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SPATIAL THINKING ANALYSIS OF GEOGRAPHIC STUDENTS BASED ON LESSON STUDY FOR LEARNING COMMUNITY (LSLC) IN GEOGRAPHIC LEARNING

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ABSTRACT: Spatial thinking in geography learning is very important to explain phenomena, find meaning, answers, and solutions about shape, size, orientation, location, direction, objects in certain spaces on the earth's surface. Therefore, geography students must be able to solve problems in their environment through spatial thinking. "*Lesson Study for Learning Community*" is considered one of the right approach to solve the problem. The research was conducted at the Department of Geography, FIS UNP in the January-June 2018 semester. The subjects of the study were geography students registered in 2016. The data collected through observation by 6 observers. Learning scenarios follow the steps of Lesson Study; "*Plan*", "*Do*" and "*See*". The data were analyzed by using data reduction, display and data verification techniques. The result of study show that students' spatial thinking skills based on "*Lesson Study for Learning Community*" can solve the problem of geography learning, both in asking, answering, discussing, and expressing opinions. Learning is more directed, fun, and collaborating between students, model lecturer, and observers.

Keywords: Spatial Thinking, Lesson Study for Learning Community, Geography Learning

1. INTRODUCTION

Geography is called “The Mother of Science" because the core of geography is the interrelationship between humans and the environment. Of course, there are many things that need to be understood about geography and its development. In a previous article [1-2] concluded the geographic notions of geographers (Erastothenes, Claudius Ptolomaeus, Paul Vidal de La Blance, Von Rithoffen, Prof. Bintarto, and Harstone); geography is the relationship between location factors, certain regional characteristics, relations between regions on the surface of the earth, both physical and social in all aspects of living things and their problems. Problems are solved through spatial, environmental and regional approaches that are beneficial for program, process, and development. This opinions still do not include other expert opinions on the notion of geography. However, it can be concluded that geography is not only related to the physical nature of the earth and parts of the universe that affect the earth alone, but includes all phenomena that exist on the earth's surface, both physical phenomena and social phenomena.

Based on research by [3] state that spatial thinking is an important character in geography learning activities. Therefore, lecturers are required to have the skills to design learning scenarios, which are able to enable students' spatial thinking to understand learning material so that the learning process runs smoothly. Spatial thinking can help in remembering, understanding, giving reasons, and communicating about the properties and relationships between objects in [4] explains that spatial thinking is one form of thinking among other forms of thinking, such as verbal, logical, statistical, hypothetical and so on. Spatial thinking itself is a set of cognitive abilities, consisting of three elements: space, tools, and process of resoning.

In learning, teachers or geography lecturers must have the skills to apply geographic approaches. The ability needed is how the strategy of the teacher or lecturer to develop spatial thinking related to geosphere phenomena, images interpretation, create maps while reading, analyzing, and interpreting maps. Maps can stimulate spatial thinking ability by visualizing images in the head (imagined) or creating them in two or three-dimensional forms. Maps are the main tools in geography learning. "Regional Geography" (Indonesian Regional and Regional World) is one of the course tought in Departement of Geograhy which able to explore maps by reading and interpretating the information provided by maps, and their relation to spatial and environmental problems. However, students do not have the ability to actualize their spatial thinking to solve physical and social phenomenon problems through spatial, environmental and regional approaches.

Spatial thinking in creating qualified human

resources is not easy. The challenge at this time is how to encourage the lecturers to use their creativity and activity to create professional, active and creative students. So that the lecturers in universities are not oriented only to conventional methods. There are many ways and steps taken by universities to overcome learning problems. One of them is lesson study for learning community, which is expected to be able to create better learning, more active and creative students through the exchange of information in learning methods, materials, or suitable learning models.

The Lesson Study for Learning Community (LSLC) is a learning community by applying the basic concept and philosophy that "The teacher is not teaching but how children want to learn " This philosophy has long been applied in Japan, and has even been entrenched. [5] state that school is a learning community which has its own vision, philosophy, and system in learning activities. Children learn from teacher, and the teacher also acts as a professional teacher, parents also learn to participate actively in the classroom. The related article about lesson study for learning community stated that Class reforms have been formed in learning activities that create dialogue, interaction, and collaboration between students [6].

