who were still passive so that the teacher linked the material more to everyday life, the lack of student activity in following the teacher's instructions so that the teacher was less than optimal in explaining procedures correctly, the lack of teacher conditioning the students so that the teacher attracted the students' attention, time is less efficient so teacher give time limits to student activities, and teacher are less than optimal in guiding students so teacher go around and ask students about the assignments given.

The results of this reflection were taken into consideration in implementing cycle II. Reflective activities aim to improve teacher professionalism and improve quality. To build meaningful learning and a conducive classroom atmosphere, teacher must evaluate various things (Zainuddin & Hardiansyah, 2023). To be able to improve students' communication and collaboration skills for each cycle, it is presented in Figure 2.



**Figure 2.** Percentage of Student Collaboration Skills per Cycle

Figure 2 shows the increase in each cycle. These results show that in cycle II the percentage was 78%. The results of cycle II were successful because the percentage exceeded 70%.

## 5. Discussion

Carrying out problem-based learning activities by presenting problems that are close to students and may be experienced by students. This statement can be strengthened by the opinion of (Indrawan et al., 2021) who stated that students' collaboration abilities can be triggered by providing a problem that exists around their living environment to be solved and finding a solution together based on group decisions.

The way to improve collaboration skills with a problem-based learning model is to use the right syntax with several steps, namely; 1) carry out planning before starting research; 2) take action or treatment in the field; 3) observing the reactions that occur after being given an action; 4) carry out development in presenting solutions; 5) carry out analysis and evaluation regarding actions in research to improve further. In collaboration skills, there are four indicators observed, namely working together productively, being able to compromise within a group, showing respect between peers, and being able to share responsibilities within a group.

The first indicator observed is that students are able to work productively in groups by looking for problems, discussing solutions to problems and not carrying out other activities outside of instructions. According to (Evans, 2020) collaboration skills require productive group activities, such as being able to plan and make group decisions, communicate thoughts with the group, contribute ideas, monitor, reflect, and adapt individual and group processes that are beneficial for the group.

The second indicator is compromising with group friends. Students are able to overcome problems that occur in groups. Students are able to make agreements with friends in their group. According to Desyarti Safarini (2019), students' collaboration skills work effectively and productively in groups if students solve problems with mutual agreement and are open-minded to differences. According to Scoular et al. (2020) students can show that all participants have different perspectives but must be able to compromise in the application of shared knowledge.

The third indicator is being able to show a respectful attitude towards group friends and friends between groups. Students want to collaborate with friends from different backgrounds, and respect each other when other friends provide opinions. Work with a team/other people effectively and with respect. Students are able to collaborate with colleagues without choosing other discussion partners, students are also able to work together to complete assignments in a conducive discussion manner (Evans, 2020).

The fourth indicator is that students are able to share responsibility in groups. Students do not work individually but must have their own roles, even though there is a lot of work in groups, students do not divide existing tasks individually and then combine them into one. Students still discuss together and do not give responsibility to just one person in the group. According to van Laar et al. (2020) students who have collaboration skills mean they do not depend on one person, they understand their role in the group for cooperation. Sharing responsibility in collaboration is visible through active activities and responsibilities shared together.

Obstacles to improving collaboration skills with a problem-based learning model in grade IV elementary school are; 1) Students are hampered by finding problems that can be used as discussion material; 2) Teacher are constrained in being able to encourage students to investigate and organizing learning tasks related to problems. Efforts made to overcome this problem are by; 1) Presenting problems in the form of news, videos and photos that illustrate the problem; 2) Students are encouraged to investigate solutions by presenting more references on how to overcome problems with news, videos and photos of related solutions.

The implication of implementing classroom action research is that it can train students to collaborate productively, show respect in collaboration, compromise well, and share responsibility. Learning that is based on problem finding in science subjects can improve collaboration skills in students, this can be seen from the large number of questions asked by students, productive collaboration occurs in discussion activities, each child has respect for

each member groups, and students can have a role in dividing tasks within the group. By inviting students to solve problems in the surrounding environment together with small groups, they can overcome existing problems, namely the lack of students' collaboration skills. Creating students who have collaboration skills certainly requires continuous education from the students themselves. It is hoped that this research can be an idea for carrying out further research to improve students' collaboration skills.

The innovation carried out at each meeting in the research cycle is to present a wider variety of learning media for students to find problems and investigate to find solutions. In each lesson the teacher tries to find media in the form of news/readings, photos related to the problem, learning videos or news videos that convey the problem. This media can be used by students to look for more problems and find solutions to problems. With the existence of learning media for conducting investigations, skills for collaborating to solve problems become more meaningful and increase.

Each cycle in this research has carried out observation, evaluation and reflection. Based on these results, each action cycle experiences an increase in the collaboration skills possessed by students after using a learning model that prioritizes problem-based learning through social studies subjects. Image where the presentation of students' collaboration skills increases in cycle I, namely the first meeting got 47% and the second meeting got 51% with an average value of 49%. Increased collaboration skills after the second cycle of action, namely the first meeting was 73% and the second meeting was 82% with an average value of 78% (good category).

## **6. Conclusion**

The way to improve collaboration skills with a problem-based learning model in grade IV elementary school is to use learning stages that focus on problem solving by using; 1) Provide orientation regarding problems to students; 2) Organizing students to research; 3) Assisting independent and group investigations; 4) convey and present work results; 5) Analyze and deploy problem solving processes. Obstacles to improving collaboration skills with a problem-based learning model in grade IV elementary school are; 1) Students are hampered by finding problems that can be used as discussion material; 2) Teacher are constrained in being able to encourage students to investigate and organizing learning tasks related to problems. Efforts made to overcome this problem are by; 1) Presenting problems in the form of news, videos and photos that illustrate the problem; 2) Students are encouraged to investigate solutions by presenting more references on how to overcome problems with news, videos and photos of related solutions.

## **Limitation**

Of course, in this research there are several limitations that were not addressed by the author. The following are some limitations, namely:

1. This research was conducted only at one elementary school.
2. This research was conducted only on social studies subjects.

## **Recommendation**

Recommendations given by the author for further development based on research findings:

1. This research only uses one learning model, namely problem-based learning to develop students' collaboration skills. It would be more beneficial for future research to explore more widely existing learning models.
2. This research only examines collaboration skills that are treated with problem-based learning. It would be beneficial for future research to explore other skills.
3. This research was conducted on science subjects in class IV. It would be beneficial for future research to explore other subjects and grade levels.

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## Conflict of Interest

The authors state emphatically that there are no conflicts of interest related to this research.

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