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# Problem-Based Learning as an Effort to Improve Junior High School Students' Learning Mastery and Communication Skills

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ABSTRACT

*The objectives of this research were to determine the Problem-Based Learning model that enhances natural sciences minimum mastery criteria of learning achievement and communication skills at Junior high school Taman Dewasa Jetis, Yogyakarta. This research was Classroom Action Research. This research, each cycle contains planning, implementation, observation, and reflection. The cycle was completed in the second cycle because indicator of success had been achieved. Research instruments include teacher and students' observation sheets, sciences learning achievement tests and communication skills questionnaires. The results show that students could reach the natural sciences minimum mastery criteria of learning achievement and an increase in communication skills was worth considering. In the first cycle, students' learning achievement rose 6.75 points above the natural science minimum mastery criteria; the second cycle rose 18.8 points above the natural science's minimum mastery criteria. Communication skills in the first cycle increased by 3.65%, and in the second cycle increased by 10.57%.*

*Keywords: Problem-Based Learning, Classroom Action Research, Students' Learning Achievement, Communication Skills,*

ABSTRAK

Penelitian ini bertujuan untuk mengetahui model Problem Based Learning (PBL) dalam meningkatkan kriteria ketuntasan minimal IPA terhadap prestasi belajar dan keterampilan komunikasi di SMP Taman Dewasa Jetis Yogyakarta. Jenis penelitian ini yaitu Penelitian Tindakan Kelas (PTK). Dalam PTK, setiap siklus berisi perencanaan, pelaksanaan, observasi, dan refleksi. Siklus selesai pada siklus II karena indikator keberhasilan telah tercapai. Instrumen penelitian berupa lembar observasi guru dan siswa, tes prestasi belajar IPA dan angket keterampilan komunikasi. Hasil penelitian menunjukkan bahwa siswa dapat mencapai kriteria ketuntasan minimal prestasi belajar IPA dan peningkatan keterampilan komunikasi. Pada siklus I, prestasi belajar siswa naik 6,75 poin di atas kriteria ketuntasan minimal IPA; siklus II naik 18,8 poin di atas kriteria ketuntasan minimal IPA. Keterampilan komunikasi pada siklus I meningkat sebesar 3,65%, dan pada siklus II meningkat sebesar 10,57%.

Kata Kunci: Problem-Based Learning, Penelitian Tindakan Kelas (PTK), Hasil belajar siswa, Keterampilan komunikasi

## Introduction

In the era of education 4.0, assessment of learning outcomes, strengthening character education for students, and developing 21st century skills are the main objectives of learning (Fernandes, 2019). The learning process in schools has used the 2013 curriculum through which standards or minimum mastery criteria or in Indonesian namely Kriteria Ketuntasan Minimum (KKM) must be achieved by students. In general, each school has its own KKM involving three determined aspects such as students' characteristics (intake), subjects' characteristics (the material complexity or competence), and the condition of education units (institutional capacity) in the process of achieving competence (Alfath & Raharjo, 2019; Hidayati, 2020; Milhah, 2022).

The 21st century skills in the era of education 4.0 are generally subsumed into 4 Cs, namely critical thinking, creativity, collaboration, and communication. The communication process is one of the determinant factors of learning. Communication plays a significant role in learning activities (Ernawati & Ramadhan, 2019). Communication is a process that involves two or more people, in which the exchange of information takes place in order to achieve certain goals (Ruler, 2018; Yamin, 2018). Forms of communication for scientific thinking can be realized through various ways including oral, written, mathematical, graphical representation of ideas, and observation (Sarwanto, 2016; Ulfiatun et al., 2017; Wati et al., 2019). Students can identify how to write, convey information scientifically, distinguish scientific communication from other types of expressions, and explain the reasons behind differences such as the needs for scientific precision, detail, and proof of opinion. Communication skills can be reviewed through four attitude criteria, namely expression, evaluation, response and negotiation (Chang et al., 2010). Forms of communication can be expressed verbally, non verbally and in writing (Ika, 2018; Tenney et al., 2019).

The results of observations and interviews in Junior high school Taman Dewasa Jetis indicate that the condition of students is not conducive due to the following learning process. Students do not pay attention to the teacher and are busy joking with their friends; some other lay they their heads on the table. Students find that the materials are difficult to understand. For this reason, students do not immediately do the assignments, some even do not do them at all. In group activities, students dominated the discussion. Generally speaking, two students in the group did written assignments during the discussion, one as a writer and the other one as a dictator, while others are busy with themselves. When asked for the upcoming presentations, only a few students voluntarily came forward to show the results of the discussion. The majority of students tend to avoid taking presentation tasks. When following the evaluation process, the average students easily give up on figuring out written problems. Students do not finish answering questions even though there is still the time allotment. The average grade of mastery learning for natural sciences students do not meet the minimum mastery criteria (KKM) score of 65 set by the school. The average students' learning outcome is 62.65.

