



## Project Based Learning Model to Improve Communication Skills and Science Learning Outcomes

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### Abstract

21st century learning does not only focus on learning outcomes but also emphasizes the 4C skills. The 4C skills include critical thinking, creativity, communication and collaboration. These four skills are important skills and must be possessed by every student in order to be able to face the challenges of life in the 21st century or in the digital era. One of the 4C skills that must be mastered by students is communication skills. Communication skills can be trained and developed through the application of a project-based learning model (PjBL). PjBL is one of the learning models which is the main program of choice in an independent curriculum that can bridge the development of student's communication skills. Good communication skills affect mastery of the material and student learning outcomes. The purpose of this study was to determine the effect of the project based learning model in improving communication skills and science learning outcomes. This type of research is classroom action research which consists of two cycles. Each cycle includes planning, implementation, observation, and reflection. This study uses a qualitative approach to improve and find solutions to real and practical problems in improving the quality of learning in the classroom. The results of the first cycle of reflection were analyzed, then in revision to improve learning in cycle II. The data collection technique used in this study is through observation and learning outcomes assessment tests. The research design uses the Kemmis and Mc. Taggart models. The results showed that student's communication skills increased from 60% (enough) in Cycle I to 75% (good) in Cycle II. In addition, the mastery of student learning outcomes also increased from Cycle I by 60% to 84% in Cycle II. Thus, it can be concluded that communication skills and science learning outcomes for class VII-E students of SMPN 6 Madiun can be improved by applying a project-based learning model. For future researchers, they should conduct similar research but with other materials and further develop project-based learning not only to improve communication skills and learning outcomes.

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## INTRODUCTION

21st century education is education that combines aspects of knowledge, communication skills and attitudes with mastery of Information and Communication Technology (ICT) (Setiawan et al., 2022). In the 21st century learning emphasizes more on changes such as changes from learning that was previously teacher centered becoming student centered, learning activities that previously memorized a lot changed into activities to seek and build

their own knowledge and change individual learning patterns to group or collaborative learning. In the 21st century, there is an important agenda that focuses on creating quality future generations who are able to compete in facing the industrial revolution 4.0. The future generations in question are students who are qualified and supported by skills such as collaboration, communication, professionalism, having innovative problem solving, being creative, being able to think critically and mastering digital literacy (Amalia, Yushinta et al., 2021).

The 21st century skills that must be mastered by students are the 4C skills which consist of critical thinking skills, creativity, communication and collaboration (Sartini & Mulyono, 2022). These four skills are important skills and must be possessed by every student in order to be able to face the challenges of life in the 21st century or in the digital era (Redhana, 2019). These four skills are packaged in the independent curriculum learning. One of the 21st century skills that students need to master is communication skills. Communication is an activity that cannot be separated from the interaction between two parties. When students respond to explanations given by the teacher, ask questions, answer questions, or express their opinions, this is a communication activity (Setiawan et al., 2022). Student's communication skills include the ability to carry out group discussion activities and also present the results of discussions orally. Communication skills help students more easily to absorb material that are relevant and convey the results of discussions more easily, so that this also has an impact on learning outcomes (Wati et al., 2019).

The independent curriculum is one of the bridges to realize the mastery of 21st century skills. The independent curriculum has a distinctive feature, namely an emphasis on student-centered learning models, training and increasing student independence through the application of project-based learning models or commonly referred to as Project Based Learning (PjBL) (Kemendikbudristek, 2022). The independent curriculum is a solution in facing challenges and competition for human resources globally in the 21st century.

Based on observations and interviews conducted at SMPN 6 Madiun, information was obtained that students from these schools had poor communication skills and science learning outcomes. Almost all students have very little confidence in discussions, they are afraid to make presentations in front of the class, and are afraid to ask the teacher or the presentation group. Some students also felt embarrassed and insecure about the results of their discussion. Possible causal factors are due to lack of mastery of the material and the inability of students to express ideas or opinions that are in their minds. In addition, student's skills in asking and answering questions during discussions or presentations are still lacking. Sometimes students feel embarrassed to ask questions or to answer questions. This is because when students feel wrong in asking questions or in answering, they will tend to be laughed at by their friends. So they became silent and thought that it was better not to ask.

