Implementation of Lesson Study and Problem Based Learning Model on Mathematics Learning Independence

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Abstract
The learning independence of students is still low as the background of the implementation of this research. The purpose of this research is to describe the independence of students using Lesson study and Problem Based Learning models in mathematics learning. This type of research is descriptive research. The population is all students of class VIII of Junior High School Pertiwi 2 Padang in 2019/2020. Sampling was done by purposive sampling and determined class VIII-2. The research instruments were the learning independence questionnaire and the Lesson Study observation sheet. Analysis of learning independence data is described based on the results of the pretest and protest scores. The Lesson Study was carried out in 4 rounds using the Problem Based Learning model which included Plan, do, and See activities. The results showed that there was an increase in students’ learning independence through the implementation of Lesson study with the Problem Based Learning model.

Keywords: Lesson Study, Problem Based Learning, Learning Independence Study


INTRODUCTION

Fields that have an important role in the development of science and technology one of them is mathematics. Special features are not simple math as science is abstract, deductive, consistent, hierarchical and logical cause difficult to study mathematics and eventually many learners are less interested in mathematics.

The important thing from the education process is the learning activity which is the process of interaction between the teacher and students. The world of education has begun to make changes to improve the education system. Teachers are no longer a center of information and students become active in activities learning. The teacher who is creative in designing learning activities will make learning active.

The teacher’s activities in learning are (1) compiling plans learning; (2) implementation of learning activities; (3) evaluating learning. Develop a learning plan, which is an activity to prepare
learning which includes preparing a Learning Implementation Plan (RPP), determining the Minimum Mastery Criteria (KKM) and preparing a means to support learning.

Learning activities should be designed to ensure that the students are at the forefront of learning activities or student-centered (Arif, 2015; Husamah), to be more creative in creating a conducive class (Shettino, 2016; Yusof, Hasan, Jamaludin & Harun, 2012), and later on to produce meaningful learning (Chiang & Lee, 2016; Haridza & Irving, 2017; Winarso, 2014), which in this case is to develop creative thinking skill and problem solving skill.

Based on observations on 15 March 2019 in class VII of Junior High School Pertiwi 2 Padang, the applicable curriculum is Curriculum 2013 (K-13). The scientific approach has been used by the teacher in the learning process but has not been implemented well. In learning activities, teachers still dominate, while students look passive and do not understand the teacher's explanation. If the learning material the teacher described is not understood, learners do not want to issue an opinion and less active.

The results of interviews with grade VII teachers Junior High School Pertiwi 2 Padang found that during the mathematics learning process the teacher had tried to make scientific learning run well, but in the implementation, it was constrained by the habits of students who still liked to receive the full material from the teacher. Students do not want to ask the teacher about material that is not yet understood and the question is only answered by students with high ability. The teacher has involved students in the learning process such as question and answer that is done after explaining the learning material, but students who respond to questions from the teacher are only a few. During the learning process, students are sometimes still ashamed to show activeness, because if it is felt that it is not correct the students are afraid to answer. Two to three students are quite active, the best wishes to try to answer teacher questions have not yet emerged from students. This shows the independence of learning mathematics students are still lacking and the need for further improvement. According to Rahmi (2016), learning independence is the willingness and effort of students to learn and achieve learning goals by planning their learning activities.

The results of interviews conducted with students of class VII Junior High School Pertiwi 2 Padang found that mathematics is a difficult lesson to do because it is always connected with formulas and numbers. Learners are afraid to ask about material that is not yet understood by the teacher, with various reasons such as feeling embarrassed or afraid of the question being asked wrong.

The focus of attention on the learning process is the activities of students. Learners are passive, less independent, and less daring to express their opinions is the need for improvement to create a pleasant learning environment Yag and make the learning process of students into the spirit. One of the activities is to improve the learning process by applying Lesson study and models Problem Based Learning.

Lesson Study is a teacher professional method developed in Japan as Juyokenkyuu. The term Lesson Study was coined by Makoto Yoshida to develop teacher professionals in Japan by investigating or testing teaching practices to be more effective.

Lesson study according to Supranoto (2016) is a model of educating professional development through collaborative and sustainable learning studies based on the principles of collegiality and mutual learning to build a learning community. Besides, Susilo (2011) state that Lesson study is a collaborative process in a group of teachers when identifying learning problems, designing a learning scenario. It can be concluded that lesson study is a learning model in improving
educator professionalism that is carried out together in order to realize the performance of educators in a better direction. Own lesson study is not a learning method or strategy but lesson study activities can apply learning methods or strategies that are appropriate to the situation, conditions, and problems faced by educators.