The learning process involves the interaction of teachers, students, and learning resources (Pane & Dasopang, 2017; Sain et al., 2014; Suhartoyo et al., 2020). In the learning process a strategy is needed to achieve the learning objectives. One strategy is to condition students in learning activities. Based on observations at school, the teacher uses the direct instruction learning model. Group activities have not maximally been undertaken. The learning process of sciences in schools has not implemented the Problem-Based Learning (PBL) model. In the PBL model, students are faced with real and authentic problems in terms of social contexts as well as materials (Fathurrohman, 2015; Hasibuan et al., 2019; Khoiriyah & Husamah, 2018; Seibert, 2021; Siagian et al., 2019; Sujatmika et al., 2019). Thus, the students' activities no longer deal with listening, recording and memorizing the materials but rather focusing on critical thinking, problem solving, communication, collaborative and creativity. The PBL model briefly consists of five stages, namely (1) giving orientation to the students' problems, (2) organizing students' research, (3) guiding students to investigate independently and in groups, (4) developing and presenting results of assignments, and (5) analyzing and evaluating the problem solving processes (Arends, 2012; Arikunto et al., 2019; Warsono & Hariyanto, 2014).

As these aspects indicate, the research aimed to present the PBL model as one of the solutions to improve students' learning mastery and communication skills through classroom action research. Using PBL, students can be trained to better master material concepts, have an open mind, self-actualize, and can develop communication skills. PBL is one of the conceptual framework-model recommended for the 2013 curriculum (Nashrullah & Qosyim, 2018; Pratiwi et al., 2019; Purwati & Darussyamsu, 2021; Sani, 2014).

## Method

This Classroom Action Research (CAR) was undertaken at Junior High School Taman Dewasa Jetis, Yogyakarta, involving the 9th graders during the even semester of 2020/2021 academic year. There were 20 students in the class. The CAR design is in the form of a cycle along with its four stages,

namely (1) planning, (2) implementing actions, (3) observation, and (4) reflection (Arikunto et al., 2019). Figure 1 shown the CAR design. The cycle repeated until success indicators were established by the researchers.

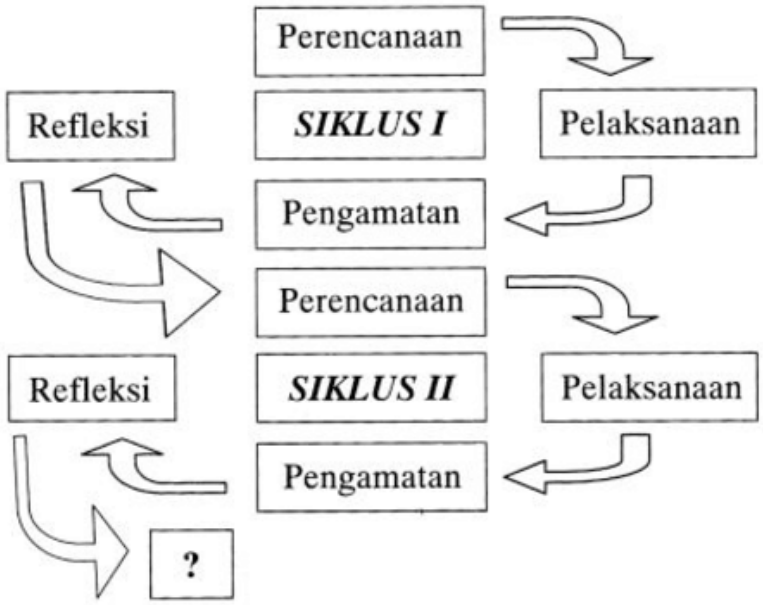


**Figure 1**. Classroom Action Research Design

According to the research, the planning stage was considered with designing learning tools and research instruments. The implementing actions stage was a teacher teaching activity in the classroom using the PB1 model and learning tools developed at the planning stage. The observation phase was an activity of observing the actions of students and teachers in the classroom. The reflection stage involved collaborators. In this study, the collaborator was a science teacher. Reflection was an activity of sharing the results of observations for continuous improvement of learning activities.

