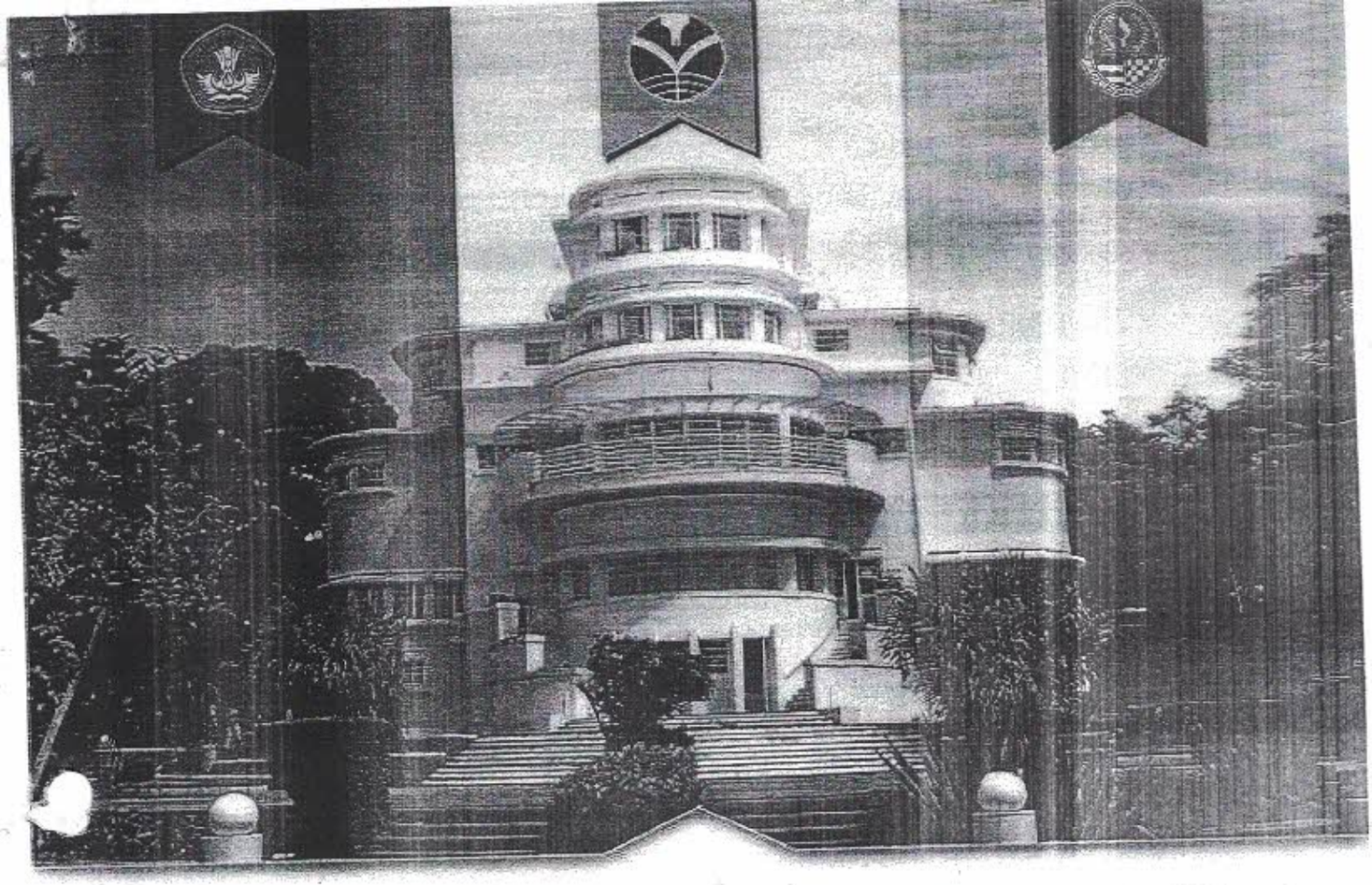

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Implementation of Lesson Study In Enhancing of Student Learning Activeness On The Discreet Mathematics Subject In Mathematics Education Study Program of Ahmad Dahlan University

