

A DESCRIPTIVE STUDY OF STUDENTS' ACTIVE ROLE THROUGH LESSON STUDY-BASED DISCOVERY LEARNING

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Abstract— This study aimed to describe the ability of the students' active role in class VI A on function of complex variables course in mathematics education program, teacher training and education faculty, Universitas Muhammadiyah Purwokerto. The topics taught in cycle I, cycle II, and cycle III were analytical function, harmonic function, elementary function and its properties, and elementary function mapping. This study was a descriptive research with qualitative approach. Subjects of this study were students of class VI A taking complex variables function course in the even semester of the academic year 2016 / 2017. In this study, students were divided into 13 groups heterogeneously. Each group consisted of 4-5 people. Based on the result of the study, it was found that in cycle I, cycle II, and cycle III students met the seventh indicator that students were responsible for their work results with the percentage of each cycle 95.31%, 96.86% and 90.63%.

Keywords: Students' Active Role, Complex Variables Functions

I. Introduction

The background of this study was the low active role in the process of learning of the students in 6A, both male and female students. In this case, students were very passive, not eager to ask and answer questions from teachers, unwilling to focus on teacher's explanation. It can be stated that the active role of students in grade 6A was not maximum yet. It was shown by the fact that: a) only few students who were eager to ask the lecturer, b) only few students who were eager to answer questions from lecturer, c) only few students who were eager to do the task given by the lecturer. Thus, the lack of students' active role in following mathematics course resulted in the students' initial conditions that students' gave less support for teaching and learning process.

The ability of students' active role and mathematical communication is important in learning activities since it is the main factor in determining the learning success. According to Djamarah (2010) the students' active role in learning is very important because it is an active process of the learners in building thoughts and knowledge.

One of the efforts that can be taken by the lecturer in order to optimize the students' active role is by updating the learning model used. Discovery Learning is one of the learning model that can be

used for optimizing the students' active role. In applying this learning method, the teacher acts as a mentor by giving the students opportunity to learn actively. It means that teacher should be able to guide and direct the learning activities of the students according to the purpose (Sardiman, 2005: 145).

Discovery learning is one of learning models in curriculum 2013. Discovery learning is a form of learning method centred on students' active learning, which aims to provide opportunities for students to be a problem solver, a scientist, historian, or mathematician. Through such activities, students will master, apply, and discover concepts, theories, rules, or understandings, and / or useful things (Bruner in Markaban, 2006).

Based on the background above, the researcher wanted to describe the active role of the 6th semester students of class A of 2014, Mathematics Education program of Universitas Muhammadiyah Purwokerto in complex variables function course through lesson study. Learning model used in this research was discovery learning.

II. Research Method

The stages of the lesson study include planning (planning), planned everything in learning, do (activity) is an activity to carry out what is planned in planning stage, and see

(reflection and evaluation) is an activity to reflect and evaluate learning activities. The implementation of this lesson study phases was carried out in 4 cycles.

1. Time and Place of Study

This research was conducted in the even semester of academic year 2016/2017 at Muhammadiyah University of Purwokerto. The details of the implementation of the study are presented in Table III.1 below.

**Table III.1
Research Schedule**

Day/ Date	Time	Room	Activity	Teaching Topic
Monday, May 10, 2017	10.00 – 10.30	Lectures ' Room	Plan 1	Analytical Function, Harmonic Function
Wednesday, May 12, 2017	13.00 – 15.30	Room G2. 13	Do 1	
Wednesday, May 12, 2017	16.00 – 16.30	Lectures ' Room	See 1	
Monday, May 17, 2017	10.00 – 10.30	Lectures ' Room	Plan 2	Elementary Function and Its Properties
Wednesday, May 19, 2017	13.00-15.30	Room G2. 13	Do 2	
Wednesday, May 19, 2017	16.00-16.30	Lectures ' Room	See 2	
Monday, May 31, 2017	12.30 – 13.00	Lectures ' Room	Plan 3	Elementary Function Mapping
Wednesday, June 2, 2017	13.00-15.30	Room G2. 13	Do 3	
Wednesday, June 2, 2017	16.00-16.30	Lectures ' Room	See 3	

2. Research Subject

Subject of this research was the students of the 6th semester of class A of 2014, Mathematics Education program of Universitas Muhammadiyah Purwokerto taking complex variable function course. Students were divided into 13 groups heterogeneously. Each group consisted of 4-5 people.

3. Research Procedures

This study was conducted in 3 cycles. The stages of each cycle are described as follows.

a. Plan (Planning)

The purpose of this stage is to design the learning so that it can provide solutions to the problems and events occurring in the learning done by the model lecturer. At this stage, the model lecturer and three observer lecturers design the lesson planning. At this stage, the model lecturer provided learning equipment for the observer lecturers. Then, there is an evaluation on the planned equipment. The learning equipment consist of course plans, seating plans, learning observation sheets, active role observation sheets, and student worksheets. It is a student- centred

learning purposing to improve the students' active role.

b. Do (Implementation)

The purpose of this stage is to implement the learning in accordance with the planning designed at the *plan* stage. At this stage, the model lecturers practice learning based on the learning design at the previous stage. The course plan designed at the previous stage is the guideline for lecturer and students' activities at this stage. The role of the observer at this stage is to record student activities requiring attention and students' active role improvement. The observer lecturer's guideline in observation is the course plans, seat arrangement plans, learning observation sheets, active role observation sheets, and students' worksheets. This observer lecturer's guideline is based on the learning design made in the previous stage.

c. See (Reflection and Evaluation)

The purpose of this stage is to reflect and evaluate the implementation of learning at the *do* stage. Implementation of this stage begins with the exposure of the model lecturer on the implementation of learning done. Model lecturer provides self-reflection on what is felt and what happens during the learning process. Model lecturers can also express the barriers faced during the learning process. The activity at this stage is followed by the exposure by the observer lecturers on the findings obtained during the implementation of the *do* stage. The findings can be positive or negative on the implementation of learning, implementation of lesson study, and student's active role. The next activity at this stage is giving feedback from the observer lecturers on the problems found. The results of this feedback is then written in the form of course plans by model lecturer that will be used as discussion material at the *plan* stage for the next cycle.