Research instruments involved observation sheets for teachers' activities, observation sheets for students' activities, mastery test sheets for natural sciences learning outcomes, and communication skills questionnaire sheets. Experts had constructively consulted the instruments. The instruments were also content-validated by experts by looking at the suitability of the material to the question items. The expert included natural science teachers in Junior High School Taman Dewasa Jetis and lectures from the Department of Natural Science Education of Universitas Sarjanawiyata Tamansiswa and Universitas Negeri Yogyakarta. There were 20 items for the mastery test for each cycle. The communication skills questionnaire sheet had 19 questions that summarized the activities of expression, evaluation, response and negotiation in conjunction with verbal, nonverbal, and written thinking skills. Indicators of success included achieving the minimum mastery criteria that increase at least 10 points and an increase in the communication skills reaching at least 10%.

## Result and Discussion

### Result

This research began with identifying pre-cycle conditions pertinent to learning mastery and communication skills. Information on classroom conditions was an integral part of observations and interviews with natural sciences teachers. The materials' daily quizzes in Reproduction System of Plants and Animals of the dealt with learning mastery grades. The next activity was the CAR's implementation of actions in the class using PBL learning model. The materials in cycle 1 were the continuity of the previous materials, namely Reproduction System of Plants and Animals. The material

of Inheritance of Characters in Living Beings used in cycle 2. The implementation of cycle 1 would review in the cycle 2 because the indicators of its success had not been achieved considerably.

CAR's Cycle I

a. Planning

Planning began with developing learning tools consisting of lesson plans, teaching materials, media, students' worksheets, mastery evaluation instruments for learning natural sciences, and communication questionnaires. The cycle I activity was expected to be completed in the fourth meeting. The PBL learning model directed students to the problem-solving session in a group discussion. During the cycle, teachers' and students' activities were observed by collaborators using observation sheets and field notes. The observations of researchers and collaborators were analyzed (reflected) as a basis for determining the next step.

b. Implementing Actions

The implementation of learning activities used the PBL model, consisting of 5 stages. Students were given sufficient explanation regarding the material and an explanation of the stages of the PBL learning model that would be used and then oriented to problems related to the material. Problems were presented using the image, video, and Power Point media. The teacher organized students into six groups of four to five students to research problems, formulate hypotheses, and solve problems. The teacher trained students to carry out investigations both independently and in groups. The teacher went around to check the implementation of the discussion activities. The teacher would assist in the form of instructions for discussion participants who were still having difficulties, so they were not notified directly about the truth. Thus, group members were expected to be able to do their problem solving. After the discussion ended, students were allowed to present their work in the form of a simple report. Group representatives were asked to deliver the discussion results in front of the class. At the end of the activity, students and teachers confirmed, analyzed, and evaluated the problem solving process.

c. Observation Results of Students' and Teacher's Activities

As collaborators put, students were conditioned to take part in PBL's activities, but they found passive students in almost every group. Group activities were dominated by students who were dominantly intelligent in their groups. The tasks of each group member had not been clearly divided. There were students who just kept quiet and waited for their friends to complete tasks without giving input and suggestions. Passive students tended to be ignorant and were busy with themselves. In general, all groups completed the given task. In the presentation activity, students dominated in the group presentation. At the end of the activity, a confirmation was required concerning the answers emerged. Students markedly seemed active in question and answer activities. After the discussion ended, an evaluation of learning mastery was conducted using the question and answer method and tests.

To find out the improvement in communication skills, students were asked to fill out a questionnaire. The observed communication skills aspect was mainly concerned with some students who appeared to communicate verbally, and non-verbally while carrying out discussion activities that minimally emphasized expressions, evaluations, responses, and negotiations. Students dominated in the group appeared more active in communicating. Other students remained waited, silent and busy with themselves during the discussion. When it was time to make a presentation, group members actually left the presentation task to the dominating student.

In general, the teacher has carried out the entire PBL stages. The teacher provided enough time for group activities, so that students who had completed their assignments did not wait for a long time. The teacher reinforced the materials after the discussion was over. The learning process had been going well as planned.

d. Reflection

The researcher and collaborator reflected on the implementation of cycle I in the form of qualitative and quantitative data. Quantitative data were in the form of complete test results of sciences

students' learning outcomes and communication skills questionnaire, while qualitative data were in the form of observation sheets, and field notes. The CAR's Cycle II was undertaken to improve the cycle I. Some conditions needed some improvements in the cycle I include (1) passive students, (2) smart students who dominated in the class, less dominated students in interactions with other group members, (3) untapped students' communication skills, (4) the average grade of complete test results in learning natural sciences and communication skills had not increased expectedly. The average grade for complete sciences learning outcomes is 71.75 points. This grade is higher than the minimum mastery criteria (KKM) of 6.75 points, and it is higher than a pre-cycle condition that reaches 9.10 points. The average grade of the first cycle concerning communication skills questionnaire is 71.00 points. This score is a pre-cycle condition of 2.5 points or an increase of 3.65%.