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Abstract: The learning that implemented by lecturers tend to use conventional method so that the result is student activeness be less. The aim of this article is to know the enhancing of student learning activeness on discreet mathematics subject through lesson study. In the observation of student learning activeness, technique of collecting data used observation technique and the instrument was observation sheet of students' activeness. The participants of lesson study were students of mathematics education study program at class D of semester 7 amount 56 students. This lesson study was implemented for 4 cycles with 4 meetings. The implementation of lesson study engaged all lecturers in mathematics education study program as model lecturer and the others as observers. Based on analysis of observation sheet of student learning activeness was obtained that lesson study with problem based-learning (PBL) implementation can enhance the student learning activeness. It can be seen from the percentage of activeness on 1st cycle was 57.35 %, 2nd cycle was 61.67%, 3rd cycle was 59.92 % and the last cycle was 67.75%. This shown that the criteria of student learning activeness on each cycle were in good criteria.

Keywords: Lesson study, Problem based learning, learning activeness

1 INTRODUCTION

Education is an aspect that contributes to build the human in the good quality. Improving the quality of education is absolutely the responsibility of all parties. The government through the Directorate General of Higher Education (DIKTI) always works to improve the quality of education in Indonesia. One of the efforts made by DIKTI is to provide Lesson Study (LS) grants on some LPTK under its ministry. One of LPTK's of LS grantee is Ahmad Dahlan University (UAD) for the period 2011-2014 with the executing is department of math and science education that includes math education, biology education, and physics education.

In the mathematics education study program of UAD, lesson study activity in odd semester in the academic year of 2013/2014 applied to discrete mathematics subject which is a compulsory subject with 2 credits. The problem that will be solved in the implementation of LS on discrete mathematics subjects was the lack of students' activeness in the lectures activities. Based on observations and discussions with colleague who teach discrete mathematics subject, the problem should be sought immediately the solution were (1) a lack of interaction between students and students to lecturer, (2) lack of student courage to express their opinions, (3) the passive students during lectures, (4) most of the students silent and did not respond to lecturer's question, (5) students were not active to ask to either the lecturer or their friends if there were material that has not been well understood. Through lesson study in discrete mathematics subject was expected there would be improvement in the quality of learning, including the student activeness and their learning outcomes as in the research of Triandani et al (2013). Since LS is a good momentum for lecturers to discuss making improvements of learning.

Beginning from those problems then the lecturers of mathematics education through lesson study activity tried to make the active learning with students as a learning center. It was chosen Problem-based learning approach because this approach is in accordance with both of the conditions of the students and the material of the subject. Problem-based learning according to the Vernon and Blake in Sockalingam (2010) propose that PBL is an instructional approach that uses problems as a context for the student to acquire both problem-solving skills and knowledge. Meanwhile, according to Graff and Kolmos (2003) Problem-based learning is an educational approach whereby the problem is the starting point of the learning process. Thus the problem-based learning can be understood as a learning approach that is characterized by the giving of the problems as a stimulus for students to practice critical thinking and problem solving skills. Problems

that used can be raised either from students or lecturers. The characteristics of problem-based learning are: (1) learning begins with a problem, (2) ensure that the problems are related to the student's real world, (3) organize lessons around each problem, not around each discipline, (4) gives a great responsibility to the learners in forming and running their own learning process directly, (5) use of small groups, and (6) requires learners to demonstrate what they have learned in the form of a product or performance.

Lesson study (LS), in Japanese called the jugyou kenkyuu, is an approach to make improvements of learning in Japanese. The improvements of learning are done through processes of collaboration among teachers (Santyasa, 2009). The implementation of lesson study in the lecture can develop the professionalism of lecturers. This is because the continuous of LS will provide eight opportunities for lecturers (model and observer) which relate closely to the lecturer's professional development, namely (1) determining learning objectives that match the needs of the student, (2) reviewing and enhancing learning that are beneficial to students, (3) deepening the knowledge of the learning material presented by the lecturer, (4) determining the long-term goals to be achieved by students, (5) planning collaborative learning, (6) analyzing both of the learning process and student behavior carefully, (7) developing a reliable knowledge of learning, and (8) reflecting on their learning implementation based on the development of both students and colleagues. There are three phases of the lesson study. They are planning (plan), implementation (do) and reflection (see).

