

Development Instruction Quality of Statistics with Think Pair Share through Lesson Study for Learning Community on FKIP UNIPA

By Benidiktus Tanujaya

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Abstract

¹⁵This Lesson Study activity aims to improve the quality of statistics instruction by focusing on students' ability to present data in graphics. This study occupied Think-Pair-Share, a cooperative model in designing the instruction. Students were paired in groups of two before they were randomly grouped in bigger groups; groups of three then groups of six. Bigger groups were formed after the smaller groups finish discussing and doing the assignments given by the teacher. The discussion was regarding graphics components, graphics procedures, and graphics selection in terms types and forms. The instruction process was done in two cycles in two parallel classes. From the first reflection, the teacher was suggested to pay attention the best time to use the graphics during the class as well as to evaluate students' responses of the class. This study showed that students were more active during the class. It can be seen from the more relaxed learning atmosphere where students were more assertive and involved in classroom discussion. It can also be seen from their improved concepts of graphic mastery; students were able to choose the proper graphics according to the data. They were also able to make right conclusion about the presented graphics.

Key words: Think-Pair-Share; lesson study; statistics

A. Introduction

The University of Papua, the only state university in West Papua Province, was established on November 2, 2000. It consists of 13 faculties, one of which is the Faculty of Teacher Training and Education (FKIP UNIPA). As one of faculties in University of Papua, FKIP has the responsible for education implementation, and should always improve the quality of instruction. Some efforts to improve the quality of instruction in FKIP UNIPA are continuously conducted by developing and implementing innovative and creative instruction methods and strategies based on the Student Center Learning (SCL) approach.

There are various methods and instruction strategies used to apply the SCL approach in FKIP UNIPA, among others are problem-based learning, project-based learning, inquiry-based learning, and research-based learning. However, in its practice, many lecturers have difficulties to apply the various methods and strategies of instruction, so they tend to implement instruction by using lecture method. Lecture method is a teacher-centered learning (TCL) method which tends not to improve students' thinking ability. In TCL, students put all of their focus on the teacher. When the teacher talks, the students listen exclusively. During activities, students work individually, and collaboration is discouraged.

Alipio (2014), stated that TCL is a traditional approach in instruction that explains learning in terms of behaviorism theories. Behaviorists consider learning as sequential and hierarchical – a process that takes place when bits of separated

knowledge are accumulated. The theory believe that transfer of learning can only occur in a situation where there is a high degree of similarity. On the contrary, SCL is ²⁷ instruction approach based on a constructivist learning theory. The learning theory is based on the assumption that knowledge and understanding are constructed within a social context and learning occurs when deep understanding and support is observed.

In addition, FKIP UNIPA students have heterogeneous characteristics but generally have low reading interest, and tend to be lazy to do the task given by the lecturers. They prefer cheating on the tasks that have been done by their friends, rather than doing the task independently. The students who belong to this group, have a low learning interest. This situation is caused by many factors, including the lack of internal motivation of students. Various problems also occur in basic statistics lectures. Basic statistics is a compulsory subject for all students in six study program of FKIP UNIPA.

In order to overcome these problems, a new instruction system for lecturers and students of FKIP UNIPA is crucial to be implemented. SCL is one of the alternatives that ²⁶ be applied in FKIP UNIPA. The lecturers of FKIP UNIPA need to be well prepared in order to be able to perform various innovative and creative ² learning, so as to increase student's motivation to learn. One of the activities instruction that can be used is lesson study ¹ for learning community.