Concerning the deficiencies and problems in the first cycle, several conditions determine problem-solving processes (1) the teacher divided students into heterogeneous groups, (2) the teacher conveyed repetitive instructions at the beginning of the activity, (2) the teacher helped the leader in the group to do the distribution of tasks equitably, (3) the teacher more intensely walked around to guide students' activities and stimulate communications between groups, (4) the teacher gave other students the opportunity to present, (5) the teacher repeated the question to some students when conducting a question and answer session to confirm the results of the activity group.

CAR's Cycle II

a. Planning

In cycles I and II, the lesson plan is set to design for four in-class meetings. Planning in the second cycle aims to prepare learning tools using PBL learning models. The contents of the communication skills questionnaire did not change. By accommodating the reflection on the cycle 1, the teacher prepared a list of discussion groups, and made several questionnaires. The learning activities were observed by collaborators using observation sheets and field notes. The teacher and collaborator reflected at the end of the second cycle.

b. Implementing Actions

The learning process followed the Learning Implementation Plan (RPP) commonly called the lesson plan using a PBL learning model. The teachers'-oriented students to common problems encountered in daily life using media images and power points. As the reflection activities evidenced, the teacher divided students into planned groups with a hope that all group members took an active part in learning activities. The teacher conveyed the learning model that might be used. The teacher helped the group leader divide group assignments. The teacher directed the discussion activities through the instructions to solve the problem without telling students about the results. The teacher walked around to guide the discussion. The group members' questions to the teacher were fewer in number compared to the implementation of the first cycle because the instructions were delivered many times. The teacher checked the results of each group's discussion. Group representatives were asked to present the results of the discussion. Because there had been a division of group assignments, dominated students no longer came forward to present their topics of discussions.

c. Observation Results of Students' and Teacher's Activities

The results of collaborators' observations on students' activities show that the learning process ran well; almost all students took part in discussion activities. The communication between group members and other groups was well-developed. Students expressed opinions, negotiated and accepted opinions when discussing. As the discussion had been agreed, almost all students simultaneously completed the work. Students were enthusiastic about answering the teacher's questions when the question and answer process confirmed the problem-solving thinking. Students conducted an evaluation in the form of complete tests of natural sciences learning outcomes and returned to the questionnaire of communication skills.

The teacher's activity was observed by the collaborator showed that the teacher had implemented the PBL learning model as elaborated in the lesson plan. The teacher divided the discussion groups heterogeneously and helped the group leader divide the tasks into groups. The

teacher interacted more closely and more frequently with students. The teacher did not hesitate to convey instructions repeatedly. The teacher increased the number of questions during the Q & A activity at the fifth stage of PBL.

d. Reflection

The natural sciences learning process using the PBL learning model had been going well as planned. The material in the second cycle was different from the first cycle because the sustainability of the material must be completed within a semester. The successful learning process can be viewed from students' communication activities including expressing opinions when discussing, writing the results of discussions, and presenting the results of the discussion. The success of learning outcomes can be seen in the following table. There is an increase in the grade of complete natural sciences learning outcomes by 18.8 points compared to the minimum mastery criteria (KKM) score and by 12.05 points when compared to the grade of complete learning outcomes in the cycle I. The score of communication skills increased by 12.67% when compared to the pre-cycle conditions that was increased by 8.70% when it is compared to the cycle I.

## Discussion

This research was conducted in two cycles. The cycle will be continued if indicators of success are not achieved yet. The first step in each cycle is planning. There is an increase in the implementation of planning activities from cycle I to cycle II, namely making a list of learning groups by paying more attention to aspects of students' heterogeneity that includes gender, place of origin, learning achievement, students' conditions and daily behaviors, environmental conditions and learning materials. Classroom settings are designed to be more comfortable for learning and teaching sessions.

In both cycle I and cycle II, the teacher explains the learning objectives and motivates students. The teacher helps them organize their assignments. The teacher provides instructions for students in gathering the required information. The teacher helps them plan their presentation of reports. The teacher helped them reflect and evaluate learning processes during the PBL stages.

