

Enhancing Communication Capabilities in Discussion as an Effort to Improve Learning Outcomes: Implementing Lesson Study in Basic Chemistry Class

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Abstract—This study is a quasi-experimental study that aims to determine the effect of increasing student communication skills in discussing students' learning outcomes in basic chemistry learning. The indicators of student discussion skills include: (1) conveying messages well, (2) using clear language, (3) expressing opinions clearly, (4) listening to his friends' opinions carefully, and (5) responding to his friends' opinions. The communication skills in the discussion were observed in each learning process that lasted for 14 meetings. Learning is designed using the principle of Lesson Study in applying learning models that have been used by the researcher. The results showed that the improvement of students' communication skills in discussing has a significant effect on students' learning outcomes.

Keywords—*lesson study, communication skills, basic chemistry teaching*

I. INTRODUCTION

The quality learning process is capital for the achievement of quality education. Therefore, improving the quality of the learning process is always sought, either by the government or by the teacher. Teachers as the spearhead of the learning process play a very important in creating quality learning. Teachers have a moral responsibility creation of quality learning process. Whereas a quality learning process will bring students a learning spirit, learning motivation, and ultimately improve student learning outcomes.

Teachers who are aware of their responsibility in creating a quality learning process will always try, and the innovate in guiding their students learn. Innovation can be a method of learning, the learning models and approaches vary, between one object to the other object. However, the use of methods, models, and approaches in the learning process should be made earlier, so the students learn. It depends on how teachers apply the learning method, model or approach.

The lesson Study which has been used by teachers of Japan for many years in teaching their students can be a good alternative to the application of teaching methods, learning model and the approach used in the learning process. Lesson Study, which looked at the students have the same rights in the study, making teachers always pay attention to their students in learning. The teacher will observe students when they learn and why they do not learn. The entire activity of students in the learning process becomes the center of

attention of teachers [1]–[3]. Thus, by observing the activity during the learning process, teachers will improve or enhance the learning process. In other words, teachers innovating in the process of learning through observation of students while studying.

The innovations that teachers do not individually, but collectively with other teachers learning innovation is based on the observation of students while studying in the classroom, which is also carried along as well. Thus, students learn through observation of the teacher can build collegiality to solve shared problems faced by students. This makes teachers learn together also in innovating learning, which in turn can improve student achievement. Lesson study as stated [2], [4] also had a great opportunity to improve the learning of mathematics and science today. Teachers can benefit started to increase knowledge about the subject matter, increase knowledge about teaching, and improve the ability to observe students, collegiality strong network, the stronger relationship of daily practice for long-term goals, motivation and a sense of high efficacy, and quality improvement lesson plans are available. The authors conclude that the lesson study not only increases learning, more than that, challenging teachers to improve their classroom learning process [2].

Student of Chemistry Department, Chemical Education Study Program, in particular, is obliged to have the skills to innovate through the learning process. This is because they will become a chemistry teacher after completing his studies. They are expected to have the competence to deliver and implement the learning process. Also, they also must have the professionalism to become a chemistry teacher. Who has not only concerning applying the method of teaching or learning models, but also professionals in their fields namely, chemistry? They must truly understand the chemistry materials that easily pass it on to students when to be a teacher.

Based on the experience of researchers in support of this course in the last three years, is still found some problems in the learning process so that the results obtained are also not maximized. From identification of problems, among others, can be revealed that: (1) Activities to learn some students still low, (2) Some students still have difficulty in understanding the concept and the material properly, (3)

Students generally do not have the communication skills in discussions.

These problems inspired the researcher team to overcome the problem of student learning in class. Students need to be actively trained in expressing their opinions based on their understanding of subject matter. In this case, students must have communication skills in discussing the subject matter. Also, students need to be familiar with being a good listener in the class discussion process. This can be accomplished in learning using Lesson Study, as revealed by [5] that by applying the Macro Teaching and Lesson Study Model (MTLS) models can create a more effective learning atmosphere for students. The same thing was revealed by [6], Lesson Study to build pedagogical knowledge and improve the learning process.