Lesson study, according Isoda and Katagiri (2012), is a system of planning and delivering teaching and learning that is designed to challenge teachers to innovate their teaching approaches, and to recognize the possibilities of intellectual and responsible growth of learners while fostering self confidence in all concerned. Whereas according to Harvolson and Lund (2013), the aim of lesson study is to improve instruction and advance student learning. Lesson study focuses on ²¹ collaborative planning, teaching, observing, and debriefing of live lessons. Thus it can be stated that lesson study is a ¹⁵ collaborative process, which helps teachers to develop lessons and innovate new practices in order to solve instruction problems and improve the quality of instruction. ²⁵

Successful ²⁵ implementation of lesson studies has been reported in various countries at several levels of education such as the Japanese elementary school (Yoshida, 1999), in the United States (Fernandez, 2002), some univers⁵s in Indonesia (Saito, Hawe, Hadiprawiroc, and Empedhe, 2008), in Hong Kong (Lo and Marton, 2012), and Sweden (Carlgren, 2012), and several other countries including Singapore (Tan, Fang, and Ang, 2013).

Can lesson study be applied in the study at the FKIP UNIPA, especially in instruction of basic statistics? How to implement lesson studies on the learning so that the quality of basic statistics instruction can be improved? The statistics, especially the basic statistics course is one of the compulsory subjects for students in FKIP UNIPA. Therefore, this Lesson Study activity is aimed at improving the quality of basic statistics instruction by focusing on students' ability to present data in graphics.

B. Method

The instruction of basic statistics in FKIP UNIPA is implemented in several parallel classes. In the implementation of this lesson study, the basic statistics class is divided into two classes. The first class is a class consisting of Mathematics Education students, while other classes consist of Physics Education, Chemist Education and Biology Education students. There are 145 students involved in this lesson study. The first class consists of 35 students, while the 28th class consists of 110 students.

This lesson is designed by using lesson study for learning community. The implementation of lesson study includes preparation (plan), implementation of learning (do), and reflection (see). In preparation, the model teacher with a lecturer team consisting of 4 lecturers, planning in order to arrange chapter design and lesson design. The faculty team also serves as an observer that performs observations during the learning process. There are 5 lecturers from other study programs who serve as observers. Observers also serve to convey criticism and suggestions at the time of reflection activities.

Preparation of lesson studies is done by making chapter design and lesson design. Chapter design and lesson design based on the results of lecturer team discussions, are presented in appendix 1 and 2. In chapter design there are several things that need to be done by model lecturer in learning. Learning is implemented using the think pair share approach, a type of cooperative learning model. According to Pressel (1992) students in the cooperative learning environment have opportunities to help each other to improve their achievement and retention, increase self-esteem and intrinsic motivation and develop more positive attitudes toward learning skills and social skills. Cooperative learning helps students to learn academic knowledge under the guidance of a teacher and at the same time they can develop communication skills and values through cooperative interaction.

Once the implementation of cooperative learning is done, students were paired in groups of two before they were randomly grouped in bigger groups; groups of three then groups of six. Bigger groups were formed after the smaller groups finish discussing and doing the assignments given by the teacher. The discussion was regarding graphics components, graphics procedures, and graphics selection in terms of types and forms. The teaching process was conducted in two cycles in two parallel classes.

Data collection is conducted by using observation guidance and evaluation of learning outcomes. Observation guides are used by observers, while evaluating student learning outcomes at several evaluation phases using assessment as learning (AaL) methods. AaL according to Tanujaya (2017), is a method of learning evaluation conducted by lecturers and / or students themselves to know what is known and what they do not know. In this learning activity, students conduct an evaluation by conveying the knowledge and skills acquired to their friends in groups of two. His/ her friend corrected by adding or reducing what was said before, so there was a discussion to increase both their knowledge and skills. Discussions continued on groups of three and six students.

After the open class, reflection is done to address the various deficiencies in the learning process. The results of this reflection are used to improve the next learning process (in parallel classes). Reflection was first performed by model teachers, then

continued by lecturers by delivering their observations. The results of the first reflection are used by the model teacher to rearrange the learning plan together with the other lecturers.