Educational system used in Japan has been implemented in Indonesia but in different ways. Indonesia has implemented some of the philosophies that underlie education such as; Ing Ngarso Sung Tulodo, Ing Madyo Mangun Karso, Tut Wuri Handayani, and Asah, Asih, Asuh. Japan and Indonesia both teach or develop "Character Building" Long ago, students practice character values such as discipline, friendliness, respect, honesty and responsibility, as well as other positive attitudes. Lesson study for learning community aims to build a learning community between students and lecturers so that collaboration occured in developing the quality of learning which ultimately creates the colaboration between lecturers and students in learning activities. To achieve this goal researchers analyzed student spatial geography thinking based on lesson studies for learning communities in Geography learning.

2. METHODS

Lesson Study for Learning Community (LSLC) is a collaborative, sustainable learning model, and builds community in learning, LSLC is a type of classroom action research (PTK) developed by [7-8]. However, in its implementation, it can be classified in non-PTK, because lecturers are not only as models, but also as researchers. Observer acts as an observer and collector of research data.

The study was conducted at the Department of Geography, Faculty of Social Sciences, Padang State University. Spatial thinking indicators conducted in the Indonesian Regional Geography course (3 credits) are: 1) answering quiz questions, 2) matching quiz answers to maps, 3) question and answer to link physical factors with social factors (high-level questions suggested "How" and "Why", and 4) identify physical and social phenomena by utilizing maps (done at home individually). The group assignments to be presented are; 1) making a basic map, 2) physiographic maps, 3) making powerpoints, and 4) making papers, and 5) making a quiz according to the division of regions that have been determined.

The steps of implementing the research are adjusted to the PTK format, as follows; 1) Plan (planning), 2) Do (implementation), 3) See (reflection). The data analyzed by Quantitative method using percentage formulas, and qualitative data analyzed by using data reduction, display and data verification.

3. RESULTS AND DISCUSSION

In accordance with the research objectives to be achieved about the analysis of student spatial thinking based on *Lesson Study for Learning Community*, the implementation of learning is carried out in 2 cycles. Researcher act as a model lecturer, and 6 other (Mr. Nofrion, M.Pd, Mrs. Sri Mariya, M.Pd, Mrs. Lailaturrahmi, M.Pd, Mrs. Rery Novio, M.Pd, Mr. Bayu Wijayanto, M.Pd, and Mr. Aprizon Putra, S.Pd., M.Si) act as observers as well as collecting data and information during the learning process. For more details, the research implementation is as follows;

Implementation of Cycle 1

1) *Plan* (planning) activities include; a) the model lecturer prepared the Semester Learning Plan (RPS), b) on April 18, 2018, the model lecturer along with the observers planned the implementation of "*Do*". The implementation of the "*Do*" was agreed to be conducted at April 23, 2018 cycle 1, b) the model lecturer prepared the observation sheet format, c) the model lecturer and observers collaborated and discussed to determine the right method, media, and material, and d) model lecturer along with observers designed "*future mapping"* about learning material "*Characteristics of Maluku and North Maluku Region Viewed from Various Aspects*". the figure 1 below show the result of collaboration and discussion of the activities of model lecturer and observers in the form of future mapping for the "Do" on 1st cycle.

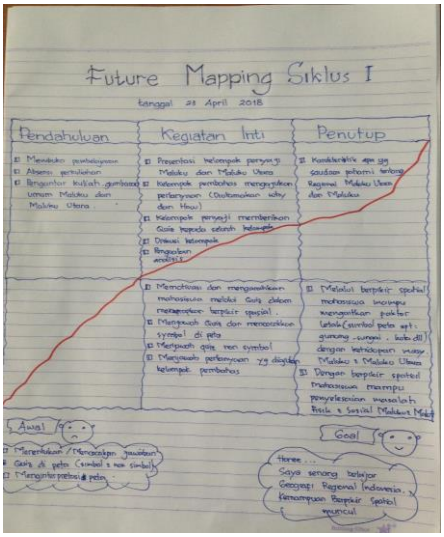

Fig 1. Future Mapping of Cycle 1 "*Do*" Activities.