Activeness according to Asnawi (2011) is in the process of learning occurs atmosphere so that students actively asking a questions and expressing an opinions. Meanwhile, according to Sriyono (1992), activeness is at the time a teachers teach, they must manage so that their students be active physically and spiritually. Learning is an active process of students to form the knowledge. According to some experts quoted Sardiman (2012,) about learning definition such as; 1) Cronbach provided a definition: Learning is shown by the change in behaviors as the result of experience, 2) Harold Spears said Learning is to is observed to read, to imitate, to try something themselves, to listen, to follow direction, 3) Geoch said learning is a change in performance as a result of practice. Also according Sardiman (2012) learning is a changing in behavior or appearance, with a series of activities for example by reading, watching, listening, imitating etc. So learning can be understood as a change in the behavior of individuals towards a better life. Activeness of learning occurs in all learning activities are incarnated in the form of listening, discussion, solving a problem and giving an opinion. Thus it can be understood that the student learning activeness is a learning activity in which students engaged actively in discussions, ask a questions, answer a questions and express opinions.

Active learning is a learning that provides learning opportunities itself or doing their own activities. Active learning activities according to Asnawi (2011),, among others, are: experience, interaction, communication and reflection. Student activeness during the learning can be seen from: (a) The enthusiasm of students in the joining of learning (b). Student interaction with lecturer, (c) the interaction among students (d) Collaboration of group (e) Activities of students in the group, and (f) Students' participation in the concluding the result of discussion.

2 METHODS

Lesson Study activity in order to enhance the learning activeness of students in discrete mathematics subject with a problem-based learning approach in the Mathematics Education Program Study involved 18 lecturers in the mathematics education program study who acted as one model and 17 observers. Therefore special on Tuesday have agreed no mathematics education's lecturer who teach except a lecturer who appointed a lecturer models, so that all lecturers can participate actively in the implementation of Lesson Study. Lesson study participants were students of Mathematics Education 7th semester grade D with number 56 students. Activity of lesson study was carried out 4 times of meeting where at each meeting includes plan, do, see phase.

In the plan phase, all the lecturers involved in the lesson study discussed to identify learning problems, design a learning device that includes lesson plan, student worksheet and the observation sheet. The observation sheet was used to observe the student learning activeness. The next phase was the do phase do. At this phase, the lecturer models did her learning while observers observed learning process, especially the student learning activeness. The last phase is see phase, at this phase all of the lecturers involved in the lesson study gathered to reflect on the implementation of learning and the observation of the students that took place during the do phase. The result at this phase was used as a material of improvement in the planning of plan phase for the next meeting.

The data of student activeness obtained using the observation sheet then analyzed by quantitative descriptive method to determine a criteria of the student learning activeness level after implementation of LS. Observation sheet that prepared Guttamen scale form by category options "yes" and "no" with the meaning of percentage for good categories if the score is more than 50, enough categories if the score equal

to 50 and the less category if the score is less than 50 (Sugiyono, 2012) Before the implementation of lesson study, students were informed about the implementation of lesson study so they were ready for learning during learning of discrete mathematics subject in the implementation of lesson study.

3 RESULTS AND DISCUSSION

During learning process of discrete mathematics subject using problem-based learning approach in the implementation of LS students was grouped into 10 groups which each group consisted of 5-6 students. The forming of a group was done randomly by considering the force and gender. Students are given a student worksheet which contained the problems to be solved along with the group then presented in front of the class.