C. Findings and Discussion

This Lesson Study activity aims at improving the quality of basic statistics instruction by focusing on students' ability to present data in graphics. This lesson study is carried out in three stages, namely plan, do, and see. According to Isoda and Katagiri (2012), the lesson study operates when teachers develop a sequence of lessons together: to plan, by preparing the lesson in advance, including a prediction of the possible learning, to do, by presenting the class to children observed by other teachers, and to reflect on the learning with the observers through discussion. Further, according to Lewis (2002) the ideas contained in the lesson study are actually short and simple, i.e. if a teacher wants to improve learning, one of the most obvious means is to collaborate with other teachers to design, observe and reflect on the learning.

As presented further description, namely the increasing of instruction, the important result obtained from the lesson study is formed learning community. Many things are gained with the learning community, namely the exchange of opinions among lecturers to overcome the problem of learning. This is in accordance with the opinion of Lewis, Perry, and Hurd (2009) which states that lesson study makes various types of knowledge more visible such as colleagues' ideas about pedagogy and students' mathematical thinking, thereby enabling teachers to encounter new or different ideas, and to refine their knowledge, as cognitive theories propose. Second, the lesson study enables teachers to strengthen professional community, and to build the norms and tools needed for instructional improvement, as situated theories of learning propose.

Plan

Lecturer model activity begins by doing learning planning. There are two things to do in learning planning, namely: determining learning problems, and preparation of lesson plan and chapter plan. Unlike the preparation of learning that has been implemented, this learning planning is done together in the group of lecturers of the study program. Although model lecturer is more dominant in the preparation of lesson plans, suggestions from other lecturers are important in this planning stage of learning.

After studying the lecture issues while teaching the students enrolled in the basic statistics class, the discussion was conducted to establish learning problems. Based on the learning problems, the model lecturer arranges lesson design and chapter design. Model lecturers then arrange the learning media used in the implementation of learning. Learning media used is a slide of power point presentation.

Do

At this stage, there are two important activities: teaching and observation. The teaching of basic statistics is carried out by model lecturer using cooperative model of think pair share type, while observation is done by nine lecturers. Model lecturers carry out learning by presenting a PowerPoint slides for discussion by students. The presentation slides are bar charts, line charts, pie charts, histograms, stem and leaf

diagrams, and boxplot diagrams. Various diagrams are presented in pairs so that students can observe the similarities and differences of the two graphs shown.

The lecturer then asked the students to find the elements of each diagram, the procedure of creating a diagram, and the level of data on each graph. Students are personally asked to convey what is known by observing the slide presentation presented by the lecturer. The lecturer then asked some students to express their opinions. The lecture then continued with the formation of students in groups. The discussion was conducted by students in groups of two, followed by three and finally in group of six.

See

The see activity is done through discussion between model lecturer and observer. This study showed that students were more active during the class. It can be seen from the more relaxed learning atmosphere where students were more assertive and involved in classroom discussion. It can also be seen from their improving concepts of graphic mastery; students were able to choose the proper graphics according to the data. They were also able to give right conclusion about the presented graphics.

Students are able to communicate in conveying opinions, criticisms and suggestions. Communication is done in groups as well as in the class as a whole. This situation is very rarely seen in previous learning. The ability of students to understand the material is also very good. Most students are able to think to solve the problems conveyed by model lecturers. This improvement cannot be separated from the presentation of lecture material in the form of slide presentation.

From the first reflection, the teacher was suggested to pay attention the best time to use the graphics during the class as well as to evaluate students' responses of the class. These suggestions were then improved on the next lesson. While from the second reflection, the observer generally highlights the difficulty of teaching the class with a large number of students.

D. Conclusions and Suggestions

Based on the results of the implementation of lesson study and discussion conducted, several things can be concluded as follows:

1. The procedures for implementing lesson study are: (1) determining lesson problem, (2) planning the lesson, (3) teaching and observing the lesson, (4) evaluating the lesson by reflecting and (5) revising the lesson.
2. Lesson study can improve the quality of basic statistical learning in the FKIP UNIPA, by improving the quality of instruction conducted by lecturers and students. Students were more active during the class. Learning atmosphere was more relaxed where students were more assertive and involved in classroom discussion.