2) *Do* or *Open Class* (implementation) research in the first cycle, the observers who was present are; Mr. Nofrion, M.Pd, Mrs. Sri Mariya, M.Pd, Mr. Bayu Wijayanto, M.Pd, and Mr. Aprizon Putra, S.Pd ,. M.Si. Research subjects were 50 Geography Education students of 2016. Spatial thinking through lesson study for learning is actualized community in student activities in answering quizzes, and matching quiz answers in peta puzzles, determining the location of a city, lake, river, strait, bay, cape, mountain and mountains, explaining the national boundary on maps that have been made by groups, and explained the linkages of physical factors and social factors through question and answer. The group who was present at that time has prepared the papers, quizzes and maps. Other groups identify and analyze physical and social phenomena done at home. Individual tasks aim to help students answer quiz questions. In addition, all students are required to carry an atlas while learning takes place. Learning scenarios in activating students' spatial thinking ability through quizzes and matching on blind maps prepared by the presenter group. Rules applied on learning activities were If the answer to the quiz is correct and matches on the map correctly, the points are 1 (one), if the answer is correct but matching on the map is wrong, then the points are 0.5 (half), if the answer to the quiz is wrong, the points are 0 (zero), the number of quizzes there were 50 questions available, and students who were present in the first cycle were 46 people, and the results of student activities answered the quiz and matched the quiz answers to the blind map explained in table 1.

Table 1. Match Quiz Answers On Map in Cycle 1

No	Total Quiz / **Alternative Answers**	**Answer**	
		F	%
1	Correct answer - correct matching	26	52
2	Correct answer - Incorrect matching	8	16
3	wrong answer	6	12
4	Quiz questions canceled	10	20
	Total	50	100

Source: Data Observer Research, 2018.

The table above shows that 26 quiz questions (52%) were answered correctly, and matched correctly to the symbol on the map. 8 (16%) quiz questions were answered correctly, and matching the wrong map symbol, 6 (12%) quiz questions were answered incorrectly. There are 10 (20%) quiz questions declared null and void, because they do not match the questioning criteria and time is provided to answer questions. 40 quiz questions were answered, there were 4 students who had the opportunity to answer more than 1-4 times, and 12 people were active but did not have the opportunity to answer the quiz. It can be concluded that all students are enthusiastic and active in learning.

The next activities is question and answer activities, the opportunity was only given to the presenter group, and other groups were given the opportunity to give opinions. The 5 questions given have met the high order thinking criteria, so the answers motivate the discussion forum to respond with developed answers and bring forth another questions. That mean that problems can be explored more deeply andright solution can be found. The question asked were; a) **Why** is Maluku focused on the problem of poverty and the economy?; b) **Why** do Maluku and North Maluku consist of small islands, explain the causal factors and their impact on the economy of the community?; c) **Why** is the issue of

fisheries not highlighted in both Maluku and North Maluku, even though the sea is very supportive for fisheries?; d) **How** is the defense of North Maluku and Maluku security in the face of threats from the sea?; and e) **What** is the effect of plate convergen phenomena for Maluku and North Maluku, and their effects on the potential of natural resources and human resources?

All questions can be discussed thoroughly, at the end of the learning, the lecturer model gave reinforcement and explanation of the material that has not been discussed while closing the lesson.

3) See (reflection), after the learning is complete, the model lecturer and observers discuss the learning process. Each observer responds to the strengths and weaknesses of the learning process, both from the students and model lecturer. Based on observers observations about "whether students study or not?" Can be summarized as follows; a) **Strengths**; learning is more structured, not a boring process, students were active, the rise of high order thinking questions, methods and media are very suitable because they are able to foster knowledge and insight broadly. Although quiz questions are classified as low order thinking, but they are able to generate spatial thinking skills and create enthusiastic students to answer quizzes; and b) **Weaknesses**; some students did not use cellphones to support learning, there were still students who did not carry atlas, a small number of students cheated on friends' assignments, quiz questions were less varied, those who gave opinions tended to the same person, and the material was less mastered.