During the learning activity, each observer used the observation sheet to observe student learning activeness, especially for monitor the student learning activeness. The results of these observations were used as the data of student learning activeness during the lesson study implementation. Furthermore, the data were analyzed descriptively quantitatively to determine whether or not an enhancing of the student learning activeness in the discrete mathematics subject using problem-based learning approach in the implementation of lesson study. The results of the data analysis of student learning activeness were shown in the following table.

Table 1. Percentage of student learning activeness

Indicator	Meeting			
	I	II	III	IV
The enthusiasm of students in the joining of learning	89.41%	79.50%	82.93%	89.30%
Student's interaction with lecturer	35.29%	44.50%	43.41%	57.67%
The interaction among students	45.29%	56.00%	49.76%	53.49%
Collaboration of group	64.12%	64.00%	62.44%	71.63%
Activities of students in the group	70.59%	75.50%	68.29%	75.35%
Students' participation in the concluding the result of discussion.	39.41%	55.50%	52.68%	59.07%
Percentage of activeness	57.35%	61.67%	59.92%	67.75%

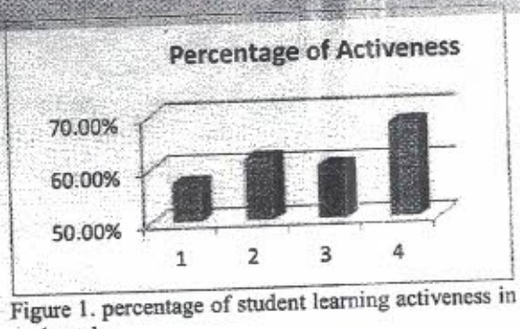

Figure 1. percentage of student learning activeness in each cycle.

Table 2. Enhancing of the student learning activeness

No	Indicator	Enhancing of each indicator of activeness		
		1st cyle to 2nd cyle	2nd cycle to 3rd cycle	3rd cycle to 4st cycle
1	The enthusiasm of students in the joining of learning	-9.91%	3.43%	6.37%
2	Student's interaction with lecturer	9.21%	-1.09%	14.26%
3	The interaction among students	10.71%	-6.24%	3.73%
4	Collaboration of group	-0.12%	-1.56%	9.19%
5	Activities of students in the group	4.91%	-7.21%	7.06%
6	Students' participation in the concluding the result of discussion.	16.09%	-2.82%	6.39%
Enhancing of activeness		4.32%	-1.75%	7.83%

Table 1 shown that the score of student learning activeness enhanced during implementation of lesson study using the PBL approach which taken place for 4 meetings/cycles with student learning activeness criteria in good category. In the first cycle of the LS, the indicators 1,4,5 of learning activeness were indicators that has a high scores. In the indicator 1, related to the enthusiasm of students in the joining of learning was better than before LS activity as possible learning approaches applied by lecturer was a relatively new in the classroom so that the students were very enthusiastic to join the learning. Setting of learning by a group and giving problems in the student worksheet to be solved by group member provided opportunities for students to collaborate and discuss with the group in order to solve the existing problems.

While student interaction with lecturer and among students were still lacking by looking at the acquisition of those indicators was in the not good category. Based on fact in the classroom in the classroom it shown that students still look shy to ask the lecturer, students prefer to keep silent or ask to their friends if there was material that was poorly understood. Students were less brave in asking to

lecturer directly, they prefer to ask their friends who considered smart or brave to inquire into lecturer. Students were only interacting with the friends who seat closest. This was possible also because during the learning in the LS activity, there are many observers in the classroom who caused students felt a little awkward and ashamed to ask or answer questions of lecturers because they worried if the question was too easy or if the answer was wrong then they will be laughed in the class. This fact also triggered the reluctance of students to participate in the conclusion of the results of discussion. It may be seen from the low scores on the 6th indicators. These habits should not be preserved during the learning activity. Overall percentage of student learning activeness in cycle 1 was in good category. Although there were score of three indicators of the student learning activeness were still not good.