As a suggestion, lecturers of FKIP UNIPA need to improve the quality of learning through the application of lesson study more. Improving the understanding and skill of Lecturer of FKIP UNIPA about lesson study needs to be done through various scientific activities such as, workshops, seminars and scientific articles writing.

References

- Alipio, J. D.C. (2014), Learner-centered approach in the teaching of mathematics a consideration of teachers' perceptions, *Dissertation*. University of Zululand.
- Carlgren, I. (2012), The learning study as an approach for 'clinical' subject matter didactic research, *International Journal of Lesson and Learning Studies*, Vol. 1 No. 2, pp. 126-139.
- Fernandez, C. (2002), Learning from Japanese approaches to professional development, *Journal of Teacher Education*, Vol. 53 No. 5, pp. 393-405.
- Halvorsen, A. L., and Lund, A. K. (2013), Lesson Study and History Education, *The Social Studies*, 104:3, pp. 123-129.
- Isoda, M., and Katagiri, S. (2012), Mathematical thinking, how to develop it in classroom, In Stacey, Tall, Isoda, and Inprashita (Ed), *Monographs on lesson study for teaching mathematics and sciences – Vol. 1*. World Scientific, Singapore.
- Lewis, C. C., (2002), *Lesson Study, A Handbook for Teacher-Led Improvement of Instruction*, Philadelphia: Research for Better Schools.
- Lewis, C. C., Perry, R. R., and Hurd, J. (2009). Improving mathematics instruction through lesson study: a theoretical model and North American case, *J Math Teacher Educ.* 12:285–304.
- Lo, M. and Marton, F. (2012), Towards a science of the art of teaching: using variation theory as a guiding principle of pedagogical design, *International Journal of Lesson and Learning Studies*, Vol. 1 No. 1, pp. 7-22.
- Pressel, B.E. (1992), A perspective on the evolution of cooperative thinking, In Davidson and Worksham (Ed), *Enhancing thinking through cooperative learning*. College Teachers Press, NY.
- Saito, E., Hawe, P., Hadiprawiroc, S. and Emedhe, S. (2008), Initiating education reform through lesson study at a university in Indonesia, *Educational Action Research*, Vol. 16 No. 3, pp. 391-406.
- Tan-Chia, L., Fang, Y., and Ang, P. C. (2013), Innovating the Singapore English Language curriculum through lesson study, *International Journal for Lesson and Learning Studies*, Vol. 2 Issue 3 pp. 256 – 280.
- Tanaya, B. (2017), Application of assessment as learning in mathematics instruction, *Proceedings of the 5th South East Asia Development International Conference 2017*, pp. 140-143. Atlantis Press.
- Yoshida, M. (1999), Lesson study (Jugyokenkyu) in elementary school mathematics in Japan: a case study, *paper presented at On the Threshold of the 21st Century: Challenges and Opportunities*, The Annual Meeting of the American Educational Research Association, American Educational Research Association, Montreal, April 19-23.

Appendix



Figure 1. Lesson Design

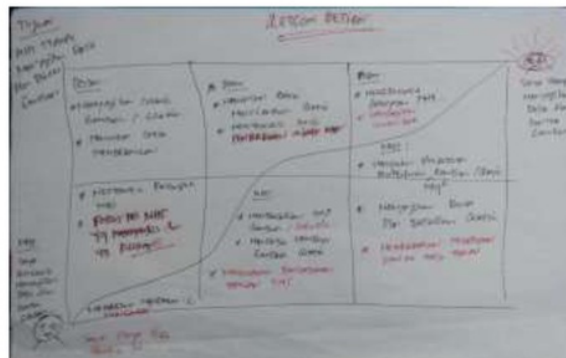


Figure 2. Chapter Design

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