Indicators of communication skills in students include (1) presenting the results of discussions in detail, detail and systematically, (2) using body language such as eye contact, posture and body movements used effectively, (3) respecting opinions/suggestions/input from the audience, (4) responding or answering audience questions, (5) conducting discussions, and (6) expressing opinions (Cangara, 2011).

The learning model that can be used to improve communication skills and student learning outcomes is the project-based learning model (PjBL). The Project-Based Learning (PjBL) is a learning model where students are involved in a project that is carried out within a certain period of time and from there a product is made. The product of the project is then displayed and presented in front of the class. Learning takes place by sharing project experiences in such a way that the end result of the project is the result of student activities (Ardianti et al., 2017). The products of the project activities were presented by each group in

front of the class. According to Brigili in (Ravitz, 2021), project-based learning requires active participation of students in problem solving activities, making new discoveries obtained through experience. We hope that this experience can become a science that can inspire students to think creatively while learning and improve communication with teachers and peers. The PjBL learning model invites students to dare to express opinions both in front of group members and other groups. Project Based Learning (PjBL) can be used as a learning model to develop students' abilities in planning, communicating, solving problems and making responsible decisions (Setiawan et al., 2022). The hope is that when the teaching and learning process is carried out well, students' motivation and interest in learning science material will increase so that it will have an impact on student learning outcomes.

Susanto in Elisabet et al (2019) states that learning outcomes consist of 3 aspects namely cognitive, affective, and psychomotor. The cognitive aspect relates to how much students understand the concept in receiving and absorbing the lessons given by the teacher (knowledge). The affective aspect is related to the attitudes that emerge after students experience the learning process. Meanwhile, the psychomotor aspect relates to students' ability to think, reason and act effectively and efficiently to achieve certain results, including their creativity. From this definition, the science learning outcomes referred to in this study are science learning outcomes in the cognitive aspect, which is related to students' knowledge and understanding of the science material taught by the teacher. Science learning outcomes can be known by providing an assessment through an evaluation test.

Based on previous research conducted by Lestari & Ilhami (2022) shows that learning science using the PjBL model can improve creative thinking skills, improve science communication skills, learning outcomes and concept mastery. The same thing can be seen from the research results of Setiawan et al., (2022) that learning activities using a project-based learning model (PjBL) can improve interaction skills, student communication and improve student learning completeness. Most of the research conducted by previous researchers states that using the PjBL model can improve creative thinking in line with 21st century skills, namely skills 4C which includes critical thinking, communication, collaboration and creativity and innovation. Therefore, this PjBL model is suitable to be applied to natural science subjects such as ecosystems and food webs. This material was chosen because it is one of the materials that has a close relationship with students' daily lives and can be taught using a project-based learning model. Thus, the purpose of this study was to determine the effect of the Project Based Learning model in improving communication skills and science learning outcomes in the sub-subject of ecosystems and food webs.

## **METHODS**

The type of research that was carried out was classroom action research which consisted of two cycles. Classroom Action Research (CAR) is a process of examining problems that arise in the classroom through reflection activities. This is done as an effort to solve the problem by carrying out various planned systematic actions in real conditions and analyzing every effect that arises from these actions (Wardhani dan Wihardit, 2017). Actions are given based on the teacher's instructions and directions, then carried out by students so that problems in learning in class can be resolved and the quality of learning in class is further improved. The CAR cycle design implemented was based on Kemmis and Mc Taggart (1990). The actions taken by researchers in each cycle are planning activities, implementation of actions, observation and reflection. In planning activities, the researcher conducts an analysis of learning outcomes and learning objectives, determines the material to be taught, then creates learning tools which include teaching modules, teaching materials, worksheets, assessment and evaluation questions, and prepares communication skills observation sheets. After making the learning

device, the learning device is applied in class. After implementing the learning tools, reflection activities are carried out to determine the actions that must be carried out next. The results of the application of learning tools are then analyzed. The data collection technique used in this study is through observation and learning outcomes assessment tests. Data on the value of science learning outcomes were then analyzed using descriptive statistical techniques. The sampling technique used in this study used a random technique. The subjects in the study were class VII-E students of SMPN 6 Madiun with a total population of 25 people. While data analysis techniques to determine the increase in student's communication skills and science learning outcomes by comparing the percentage of student's communication skills and learning outcomes in cycle I and cycle II.