Based on table 2, in the second meeting of the LS activity occurred enhancing of student learning activeness of 4.31%. Score of 4 indicators of learning activeness increased significantly, while score of the indicator 1 and 4 of the learning activeness decreased. At this second meeting, there were some students who first attended the lectures of discrete mathematics because they still followed the field experience practice in the school. So they did not know enough about the learning that was used by lecturers. As a result, when they worked with their group they were unfamiliar and a little awkward to interact. Moreover most of these students did not know each other because of different batch. This case possible caused the score of 1st indicator about enthusiastic students in the joining of learning was decline of 9.91%. Likewise for the decline in the score of 4th indicator which associated with collaboration of group. Students precisely formed two internal groups that discuss different issues of the existing problems in the student worksheet. This indicated a lack of group coordination so that each student was busy working on worksheet with a friend who was sitting nearby. Therefore, in the third cycle was planned to assess the activeness of the group by providing a reward in the form of praise to motivate students during the learning process in order to be more active.

The student learning activeness precisely decreased in cycle 3. While it still in the good category and decline only 1.75%. This can be seen from score of student activeness of 5 indicators decreased. Although the 1st indicator increased by 3.43%. The decrease of activeness was possible be caused of the saturation and boredom of students towards learning are used as the research that has been done by Aprilia et al (2012). In the learning when lecturer uses learning method many times monotonously, students will feel bored and saturated. Based on the results of reflection with observers was obtained the finding that although turnover of seating position has been done so uniformly of each group have felt sitting in the front and rear, the group that seat in front of class was still not active. They did not come forward to take a presentation. In addition, there were students from the beginning to the end of the learning process were not active at all. Students were only silent and passive during group discussion.

The finding from reflection of the 3rd cycle became concerning in 4th cycle, that was the students who have not been active since the first cycle be pursued actively by ask them to read and explain the material in front of the class. At the end of LS activity, student learning activeness increased of 7.83%. Overall score of indicators of student learning activeness have increased significantly and in a good category. In general, the student learning activeness has started to rise. The more students who want to take presentation in front of the class and respond to their friend's presentation. Some groups have already taken a discussion group, but discussions between the groups still appeared invisible. Some groups worked individual or just a discussion with his friends nearby. This was possible because there were no objects together in a group, e.g. a small blackboard in each group which made each member to focus on one object only. In addition, other possibilities were also due to the number of members of the group of 5-6 students. Perhaps if the number of members of the group was only 3 students then group discussions will go smoothly. But if this was done there would be a lot of groups and it obviously required extensive classroom. Students already used the existing handbook. This facilitated the learning process. Problem-solving skills of students were increasing.

In the figure 1, overall it shows that percentage of student learning activeness enhance during LS implementation by using PBL approach in the discreet mathematics subject although there were also declining at cycle 3. Base on table 2, the enhancing of 4.32% was at 1st cycle to 2nd cycle, 7.83% was at 3rd cycle to 4th cycle and the declining of 1.75% was at 2nd cycle to 3rd cycle.

From the implementation of LS for 4 cycles, the student was still rare to ask. Generally, students who asked at each cycle were the same person. While the other students tend to be quiet, waited for their friends asked or requested other friends to ask. It becomes a task for the lecture to think how to raise the asking ability of the students in the learning. The lecturer's efforts to activate students during the learning influenced many factors including: the number of students in a classroom, learning time, classroom atmosphere, support facilities and infrastructure. The findings for lesson study with 4 meetings can be used as considerations related to matters that affect the student learning activeness are: (1) Placement of students in the group. (2) The students' seating position. (3) Attention lecturer

during the learning process takes place. (4) The existence of reward. (5) The proportion of repeater. From those findings at least it can be consideration for the lecturers to planning their learning. Meanwhile, for the effective implementation of lesson study should involve small observer so that they do not disturb the concentration and psychological of both the students and lecturer.

4 CONCLUSIONS

Lesson study activities using problem-based learning approach in discrete mathematics subject have been able to enhance the student learning activeness at class D of semester VII which totaling 56 students. The enhancing was particularly helpful in the context of academic and character formation of the students in the community. Student learning activeness in the discrete mathematics subject using PBL in the LS activity was in the good cariteria for each meeting.

4 ACKNOWLEDGEMENTS

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