After the completion of cycle 1, the model lecturer and observers agreed to carry out the "Plan" activity. It was agreed to carry out cycle 2 activities on May 7, 2018 with the topic of "Bali and Nusa Tenggara Viewed from Various Aspects."

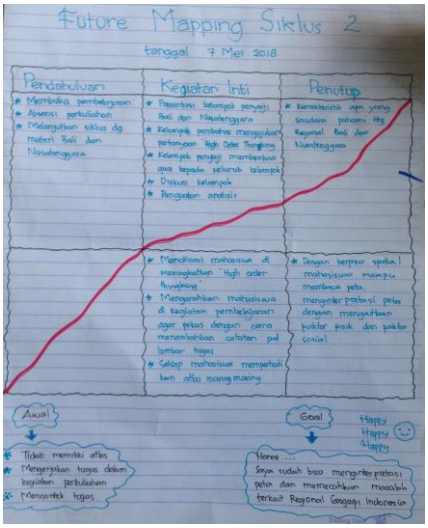

Fig 2. Future Mapping of Cycle 2 "Do" Activities.

1) Plan (planning), plan for cycle 2, has been implemented on April 23, 2018 after the implementation of cycle 1, meaning that the discussion between model lecturer and observers is not implemented.

2) *Do* or *Open Class* (implementation), the implementation of cycle 2 was attended by 4 observers; 1) Sri Mariya, M.Pd, 2) Rery Novio M.Pd, 3) Bayu Wijayanto, M.Pd, and Lailaturrahmi, M.Pd. Number of students attend the class was 50 peoples. In the opening activity, the model lecturer explained the weaknesses in cycle 1 to students. The goal was to let the students know the weaknesses and correct it, as well as to make students more active and more enthusiastic and to have more meaningful and directed learning. Material topics in cycle 2 was "Bali and Nusa Tenggara Viewed from Various Aspects" The presenter group has prepared basic maps, puzzle maps, and 60 questions. The results of student spatial thinking analysis activities both individually and in groups can be seen in table 2.

Table 2. Match Quiz Answers On Map in Cycle 2

No	Total Quiz / Alternative Anwer	Answer	
		F	%
1	Correct answer – correct matching	46	76,7
2	Correct answer - Incorrect matching	4	6,7
3	Wrong answer	5	8,3
4	Quiz questions canceled	5	8,3
	Total	60	100

Source: Data Observer Research, 2018.

Based on Table 2, 46 (76.7%) quiz questions were answered correctly and correctly matched to the map symbol, 4 quiz questions (6.7%) answered correctly and incorrectly matched the map symbol,

5 (8.3%) quiz questions were answered incorrectly, and 5 (8.3%) were declared null and void. It mean that 55 quiz questions had been accessed, 11 students have the opportunity to answer 2-7 questions, and only 7 student were active during the class but have not had the opportunity to answer and match the symbols on the map.

Discussion activity used on this learning is an activity to link regional geography material to physical phenomena and social phenomena, and environment. Some questions asked by students are classified as high order thinking, the questions asked are as follows;

a. how is the impact of Mount Tambora eruption to the region of Nusa Tenggara? explain the evidence of eruption that can be observed
b. explain the topographic relation between Java and Bali Island and evidence that those island was once united in the past
c. why the majority of foreign tourists visit Bali? Explain all the factors
d. Why is a small island like Bali can be a province in Indonesia?
e. How is that possible for Balinese people to maintain their culture until now? what are the factors behind it?

The questions above are quite challenging to discuss. The presenter group is quite ready to solve physical and social problems in Bali, all questions can be answered properly, and discussion develops when students can give their opinions in front of the discussion forum.

3) *See* (reflection), model lecturer and observers discuss the learning process that has taken place. Based on observers observation of "whether students study or not?" Can be concluded as follows: strengths and weaknesses in open class activities; a) **Strengths**; most students are active, both in asking questions, answering quiz questions, matching answers to puzzle maps and symbol maps, as well as giving opinions. Although the material seems rather difficult, they were able to generate spatial thinking skills and create an active and fun learning atmosphere. Handphones was used for learning purposes, and students didnt do unrelated task from subject; and 2) **Weaknesses**; there are still students who did not carry atlas, and some students often permit, so the learning activity a bit disturbed.