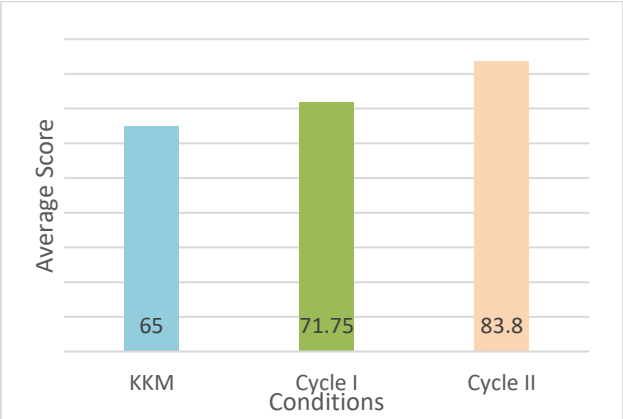


Figure **2.** The Average Score of Natural Sciences Achievement

In the implementation of the second cycle, the teacher emphasizes the intensity of instruction and interaction with students. Teachers often walk around to monitor study groups. The teacher helps the group leader divide the roles of group members. Consequently, students understand the stages of implementing the PBL learning model and they can answer questions related to assignments and they work based on their interests. In the first cycle of the PBL learning model, the teacher conveys a problem orientation; students are busy with themselves, and they do not pay attention. In this second cycle, almost all students pay attention and do their assignments earnestly. By prioritizing the teacher's approach to students at a series of PBL stages, the implementation of the second cycle proceeded according to the syntax and atmosphere more conducively.

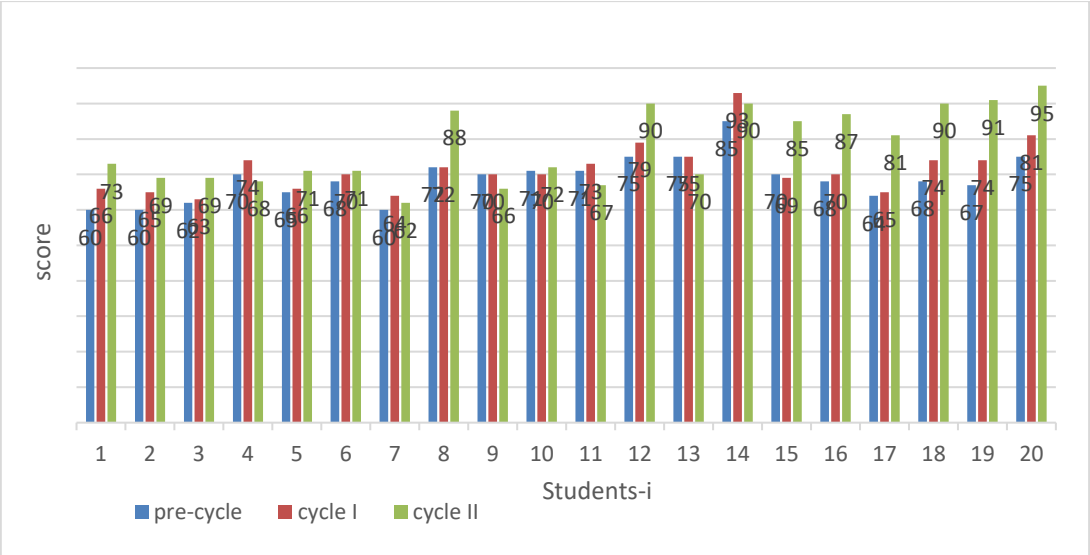


**Figure 3.** The Score of Natural Sciences Achievement

In implementing actions in the second cycle, students' complete scores from the pre-cycle, the first cycle, and the second cycle increased. Figure 2 is the summary of the average score for natural sciences achievement. There was an increase in student learning completeness from pre-cycle to cycle 2. In general, the growth of the average score of student learning outcomes had shown. Some students experienced a significant increase in scores. Reflection in cycle 1 proved to be able to improve class conditions further. Figure 3 presents students' science learning outcomes scores.

Besides, students' communication skills emerged in the cycle I. Some students were active in the question and answer session. Smart students dominated in classes. Other students did not feel confident in expressing their opinions. In the cycle II, this condition directed students to the division of group assignments suitable for themselves. The teacher managed the group members' assignments assisted by the group leader. Each student looked enthusiastic about doing the assignments.

