

# Application of Lesson Study-based Problem Based Learning to Improve Mutual Cooperation and Learning Outcomes

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**Abstract:** The COVID-19 pandemic has hit various zones in Indonesia, including the learning zone, which has also had a big impact. Where the impact of online learning can cause students to become passive, less creative and unproductive, the accumulation of information/concepts for students is less useful. Class X for the 2022/2023 academic year is currently students affected by online learning 2 years earlier and the implementation of an independent curriculum, so that class X requires concrete learning and constructivism. The Problem Based Learning (PBL) learning model is a learning that provides students with knowledge and experience to work in constructing knowledge. Through Lesson Study (LS) it is hoped that there will be an increase in learning biology in class X. This type of research uses classroom based action research. The research subjects were 35 students in class X.4 of SMA Negeri 3 Jember for the 2022/2023 academic year. The results of the study showed an increase in mutual cooperation and learning outcomes. The increase in the mutual cooperation is evidenced by the mean value of 72 (C1) and 92 (C2). While the results of learning biology proved the average value of 82 (C1) and 88 (C2). This can be an alternative for educators to apply concrete learning and constructivism to cognitive learners in the transition to the Covid-19 pandemic to improve mutual cooperation and learning outcomes.

**Keywords:** pandemi, Kurikulum merdeka, Problem Based Learning (PBL), Lesson Study (LS)

## INTRODUCTION

The COVID-19 pandemic is first and foremost a health crisis in the world. Many countries decided to close schools, colleges and universities. The United Nations (UN) is concerned about this fact. The International Organization based in New York, USA, thinks that education is one of the sectors that has been heavily affected by the Covid-19 pandemic (Roswita, 2021). The impact of Covid-19 has an impact on students, namely learning that is usually carried out in a classroom with an atmosphere of many friends must be inversely proportional to studying at home or online. Moreover, by looking at the different characteristics and abilities of each student. And how to absorb knowledge in each student must be different. This will automatically have an impact on student achievement and motivation in learning (Mastura & Rustan, 2020).

As a result of online learning, students complain about a lot of assignments without adequate modules so that students complain about the educational process they experience. Moreover, the Whatsapp, e-learning, and Zoom applications are still confusing for students. How educators describe concepts in the teaching and learning process greatly influences behavior, decisions, and ways of solving problems, so that is the process of forming meaningful learning and thinking processes for students. Usually those who get education at school sometimes find it difficult to put into practice the knowledge they have acquired with cases that are intertwined in the real world, so that the knowledge possessed by students seems to be of no use in everyday life (Dedi & Mudjiran, 2020). Class X students for the 2022/2023 school year are currently students who were affected by online learning 2 years earlier, so that class X requires concrete learning and constructivism.

Constructivism is the formation of knowledge through the interpretation of knowledge possessed by data or facts. Constructivism is also learning that prioritizes learning that is real to the environment in a relevant context, prioritizes process, embeds learning in the context of social experience, and learning is carried out in

an effort to construct experience. According to Umardiyah (2020), Constructivism is a contextual basis, namely knowledge is built little by little whose results are expanded through a limited context and not suddenly. Knowledge is not a set of facts, concepts or rules that are ready to be taken and remembered, but students must construct that knowledge and give meaning to real experience.

One of the learning models based on constructivism learning is the Problem Based Learning (PBL) learning model. According to Alper (2021), the Problem Based Learning learning model is a learning model that begins with problems found in a work environment to collect and integrate new knowledge developed by students independently. In addition, according to Andriyani & Suniasih (2021) this model also focuses on student activity in solving problems. Meanwhile Lesson Study (LS) is one of the coaching efforts to improve the teaching-learning process carried out by a team of teachers or a group of teachers in a collaborative and continuous manner, in planning, implementing, observing, and at the same time reporting teaching and learning results. So that Problem Based Learning (PBL) based on Lesson Study (LS) is expected to be able to bring students in constructing their knowledge with real and meaningful experiences of students through team collaboration from educators.