According to Rismawati (2017), Lesson study has a role in developing teacher professionalism, namely (1) the existence of collaborative teachers in designing learning, (2) the behavior of students can be studied carefully during the process learning by teachers, (3) Learning can be studied and well developed by the teacher, (4) the subject matter taught can be deepened by the teacher, (5) the teacher is constantly working to develop and improve learning strategies, (6) gives the opportunity for teachers to see the results of their learning through the eyes of students and colleagues.

According to Mulyana, S. in Putri (2012), Lesson Study is a teacher activity carried out collaboratively and continuously by building communities learning to study learning activities. Lesson Study activities carried out consist of 3 stages, namely the planning phase (Plan), the implementation phase (Do), and the phase reflection (See)

The Planning Stage (Plan), teachers and educators together with the head of department and officials of the local education office or related parties hold several workshops which aims: (1) to identify the teaching and learning strategies used and then identify how they can be improved; (2) to design and develop teaching models (lesson plans, worksheets student, teaching materials, assessment strategies and classroom settings); and (3) to try out the developed teaching material.

The Implementation Stage (Do), also referred to as "open learning", one teacher, or referred to as a "model teacher", perform planned lessons by applying teaching models developed in the classroom, while teacher educators, other teachers, and prospective teachers observe the lessons. The focus of observation is the activities of students, such as student-student interaction, student-teacher, and interaction between students and teaching materials.

Phase Reflection (See), teachers and observers met for post-class discussion to reflect on the lessons. Observers provide comments and suggestions on possible improvements for future lessons. According to Putri (2012), stage reflection is a very important stage in lesson study activities because at this stage lesson study participants will conduct discussions to improve the process next learning by referring to the learning activities that have been carried out.

The Problem Based Learning Model is one alternative to learning mathematics that might lead to an increase in learning independence in maximum because through Problem Based Learning students are presented with problems related to daily life to be actively involved in finding solutions. These problems are presented in the discussion sheet that is distributed to each group. "The Problem Based Learning Model prepares students to think critically and analytically, to find and use appropriate learning resources (Amir, 2010: 21 in Widodo, 2013). Based on the description above, a study was conducted under the title "Implementation of Lesson Study and Problem Based Learning Model on Mathematics Learning Independence".

METHODS

The research method used is descriptive research with the instrument research is a learning independence questionnaire and observation sheet Lesson Study. The questionnaire used to measure learning independence was adopted from Haerudin (2014) in Hendriana et al (2017) which
was distributed to all students before and after the learning process. The research sample was students of class VIII.2 Junior High School Pertwi 2 Padang.

The study was conducted in 4 meetings with data collection techniques consisting of a tri-phase Lesson study conducted collaboratively namely planning (Plan), implementation (Do), and reflection (See).

RESULTS AND DISCUSSION

The implementation of the Lesson Study was conducted in 4 meetings. The implementation of lesson study in this study was carried out in collaboration with teachers mathematics subject from Junior High School Pertwi 2 Padang. The lesson study group in this study amounted to three people, consisting of two teachers in mathematics Junior High School Pertwi 2 Padang who acted as observers and researchers themselves who would act as model teachers. This research was conducted in three stages of lesson study, namely, planning (plan), implementation (do), and reflection (see) that is sustainable by applying the model Problem Based Learning.

According to Huang (2008), Problem Based learning is curriculum that plans learning to achieve instructional. Meanwhile, According to Kwan (2009) that PBL is an instructional method that challenges students to learn to learn, work together in groups to find solutions to real problems. The problem is used to link curiosity and analysis of learners and initiatives on subject matter. Problem Based Learning prepares students to think critically and analytically and to find and use appropriate learning resources (fakhriyah, 2014). Problem Based Learning process begins by dividing students into groups and giving problems into the group.

According to Rahayu (2002), the learning model Problem Based Learning can train and stimulate students to think, solve problems, be able to answer questions, add and understand student knowledge, and make joint decisions verbally. According to Suyanto (2008) PBL helps students develop their skills in giving reasons and thinking when they are looking for data or information to get solutions to solve problems. But in reality there are still many students who are not yet good at oral communication, so their verbal communication skills are not good enough. Low communication skills can be improved through Problem Based Learning. According to Bernard (2015) communication skills must be possessed so that students can understand the problems given and express solutions to problems not just ideas to draw conclusions about reasoning abilities, and provide arguments for ideas expressed. These communication skills can be improved through the learning process in the classroom. The learning process in the classroom can be improved in quality through Lesson Study Sudrajat (2017). Students are expected to have skills through activities lesson study including the ability to communicate, both orally and in writing.