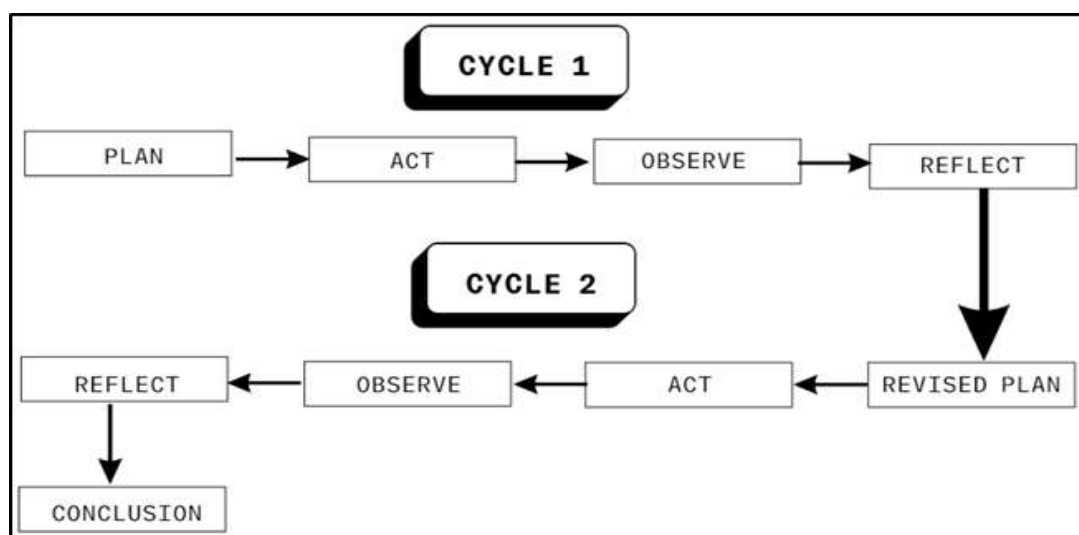


Figure 1. Classroom Action Research Cycle Chart Model Kemmis and Mc. Taggart

## RESULTS AND DISCUSSION

Based on the implementation of learning in 2 cycles consisting of 4 meetings, it can be seen that student's communication skills and student learning outcomes have increased significantly. By applying the project-based learning model (PjBL), improvements in communication skills and learning outcomes can be observed. The results of observing the application of the project-based learning model (PjBL) are presented in the table below.

Table 1. Comparison of Observation Results of Communication Skills Indicators Cycle I and Cycle II

No.	Communication Skills Indicator	Cycle I		Cycle II	
		Percentage (%)	Category	Percentage (%)	Category
1.	Presenting the results of the discussion.	59	Enough	78	Good
2.	Use body language such as eye contact and hand gestures.	60	Enough	75	Good
3.	Appreciate the opinions, suggestions or feedback from friends.	62	Good	78	Good
4.	Respond or answer questions.	60	Enough	72	Good

No.	Communication Skills Indicator	Cycle I		Cycle II	
		Percentage (%)	Category	Percentage (%)	Category
5.	Liveliness in discussion.	59	Enough	77	Good
6.	Express opinion.	60	Enough	73	Good
	Average	60 %	(Enough)	75 %	(Good)

Based on the data in the table above, it is known that students' communication skills in each observed indicator have increased after the application of the Project Based Learning model (PjBL). In the indicators presenting the results of the discussion in cycle I, it is still 60% in the sufficient category, while in cycle II it reaches 78% in the good category. This shows that students' skills on the indicator of presenting the results of the discussion have increased from cycle I to cycle II by 19%. In indicators using body language such as eye contact and hand movements in cycle I it was still 60% in the sufficient category, while in cycle II it reaches 75% in the good category. This shows that students' skills on indicators of using body language such as eye contact and hand movements have increased after the PjBL model was applied from cycle I to cycle II by 15%. The indicator of respecting opinions, suggestions or input from friends in cycle I was 62% in the good category, while in cycle II it reaches 78% in the good category. This shows that students' skills in appreciating opinions, suggestions or input from friends in cycle I were good and even better in cycle II. The indicators for responding or answering questions in cycle I is still 60% in the sufficient category, while in cycle II it reaches 72% in the good category. This shows that students' skills are getting better and increasing in cycle II, namely being able to respond and answer friends' questions when presentation activities are good and positive. The activeness indicator in the discussion in cycle I was still 59% in the sufficient category, while in cycle II it reaches 77% in the good category. This shows that the activeness of students in discussions has increased after implementing the PjBL model in cycle II. Almost all students have been actively involved during the learning activities. The indicator for expressing opinions in cycle I still shows 60% in the sufficient category, while in cycle II it has reached 75% in the good category. This shows that students' communication skills on the indicator of expressing opinions have increased from cycle I to cycle II by 15%. After implementing the PjBL model students have the courage and ability to express their opinions during presentations and discussions better. The following is a diagram of improving students' communication skills in cycle I and cycle II.