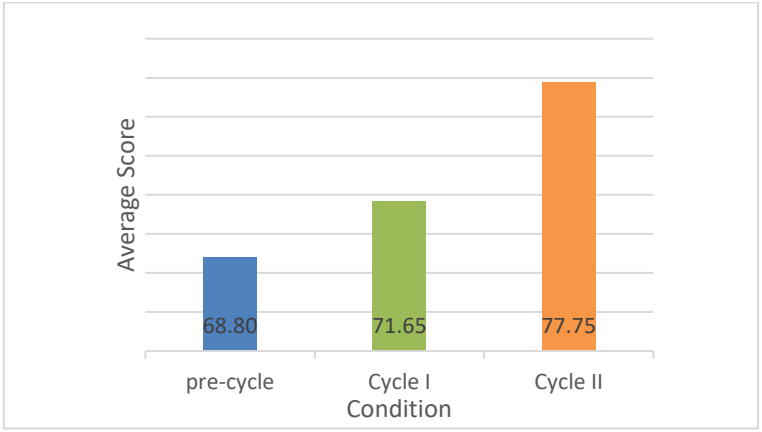


**Figure 4**. The Average Score of Students' Communication Skills

Based on Figure 4 above prove that the reflection in cycle I has a significant effect on increasing the complete natural sciences learning outcomes and students' communication skills. The improvements have a strong impact on producing positive results. The PBL stages were undertaken more attentively, and more emphasis had been put to actualize more frequent learning approaches in that students took an active part in applying them. The existing research highlight that the PBL learning model is a pivotal part of the ability to argue and achieve students' learning outcomes (Darmawan & Rante, 2022; Fatmasari et al., 2021; Safitri et al., 2018).

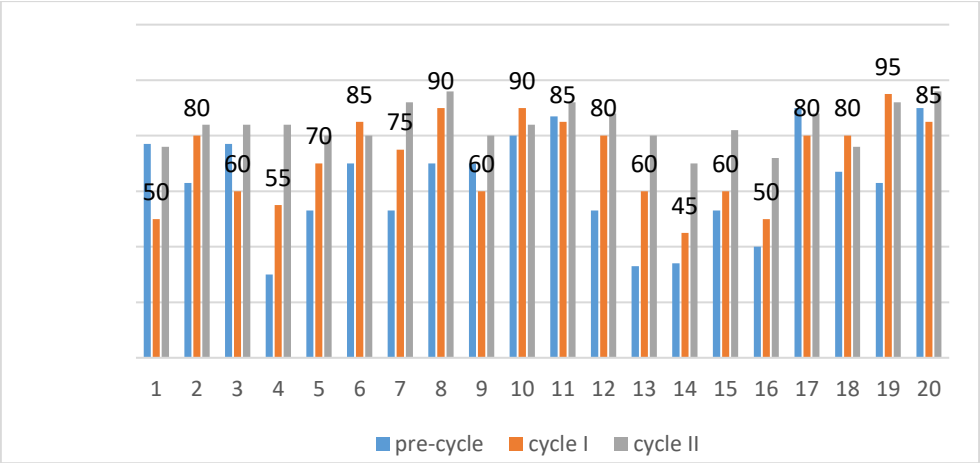


**Figure 5**. The Score of Students' Communication Skills

Communication skills were further developed to express, evaluate, respond and negotiate ideas between group members in the form of verbal, and non-verbal communication platforms. Good and directed communication skills will result in the increased mastery of learning materials. A good and directed communication process will determine the success of the learning process. Communication skills have been measured when learning with the PBL model. Figure 5 shows the result of students' communication skills. Each cycle was run well and there was a reflection done on the first cycle. Same as previous research (Maridi et al., 2019; Putra et al., 2021; Purwati & Darussyamsu, 2021), this research showed the PBL is proven to improve students' communication skills in science subjects.

## Conclusions

The results showed that students had reached the minimum mastery criteria (KKM) and communication skills. In the first cycle, students' learning mastery rose 6.75 points above the KKM, in the second cycle, it rose 18.8 points above the KKM. Communication skills in the first cycle increased by 3.65%, and in the second cycle they increased by 10.57%. This research has reached the indicator of success, so that the PBL learning model can improve students learning mastery and communication skills.

## Acknowledgement

We would like to thank the Principal, Science Teacher, and all students of 9$^{th}$ grades in Junior high school Taman Dewasa Jetis, Yogyakarta who are willing to provide opportunities for us to conduct this research. On this occasion, we suggest that a continuous research seeks the development of Subject Specific Pedagogy (SSP) of problem learning-based to improve communication skills and student science learning outcomes.

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