Aside from the fact that these class X students are students who have been affected by the pandemic so that it is more difficult to construct knowledge, these class X students are also an implementation of the independent curriculum. The Merdeka Curriculum described by Ministry of Education and Culture (2021), focuses on essential material and the development of student competence in its phases so that students can learn more deeply, meaningfully and enjoyably, and not in a hurry. Learning is far more relevant and interactive through the development of the character and competence of the Pancasila Student profile. There are 6 dimensions of character development and competency assessment from the Pancasila Student Profile (P3), namely 1) Faith, piety to God Almighty and noble character; 2) Independent; 3) Collaborate; 4) Global diversity; 5) Critical reasoning; 6) Creative. In the independent curriculum there is also the relevance of 21st century learning. According to Yose, *et al.* (2022), 21st century learning which includes 4C skills (critical thinking, communication, collaboration, and creativity) requires students to think critically, be good at communicating, be able to collaborate and have high creativity. 21st century learning can be used by teachers later in implementing the independent learning curriculum in schools. The independent learning curriculum gives teachers the freedom to create educational and fun learning.

Covering this background and to strengthen the author's research, the author also conducted observations and interviews with biology subject teachers at SMAN 3 Jember. Observations and interviews were conducted in November 2022. The results of the observations and interviews showed that the collaborative attitude or what is commonly called the mutual cooperation attitude of students in learning biology is still low. Some of the factors that result in the low attitude of mutual cooperation (collaborative) of students are due to low learning motivation, low interest in learning biology, and the lack of activity of students in group activities. According to Helentina, Shafwan, Pulungan, & Sinaga (2017), students argue that biology subjects are boring and difficult subjects to understand, this situation will certainly cause students to be unable to absorb the subject matter properly resulting in low student learning outcomes.

Cognitive learning outcomes in biology subjects, which are measurable results from biology teachers, show that approximately 50% of students still have scores below the Learning Objectives Achievement Criteria (KKTP). According to the results of research Nurul, Hidayatussakinah, & Ratna (2023), Learning difficulties are conditions experienced by students, this has an impact on hampering students' ability to master the learning objectives that must be achieved, which will ultimately affect the quality of learning outcomes. As a result, there are obstacles in the smooth learning process. Many students repeat because they have difficulty learning academically.

Based on the problems and background mentioned above, the authors took a study entitled "Application of Lesson Study-based Problem Based Learning to Improve Mutual Cooperation and Learning Outcomes". This study aims to find out how the results of increasing students' cooperative attitudes or collaborative attitudes of students and cognitive learning outcomes in biology subjects are taught using the Lesson Study-based Problem Based Learning model.

## METHOD

The type of research conducted by researchers is using Classroom Based Action Research research. At the stage of implementing this type of research, it is carried out based on the Lesson Study method which includes three stages, namely Plan, Do, and See. The research conducted by researchers was carried out from November to January in the odd and even semesters of the 2022/2023 school year at SMAN 3 Jember with a total of 35 students. The researchers made the treatment instruments that used included teaching modules, teaching materials, learning media, and LKPD (Student Activity Sheets). The assessment instrument used by the researcher is the mutual cooperation attitude (P3) and the final learning assessment (posttest). The final assessment of learning (posttest) results are used to measure cognitive learning outcomes of students' biology subjects. The category of evaluating the mutual cooperation attitude of students, that is, if a value is obtained  $\leq 20$  means it is very poor,  $21 \leq x \leq 40$  is lacking,  $41 \leq x \leq 60$  is sufficient,  $61 \leq x \leq 80$  is good, and  $81 \leq x \leq 100$  is very good (Yuliana, Edi, & Widihastuti, 2022). In the category of assessment of students' cognitive learning outcomes, if a value of  $\leq 54$  is obtained, it means that it is very poor,  $55 \leq x \leq 59$  is lacking,  $60 \leq x \leq 75$  is sufficient,  $76 \leq x \leq 85$  is good, and  $86 \leq x \leq 100$  is very good (Cahyaningtyas, Sari, & Pradana, 2020).