Independence of students learning mathematics can be seen from the questionnaire distributed before and after the implementation of Lesson Study with the Problem Based model Learning. The independence of students studying mathematics questionnaire was given to 26 students. The independence questionnaire consisted of 28 statements with 8 indicators consisting of positive and negative statements.

Indicator 1 states the initiative of students in learning is in statements 1-5. Indicator 2 states that the preparation of students’ learning needs is found in statements 5-8. Indicator 3 states that setting targets/learning objectives are in statements 9-12. Indicator 4 states that seeing adversity as a challenge is found in statements 13-16. Indicator 5 states that utilizing and searching for relevant
sources is contained in statements 17-18. Indicator 6 states selecting and implementing learning strategies found in statements 19-20. Indicator 7 states that evaluating the process and learning outcomes are in statements 21-23. Indicator 8 states the self-concept is in statements 24-28. In detail, the number of initial scores and final scores obtained by students can be seen in Table 1.

Table 1. Analysis of Pre-Test and Post-Test Questionnaire Based on the Indicators of Student Learning Independence

<table>
<thead>
<tr>
<th>Independence Indicators</th>
<th>Scores Max</th>
<th>Initial Questionnaire Score</th>
<th>Presentation (%)</th>
<th>Final Questionnaire Score</th>
<th>Presentation (%)</th>
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<tbody>
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<td>59</td>
<td>365</td>
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<td>300</td>
<td>59</td>
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</tbody>
</table>

Percentage graph chart Percentage Score Pre-Test and Post-Test Questionnaire can be seen in Figure 1.

Figure 1. Pre-Test and Post-Test Questionnaire Analysis Indicators of Based on the Mathematics Learning Independence

Based on Figure 1 it appears that there is an increase in learning independence mathematics students for each indicator. The first indicator is the initiative of students in learning, the initial score obtained is 59% and the final score obtained is 70%, from the percentage of scores obtained there is an increase of 11%. Carl R. Rogers in Rachmahana (2008) states with their initiative learning will be
more meaningful and can focus students' attention both in the process and learning outcomes, and can provide motivation for students to become free and believe in themselves by feeling involved in the study. From this statement, it can be concluded that learning by own initiative is based on the wishes of the students themselves to learn. However, the reality that occurs in the field of students is only silence when experiencing difficulties in learning and has not tried to express the opinions he has in learning, the sourcebooks used by students also do not exist or are rarely brought during lessons.

The second indicator is preparing learning needs, the initial score obtained is 64% and the final score obtained is 74%, from the percentage of scores obtained there is an increase of 10%. In indicator 2 it can be seen from students not preparing learning equipment before learning mathematics such as printed books to support learning that causes students to be confused in choosing the material to be studied and consequently in doing students' assignments they are less helped to understand the material being learned. This was also stated in a study conducted by Mulyani (2013), that readiness in learning can respond to the situation at hand through its way. But in reality, students are less prepared for learning.

The third indicator is setting targets/learning objectives, the initial score obtained is 60% and the final score obtained is 70%, from the percentage of scores obtained there is an increase of 10%. Based on observations, students will be excited when they know the form of learning applications in everyday life, this is related to set learning goals that will be achieved by students. When students have conveyed the importance of learning material in front of the class by displaying pictures in daily life, students become eager to move forward and try to find other examples of the application of the material in everyday life. Surya (2013: 4) said that one of the factors causing the difficulty to learn is that students do not know how to understand the meaning to be learned, students cannot see the importance of the material being learned to be applied in daily life, as a result, students have no target/purpose in learning. Based on this, the teacher has an important role in learning, by conveying the material being studied and guiding students to be able to apply it in daily life to make students enthusiastic in learning.

The fourth indicator is looking at difficulty as a challenge, the initial score obtained is 57% and the final score obtained is 66%, from the percentage of scores obtained there is an increase of 9%. Based on observations, at the first meeting of learning most students do not want to ask their friends if there are difficulties in learning. As a result, many of the students who are still confused answer sheet distributed discussion, learners prefer to ask teachers or silence if they feel unable to do pieces of discussion that make cooperation among learners are not visible anymore. Based on the expected learning objectives, students can work well together in their groups, after a number of stages of See in Lesson Study to find a solution, students can finally work together with their group friends and want to ask if there are problems that are not understood, this in accordance with the benefits of Lesson Study students are expected to be able to help their friends if they have difficulty with the beginning of the sentence asking for help. Increasing the desire of students to work together in groups, making the learning atmosphere more conducive, students not only rely on the teacher in learning but also their peers. The improvement experienced by students on the fourth indicator can be felt by the teacher from the increasing learning outcomes of students' mathematics. Following what Johnsons (1974) stated in Suryani (2010) that good learning outcomes can be obtained by way of students facing each other and helping each other in achieving learning goals.