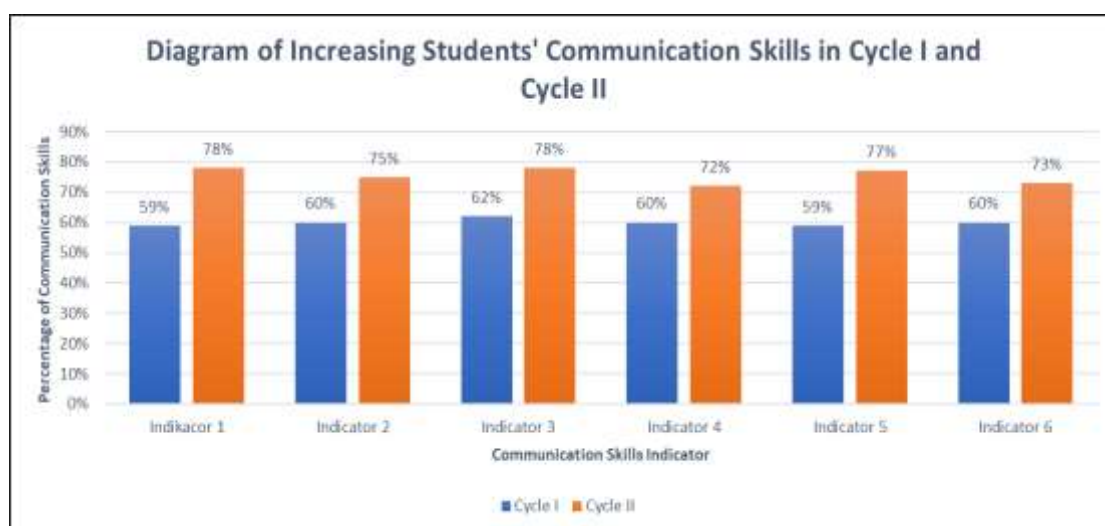


Figure 2. Diagram of Increasing Students' Communication Skills in Cycle I and Cycle II

Table 2. Comparison of Observation Results of Communication Skills Cycle I and Cycle II

Communication skills	
Cycle I	Cycle II
60 %	75%
Enough category	Good category

Based on the data in the table above, it is known that the percentage of student's communication skills using the Project Based Learning model in cycle I is still 60% in the sufficient category, while in cycle II it reaches 75% in the good category. This shows that student's communication skills when applied to the Project Based Learning model have increased from cycle I to cycle II by 15%.

Table 3. Comparison of Student Learning Outcomes in Cycle I and Cycle II

Achievement Component	Learning outcomes	
	Cycle 1	Cycle II
Total Value	1790	2200
Average	71.6	88
Complete KKM	15	21
Not Completed KKM	10	4
Completeness Percentage	60%	84%

Based on the table above, it can be seen that student learning outcomes in science learning using the Project Based Learning (PjBL) model have increased. The average value of student learning outcomes has increased from cycle I of 71.6 to 88 in cycle II. Based on the data analysis, it is known that students who have achieved the KKM (Minimum Completeness Criteria) or exceed the KKM in cycle I are 15 students out of the total number of students with a percentage of 60%. In cycle II, the percentage has increased to 84% consisting of 21 students who have passed the KKM. Achievement of completeness of student learning outcomes classically in cycle II is in accordance with indicators of success where student learning completeness reaches a figure of 84%. The following is a diagram of increasing student learning outcomes in cycle I and cycle II.