Learning with the Problem Based Learning (PBL) learning model has learning steps. The learning steps of the Problem Based Learning (PBL) learning model used by researchers are 1) finding problems; 2) analyzing problems and studying issues; 3) find and report; 4) present solutions and reflect; 5) review, integrate, and evaluate (Tan, 2003). In practice there are 2 cycles in learning. In 1 learning cycle it is carried out with Plan, Do, and See activities in accordance with the Lesson Study stages. The stages of each cycle can be seen in Figure 1.

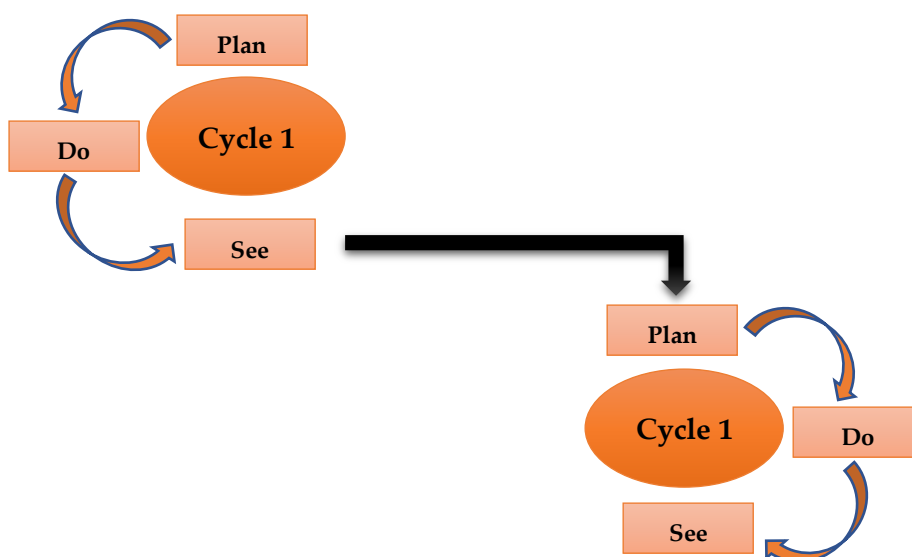


Figure 1. Lesson Study Implementation Stages in each Cycle

## RESULTS AND DISCUSSION

The results of research that has been carried out on learning biology by applying the PBL model through Lesson Study are getting good results from students. The intended result is an increase in mutual cooperation skills and student learning outcomes from cycles 1 and 2. In each cycle, the researcher evaluates the mutual cooperation attitude and cognitive learning outcomes of students in the form of a posttest. The results of the assessment are then categorized according to the predetermined value. The percentage of the number of students from the results of the assessment of mutual cooperation attitudes and cognitive learning outcomes in each cycle is seen in Table 1.

**Table 1. Results of the Percentage of the Number of Students based on the Assessment Category of Mutual Cooperation Attitudes and Learning Outcomes**

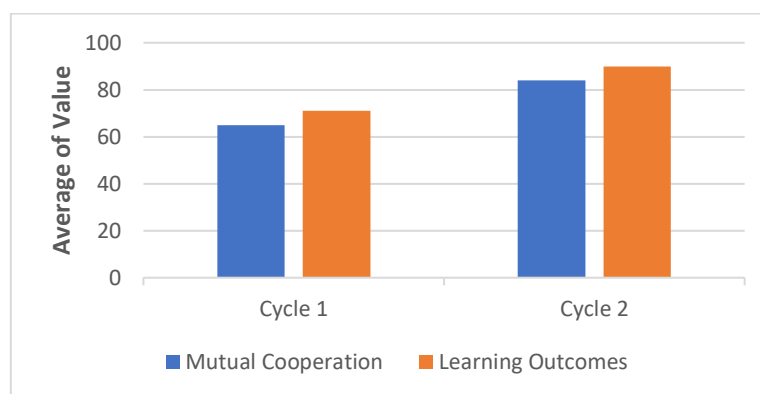
Category	Mutual Cooperation (P3)		Learning Outcomes	
	Cycle 1	Cycle 2	Cycle 1	Cycle 2
Very less	7,85%	5,75%	7,50%	2,25%
Less	7,00%	5,25%	10,05%	5,15%
Enough	18,15%	12,65%	2,45%	7,20%
Good	38,95%	40,00%	29,15%	45,25%
Very good	28,05%	36,35%	50,85%	40,15%