Based on the background above, then the formulation of the problem of this research is "How to improve students' communication skills in the discussion as an effort to improve student learning outcomes."

II. METHOD

This research is a quasi-experimental study that aims to determine the effect of students' communication improving skills in discussing student learning outcomes in basic chemistry learning. The study was conducted on 29 students of the chemistry education study program ICP class enrolled in the 2017/2018 school year and programmed the continued Basic chemistry courses.

The study lasted for eight months, from January to August 2018. The research was carried out through a joint study of problems in chemistry learning, especially basic chemistry and advanced basic chemistry that occurred in learning so far. Next, the research team together design the learning that will be carried out. The core of this study is implementing learning in the classroom by a lecturer and observed by the observer. The observation results from the Learning process are analyzed collaboratively by the research team to plan further learning. And so on until the learning process is completed in one semester. This process is carried out cyclically as the steps for implementing Lesson Study, Plan Do and See [7], [8].

It was 14 learning meetings. Pre-tests were conducted to determine students' initial abilities in basic chemistry, especially chemistry material in high school. The discussion process in Learning begins with the topic of discussion by the model lecturer who is the material covered in the Advanced Chemistry course. Observer observes students' activeness in discussing and recording them on observation sheets that contain indicators of observance of communication skills in the discussion. In the middle and end of the semester-test are conducted as a Mid-Semester Examination (MSE) and Final Semester Examination (FSE).

Observation is used to measure students' activities in the discussion were analyzed descriptively to see the improvement of students' discussion skills during the learning process which lasted for 14 meetings. While the results of the Pre-test, MSE, and FSE were analyzed for knowing the differences from Pre-test to MSE as N-gain 1 (g1) and from MSE to FSE as N-gain 2 (g2) to see students' increase skill in the discussion. Furthermore, the t-test is used to analyze the effect of increasing communication skills in

discussing Basic Chemistry learning by using Pre-test - post-test only group design:

O1.....X.....O2.....X.....O3

III. RESULT AND DISCUSSION

A. Result

Observations of student discussion activities conducted at each meeting during the learning process showed an increase in students' discussion skills in the discussion form. This increase in ability is indicated by an increase in each indicator of the communication ability observed. The indicators of the ability of discussion observed include [9]: a. Send a message well, b. Use of clear language, c. Express opinions clearly, d. Listen carefully to the opinions of his friends and e. Respond to his friend's opinion. In full, the improvements are illustrated in Figure 1.

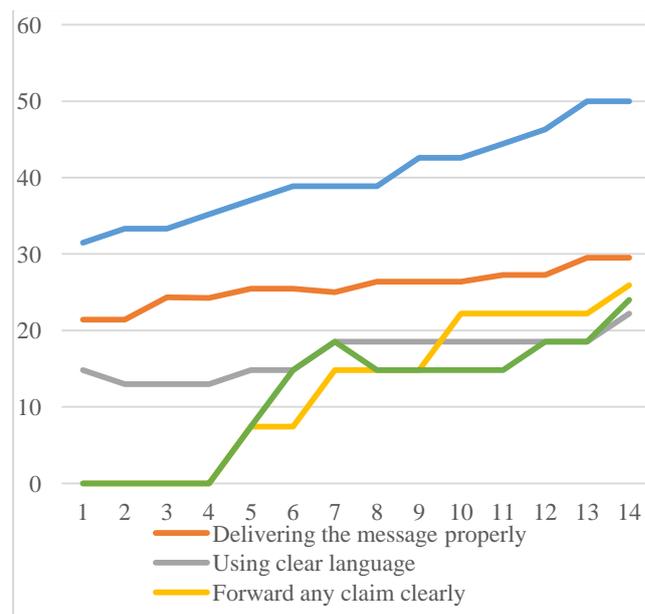


Fig. 1. Graph of The Improvement Students' Communication Skill in Discussion through Application of lesson study in Learning

The percentage of indicators of communication skills in discussions and the effect of increasing student learning outcomes can be seen in Table 1.