Based on the results of cycle 1 and cycle 2, students' spatial thinking skills can be summarized based on lesson study for learning community, especially in the subject of Indonesian Regional Geography as follows;

Table 3. Recap of Cycle 1 and Cycle 2 Implementation

No	Total / Alternative Anwer	Answer			
		Cycle 1		Cycle 2	
		F	%	F	%
1	Correct answer – correct matching	26	52	46	76,7
2	Correct answer - Incorrect matching	8	16	4	6,7
3	Wrong answer	6	12	5	8,3
4	Quiz questions canceled	10	20	5	8,3
	Total	50	100	60	100

Source: Research Data Processing, 2018.

The table above shows that; the percentage of corectly answered questions and map matched answer were increased in cycle 2. This means that students' spatial thinking skills are getting better. And students with less spatial ability decreased in cycle 2, because at first the number who answered hesitantly and matched the wrong answer on the symbol map decreased in number. At first, asked questions by students was classified as low order, but quiz answers were able to stimulate a high level of spatial thinking. Likewise when discussion was conducted, students are able to provide the right answers, and gave their opinions so the material or subject could developed and ultimately the problems and characteristics of "Maluku and North Maluku: and" Bali and Nusa Tenggara "both physically and socially can be expressed.

Furthermore, to answer "whether students have learned" based on 10 questions on the observation sheet, the records of 6 observers on cycle 1 and cycle 2, can be summarized as follows;

1. Are there students who do not pay attention in learning process? Some students have studied, but there are some students using their cellphones and talking to friends
2. Do students ask questions to lecturer or other students? Students ask questions to the presenter group
3. Do students answer the questions from lecturer or students? Students answer

questions from the presenter group and discussion forum
4. Do students work with other students to solve problems? Students collaborate in discussion groups
5. Are students depressed in taking lessons? Students are not depressed, because learning is structured, directed, and fun
6. Do students look happy in taking lessons? Students are very happy to take lessons, because they are free to express opinions and get direction and reinforcement in learning materials that are considered difficult
7. Is there material that is difficult for students to understand? There is a difficult beginning in the material, but through the lesson study for learning community, learning is easy to understand
8. Has the lecturer carried out his role in accordance with the planning? The lecturer has done his role well, because the structured learning model starts from observing, asking questions, gathering information, discussing in groups, and confirming the results of the discussion
9. Is the method applied right? The method applied by the lecturer is very suitable and appropriate for subject Indonesian Regional Geography, because methods can solve problems from various aspects, both spatial, environmental and regional aspects
10. Are the overall learning objectives achieved in accordance with planning? Learning objectives have been achieved and in accordance with the planning, the lecturer member reinforces and explains the material that is considered difficult. Provide guidance on student weaknesses in discussion

Based on the observer's notes above it can be concluded that, Lesson Study for Learning Community is able to provide solutions to stimulate students to be active on learning process and students spatial thinking skills can be developed so they could undesrstand the subject that were discussed. A positive collaboration occurs in discussing between study groups and creating a fun and non-boring learning atmosphere.

4. CONCLUSION

Spatial thinking analysis based on Lesson Study for Learning Community (LSLC) aims to form learning communities that work together in the form of collaboration in learning. The spatial thinking context in this study is to provide Low Order Thinking and High Order Thinking questions through maps. Maps are the main item to stimulate students' spatial thinking in geography learning. Through collaboration in discussions, the implications of LSLC provide significant results for students in finding solutions about spasial problems happened on a region that have been discussed in cycle 1 and cycle 2. Reading and interpreting maps is initially considered difficult, but after going through the LSLC process, students can understand and recognize the symbols on the map, and analyze the relationship between physical and social factors in the material that has been discussed. The lesson study for community model is expected to motivate teachers and lecturers to develop LSLC in different courses. Collaboration between teacher or lecturer can build community sharing knowledge, method, teaching materials, so that the quality of learning increased.

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