Based on Table 1, the results of the mutual cooperation (P3) assessment show that overall the percentage of students who get good and very good grades from cycle 1 to cycle 2 shows an increase. Likewise in the assessment of student learning outcomes as shown in Table 1, as a whole it shows a decrease in the very less category from cycle 1 to cycle 2. Meanwhile, the categories of sufficient and very good scores increase from cycle 1 to cycle 2. The value of mutual cooperation increases (P3) and student learning outcomes can be seen from the average value obtained in each cycle. The average results of mutual cooperation attitudes and student learning outcomes in each cycle can be seen in Table 2.

**Table 2. Results of the Average Value of Mutual Cooperation (P3) and Student Learning Outcomes in Each Cycle**

Average Value of Mutual Cooperation (P3)		Average Value of Learning Outcomes	
Cycle 1	Cycle 2	Cycle 1	Cycle 2
65	84	71	90

Based on Table 2, it can be seen as a whole that it can show the average value of mutual cooperation (P3) and the learning outcomes of students have increased from cycle 1 to cycle 2. In cycle 1, the average value of mutual cooperation attitude (P3) is 65, while in cycle 2 it has the increase to 84. Meanwhile, the average learning outcomes also experienced an increase in value from cycle 1, the average was 71 to 90 in cycle 2. The increase in the mean value of mutual cooperation (p3) and student learning outcomes in more detail can be seen in Figure 2.



**Figure 2. Increasing the Average Value of Mutual Cooperation (P3) and Learning Outcomes**

Based on figure 2, it shows that there is an increase in the average value of mutual cooperation (P3) with the learning outcomes of students from cycle 1 to cycle 2. This increase is due to the LS-based PBL model learning carried out by researchers during biology lessons in class. Students in their learning show different responses in each cycle.

Research conducted by researchers who act as model teachers consists of 2 cycles in learning. Cycle 1 which consisted of plan, do, and see was carried out by the researcher in implementing the LS-based PBL learning model in the classroom. At the plan cycle 1 stage, the researcher prepares and designs learning tools in the form of teaching modules, teaching materials, learning media, worksheets, and research instruments.

The plan stage was carried out by researchers together with tutor teachers and supervisors. The learning objectives designed by researchers at the plan stage in cycle 1 are to observe conventional biological technology innovations in the field of food (nata de coco) using their understanding. Furthermore, at the Do stage, there are findings of problems in the implementation of classroom learning.

The findings of the problems that occurred during the Do stage of cycle 1 were that students were still not familiar with the PBL model learning, so that there were many learning steps in the PBL model that took more than the estimated time designed by the researcher. In addition, students still do not understand in discussing and working together in solving LKPD, so there are students who are just silent and pay attention to their group mates in discussions. As for the planning carried out by researchers as model teachers who do not understand the application of differentiation learning, so that students also do not understand the division of learning activities according to their learning styles and interests in accordance with differentiation learning. Problems in cycle 1 of the Do stage resulted in the time allocation given exceeding the specified class hour limit. The findings of the problems found in the Do stage of cycle 1 will then become material for reflection in the See stage.