TABLE I. COMMUNICATION SKILLS AND LEARNING OUTCOMES OF STUDENTS

No.	Aspects of assessment	Description	Results of Assessment
1.	The Improving Students' communication skills in discussions	Students' communication skills are observed at each meeting and getting the average of the achievement of each indicator of communication skills	1. Delivering the message properly = 25.72 % 2. Using clear language = 16.80 % 3. Forward any claim clearly = 12.44% 4. Listen carefully to his opinion = 40.22 % 5. Responding to his opinion = 11.50%

TABLE II. TABLE I, CONT.

No.	Aspects of assessment	Description	Results of Assessment
2	The Influence of Improving Communication Skill in discussion towards Students' Learning Outcomes	The difference in the value of the average student at the midterm exam and final exam in terms of cognitive abilities	1. Average score of: MSE = 52,97 and FSE = 82,83 2. The Increase in the average score of students after learning Basic Chemistry by 37% 3. The significance value of t-test is $0.001 < 0.05$

B. Discussion

This research that was designed to determine the effect of increased communication skills towards students' learning outcomes carried out through Basic Chemistry Learning by applying the lesson study principles. The result that shows improvement as long the learning meeting proceeds (figure 1). It is made possible by (1) observation of students' discussion activities at each learning meeting, (2) reflection at the end of each learning meeting conducted by the teaching team of this course which aims to improve the learning process it has taken place through the designing the next learning process. This activity is carried out continuously together by the teaching team of this course as a cycle in the form of planning, implementation and observation, and reflection. This activity is related to Lesson study [3], [10]–[13].

Improved communication skills shown in Figure 1 affect improving student learning outcomes by 37% (Table 1). The minimum value that has been determined that is, a score of 65 to meet the standard to pass with a C value on this course has been exceeded after Learning process, which is from an average score of 52.97 to 82.83. This increased significance based on hypothesis testing obtained a value smaller than $\alpha = 0.05$ which means that communication skills in discussing have a significant effect on student learning outcomes. It is possible because the learning process encourages students to always play a role, especially in the discussion process. The part of a student who is still active in the learning process is one of the learning objectives with the lesson study model.

Lesson Study Model that was done in this study has been carried out by the Japanese education system since the 1900s. However, it was not until 1999 that Stigler and Hiebert explained the Lesson Study extensively in his book "The Teaching Gap" [14]. Lesson Study is the approach used to research classroom teaching. This approach can explore the development of a teaching model that is more meaningful because it emphasizes the teaching process. By the results of this study, communication skills are increasing from the first meeting of the learning process to the final process of learning. It happened by reflection at the end of the meeting by the research team to improve the next learning process. Exploration of the teaching process is in the form of learning studies [15] and systematically through teaching observation [16]. Lesson Study is a continuation of collaboration and teaching methods that have their characteristics [17].

Lesson Study can improve teacher learning experiences that have an impact on improving their teaching. Teacher learning experiences include teacher's knowledge of content (knowledge content) and knowledge of teaching methods (pedagogical knowledge), which must be built and produced

from observations and reflections of teaching practices [1], [18]. It also does not exclude students' interest in the learning process. Evaluation and reflection of each lesson not only focuses on the teacher but also on developing student learning. The teacher observes students' learning abilities and intelligence [1], [19]. It helps the teacher plan lessons carefully to suit the needs of students.

Communication skills built during the learning process also have an impact on student learning outcomes. The things conveyed by students are the result of an understanding of learning material that is communicated in the discussion process. A person cannot express his opinion if he does not understand well [20]. It is also in line with what has been reported that Lesson Study enhances the creativity and critical thinking skills of prospective teachers [21], especially when analyzing the depth of learning, stimulating innovation, and reforming the learning process.

IV. CONCLUSION

The students' communication skills in the discussion that were built through the application of lesson study in the learning process shown increased about the length of the learning process meeting. Also, the increasing communication skills in discussions also influence students' learning outcomes on Basic Chemistry.

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