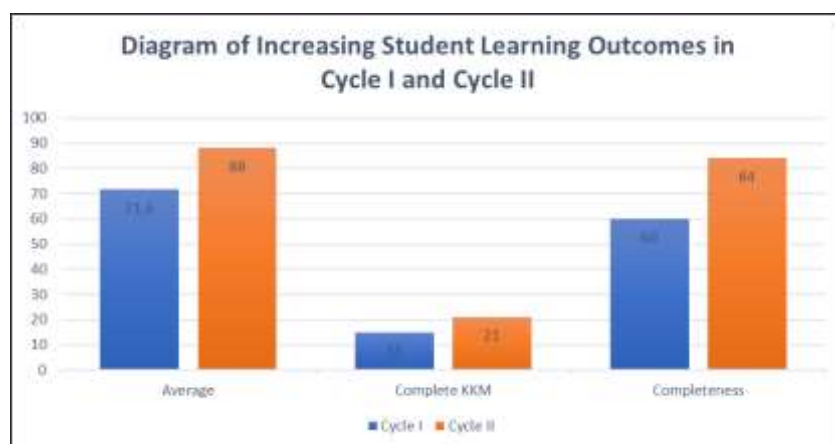


Figure 3. Diagram of Increasing Students Learning Outcomes in Cycle I and Cycle II

Project Based Learning (PjBL) model in cycle I has deficiencies, so it is necessary to revise and improve the learning cycle II. Some of the improvements made were the formation of heterogeneous groups based on student abilities and gender, motivating students to provide questions, opinions, and suggestions in presentation activities with a focus on learning material not appearance during presentations, encouraging students to pay close attention when friends are present expressing opinions, motivating students to be more active in communicating in presentations, and teachers are more intense in guiding students to improve their communication skills. Researchers held discussions with teachers regarding learning steps that could not be carried out in cycle I, then corrected actions in cycle II so that there was an increase in communication skills and student learning outcomes. When learning through the PjBL model in both Cycle I and Cycle II, students were seen to be very enthusiastic and active and responded very positively to learning activities.

The Project Based Learning (PjBL) model makes science learning more meaningful, fun, and improves student's communication skills because this learning model involves students to participate actively and communicatively in the process of making projects, discussions and presentations. The Project Based Learning (PjBL) model can improve student's communication skills. This is supported by the opinion of Imamah & Muqowim (2020) who say that the Project Based Learning (PjBL) model can improve critical thinking skills, presentation skills, speaking skills, and work efficiently in groups. This is the same as what was revealed by Oktavianingsih (2017), which revealed that the Project Based Learning (PjBL) model can increase learning activities, communication skills, activeness and collaboration between students. This learning provides contextual experiences for students to organize projects according to the creativity of each group so as to create a pleasant learning climate and make students enjoy the learning process well. With this learning climate, students are more motivated to learn because they are enthusiastic and very interested in learning activities. This also has an impact on improving student's communication skills which will also indirectly affect student learning outcomes.

## CONCLUSION

Project Based Learning (PjBL) model can improve communication skills and science learning outcomes for class VII-E students of SMPN 6 Madiun. The Students' communication skills increased from cycle I by 60% (enough category) to 75% (good category) in cycle II. The average value of student learning outcomes has increased from cycle I of 71.6 to 88 in cycle II, while the percentage of student learning completeness also increased from cycle I by 60% to 84% in cycle II. Factors that influence the results of the research include the learning model used, the method used by the teacher in managing the class, learning media, the number of students in one class, the atmosphere of the classroom environment, motivation and initial abilities of students and the division of study groups according to student characteristics.

## SUGGESTION

Researchers provide suggestions: (1) teachers in schools should be encouraged to create an active, communicative and fun learning atmosphere with creative and innovative learning models such as project based learning (PjBL) so that they can achieve maximum learning objectives, (2) teachers are encouraged to use this model PjBL as a variation of the learning model to improve student's communication skills, (3) teachers should motivate and encourage students to participate actively in learning, (4) for further researchers should further research and develop the application of learning based project (PjBL) in learning to develop 4C skills, student learning outcomes and achievement of national learning goals.

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