The See stage in Lesson Study in cycle 1 is an evaluation and solution of the problems found by researchers at the Do stage in Cycle 1. The evaluation and solutions aim to make the researcher's basis for follow-up plans in learning or cycle 2. Follow-up plans to be carried out namely planning and compiling teaching modules according to the characteristics, style, and interests of students. In activities at LKPD, it is necessary to adjust the workmanship with the allocated time so that the achievement of the mutual cooperation attitude (P3) assessment is maximized. The choice of differentiation is adjusted to the material and interests of students in processing in class. Based on the evaluation and solutions to the problems that occurred at the Do stage in Cycle 1, a follow-up plan will be carried out by researchers on learning in cycle 2.

Cycle 2 was carried out by the researcher, referring to the evaluation at the see stage in cycle 1. The learning stages in cycle 2 were the same as cycle 1, namely there were the stages of plan, do and see. In the planning stage in cycle 2, the researchers carried out together with the tutor and supervisor, namely discussing and planning learning tools to be used during learning (Do stage). The learning objectives to be achieved in cycle 2 are to identify questions and problems in making nata by looking at assumptions based on scientific research results. At the Do stage in cycle 2, students are more organized in learning, for example students already understand the PBL learning steps, so the estimated time given by the researcher does not exceed the time allotted. In addition, the differentiation learning applied by researchers in Cycle 2 is in accordance with the learning activities of students, where students are given the freedom to carry out learning activities according to their learning style, namely those who want to study articles mean students who have a visual learning style, who want to watch Learning videos are meaningful for students who have an auditory learning style, and those who want to stick to and compose puzzles mean students who have a kinesthetic learning style. The application of learning activities (process differentiation) makes students active, motivated, and happy in participating in learning. This is supported by research from Ferlianti, Mu'iz, & Chandra (2022), which states that the use of a differentiated approach can also be carried out at the high school level in science learning, where the results of the study show that the application of differentiation learning using the blended learning's station rotation method improves student learning outcomes.

The PBL learning steps used by researchers are according to Tan (2003) namely 1) finding problems; 2) analyzing problems and studying issues; 3) find and report; 4) present solutions and reflect; 5) review, integrate, and evaluate. The first stage is finding problems, namely students with learning activities or learning processes they choose to find problems with the cognitive knowledge possessed by students. At this step students are also trained to make questions related to the problem to be investigated and explored. The second stage is analyzing problems, and studying issues, namely students with the knowledge they have solve problems from the learning process they experience. In connection with issues that exist in the world and issues that exist at the national level. The third stage in the PBL model is finding and reporting, namely students are asked to explore from various learning sources and report in forums or in groups the findings found to answer questions on problems that have been discussed in groups. The fourth stage is presenting problem solutions and reflecting, namely at this stage students are expected to be able to communicate the results of group discussions with classmates so that they can be conveyed from group discussions into classroom learning. The final stage of the PBL model is that students are able to evaluate the material and learning processes during

these lesson hours so that later learning evaluation materials and discussions are made at the next meeting. PBL learning activities can train students to be active in working together in groups. This was assessed by researchers in the Pancasila Student Profile (P3), namely the attitude of mutual cooperation in group discussions. It is supported by research from Naila, Bambang, & Firosalia, (2018), which says that the problem-based learning model can improve student cooperation and thematic learning outcomes.

Learning in cycles 1 and 2 as a whole gets a positive response and improvement from students. The response is from an increase in the average results of mutual cooperation (P3) and student learning outcomes. This increase proves that the Lesson Study-based PBL learning model is effective for improving mutual cooperation attitudes and student learning outcomes. These findings can be a choice of educators in a variety of classroom learning.

## CONCLUSION

Learning using Lesson Study-based PBL through the research conducted has proven to be capable of improving mutual cooperation (P3) attitudes and students' biology learning outcomes. Improved mutual cooperation attitude (P3) can be seen from cycle 1 with an average score of 65 and cycle 2 with an average score of 84. Improved student learning outcomes in biology subjects in cycle 1 with an average score of 71 and in cycle 2 with an average score of 90. So, it is hoped that educators can apply Lesson Study-based PBL as an option in learning biology. In further research, researchers should also assess the attitude of the Pancasila Student Profile in addition to mutual cooperation, so that the attitude skills possessed by students are explored.

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