The fifth indicator is utilizing and searching for relevant sources, the score initial obtained is 45% and the final score obtained is 62%, from the percentage of scores obtained there is an increase
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of 17%. This indicator has the highest percentage increase of all indicators. Research conducted by Nur (2012) states that the use of learning resources overall can improve student learning outcomes. However, based on observations, at the first and second meetings of learning students prefer to solve existing problems by waiting for answers from friends before looking for themselves in the existing sourcebook. At the meetings third and fourth, students were seen to start looking for answers by looking at the existing sourcebooks. According to Rahmi (2016), learning independence can be improved by having adequate learning resources in the form of textbooks to be able to find information about the material being studied. The Junior High School Pertiwi 2 Padang has provided resource books to support learning activities and distribute them to each student. However, students who have sourcebooks rarely bring their books, because they feel bored when reading existing sourcebooks so they prefer to see their friends, this proves that interesting sourcebooks can arouse interest in learning from students, so students can understand the material well with the help of existing sourcebooks. Other sources available at school are LKS, LKS has not been obtained by all students because there must be payment of fees in advance. Even though the material is more detailed and can be easily understood by students is in the worksheet. However, seen from the changes in behavior that occur in students make the fifth indicator has the highest increase of 17%. Even though Indicator 5 has the highest increase, if seen from the percentage of the pre-test questionnaire, indicator 5 has the lowest percentage of independence among the other indicators.

The sixth indicator is choosing and implementing a learning strategy, the initial score obtained is 61% and the final score obtained is 69%, from the percentage of scores obtained there is an increase of 8%. The sixth indicator has an increase in the lowest percentage scores of all indicators. Zimmerman and Martinez Pons (1986) in Latipah (2010) suggested that in the learning process, students who are aware, have a sense of responsibility, and know-how to learn themselves can get good learning achievement. But based on observations, students are not too concerned with mathematics learning strategies or their ways of own learning to be able to understand the learning material. Students receive more from friends or teachers without having to search first in their way own, students do not have the responsibility in completing tasks given and seen at the first meeting, only a few groups discuss to complete the discussion sheet.

The seventh indicator is evaluating the process and learning outcomes, the initial score obtained is 61% and the final score obtained is 70%, from the percentage of scores obtained there is an increase of 9%. Based on observations, students become more likely to move forward if it is mentioned that there is an additional value, from this it appears students pay attention to the value of mathematics to be better.

The eighth indicator is self-concept, the initial score obtained is 59% and the final score obtained is 67%, from the percentage of scores obtained there is an increase of 9%. Research conducted by Dwija (2008) suggests that self-concepts can influence student learning outcomes. Based on observations, students are less concentrated in learning as evidenced from the many students who are doing other activities besides learning, students are also nervous about expressing opinions or answers about problems that are asked either by the teacher or fellow students so that most participants experience difficulties in the learning process.

The overall initial score obtained in the student self-study questionnaire was 59% and the final score obtained in the student self-study questionnaire was 69%, from the percentage of scores obtained there was an increase of 10%. Based on the discussion of an increase in learning independence students', this is influenced by the syntax of the Problem Based Learning model in the
stage guiding of individual / group experiences, where students are asked to gather the information that is by existing problems. This shows students are trying to solve the problems found on the discussion sheet in the group, even though there are among those problems that seem difficult.

The discussion above shows the independence of learning mathematics students has increased in each indicator. This increase is caused by problem-solving that takes place during the learning process in the model Problem Based Learning that challenges the ability of students. And assisted by teacher collaboration in solving problems that exist during the process of learning. Lesson study activities enable teachers to work together to solve problems during the learning process (Stage See) and can find solutions to students' problems to plan for the next meeting (Plan Phase), to create a learning atmosphere pleasant which can increase independence learners.

CONCLUSION

Based on the results of the research obtained, it can be concluded that the implementation of Lesson Study and the Model Problem Based Learning can improve the learning independence with the early score in the student learning independence Questionnaire is 59% and the final score in the student learning independence questionnaire is 69%, the result of percentage of score obtained there was an increase of 10% in class VIII.2 Junior High School Pertiwi 2 Padang.

REFERENCES