4. Data Collection Technique

Data collection techniques used in this study include:

a. Observation of Student Active Roles

At this stage, the observation done to know the active role of students in the learning process. Students were divided into 13 groups heterogeneously and then each group was given tasks to do. Work time was arranged. After that, lecturers together with the students discussed the tasks given. The observed points was based on the indicators of the students' active role such as: students looked for ways to solve their own problems, answered questions, learned to ask questions, took information from the book, discussed something with their friends, showed responsibility for their work results.

b. Documentation

Documents used in this study were video and photo recordings of each implementation; *plan, do, and see.*

5. Data Analysis Technique

The data of this research were analyzed using descriptive qualitative method. More detailed analysis procedures are as follows:

a. Data reduction

This step was done to select the appropriate and inappropriate data based on the research problems. In this study, the selected data were the supporting data the description of the students' active role in the learning process.

b. Presentation of data

After the appropriate data were selected, the data were presented in the form of images completed with explanation.

c. Conclusion

After the data were matched, the conclusions were drawn on the student's active role during the learning process taken place.

III. RESULTS AND DISCUSSION

The results and findings during the implementation of the lesson study are summarized based on the each stage of the each cycle of learning done. The details are as follows.

a. Cycle I

a. Plan

The main discussion on the *plan* stage for cycle I was course plans on analytical and harmonic functions, learning models applied in the *do* stage, and group division for each observer. The learning model used was discovery learning (DL). Students were grouped into 13 discussion groups, one group consisted of four to five students. Observer 1 (Eka Setyaningsih, M.Si) observed the students' active role of group one to four, observer 2 (Erni Widiyastuti, M.Si) observed the students' active role of group five to eight, and observer 3 (Anton Jaelani, M.Pd) observed students' active role of group nine to thirteen. Each discussion group was given the worksheets to be discussed with the other members. Each group was given 30-45 minutes to complete the task. Then, the results of the discussion were presented through the presentation and discussed together with the lecturers. The presentation technique of this stage was two students at once presented the results of group discussion then students from other groups responded. The result of observation sheet and the students' worksheet were analysed based on the indicators of students' active role.

b. Do

Here is one of the results and explanation of each indicator of students' active role of group 1-4 (Observer 1: Eka Setyaningsih, M.Si.)

Figure 1. Observation result of students' active role of groups 1-4

		Aktivitas mahasiswa						
Kelompok	Nama Mahasiswa	1	2	3	4	5	6	7
1	NOVITA WISKA A.	1	1	1	1	1	1	1
	HANI ALFANDE	0	0	1	0	1	1	1
	JERY ARIYANTO	1	1	1	1	1	1	1
	ARIF HIDAYAT	1	0	1	1	1	1	1
2	RISTA ISTIQOMAH A.	1	1	1	1	1	1	4
	TRU WAHYU ARI W.	1	1	1	1	1	1	1
	ANDI SUPRIYONO	1	0	1	1	0	1	1
	WEDAN AGUNG P.	1	0	1	1	1	1	1
3	FIAD ZAINI	1	1	1	1	1	1	1
	MURAHAD IMAM M.	1	1	1	1	1	1	1
	NUR HIDAYANTO	1	1	1	1	1	1	1
	ANGGITA RIFIN	1	1	1	1	1	1	1
4	MUHAMMAD ARIFF M.	1	0	1	1	1	1	1
	ENDANG PURNAMA	0	0	0	0	0	0	0
	NUR ARIFF	1	0	1	1	1	1	1
	MILA ANISA WAHIT	1	0	1	1	1	1	1
	MUHAMMAD ARIFF T.	1	0	1	1	1	1	1
	TRIVAS SETYON.	1	1	1	1	1	1	1
	YULI KEMALATI	1	1	1	1	1	1	1

Keterangan:
 1 - Siswa menjawab pertanyaan berdasarkan masalah.
 2 - Siswa mendiskusikan masalah dengan temannya.
 3 - Siswa mengajukan masalah kepada orang lain yang ada.
 4 - Siswa mengajukan pertanyaan.
 5 - Siswa mengorganisir masalah yang ada.
 6 - Siswa dapat melakukan suatu perubahan sendiri.
 7 - Siswa benar-benar bertanggung jawab atas hasil pekerjaannya.

Paralekerto, 12 Mei 2017
 Observer
 Eka Setyaningsih, M.Si.
 NIK. 2160109

c. See

Based on the observer's observation, observer 3 found some problems such as:

- 1) Female students were more active to ask than male students;
- 2) After 45 minutes of the lecture, students started to focus because most students did not understand the material given;
- 3) Time allocation provided for discussion (completing the worksheets) was not enough for students so that the result was not maximum yet.
- 4) During the discussion process, some groups were confused and need guidance to do the tasks.

However, the overall achievement of the student's active role was quite good.

2. Cycle II

a. Plan

Based on the observation in cycle I during the learning process, the main discussion on the *plan* stage for the second cycle was to make improvement based on the feedback given by the observer during the learning cycle I. In addition, the other main discussions of this cycle were: preparing course plans on elementary function and their properties, learning model used at the *do* stage, group division for each observer, and students' worksheets. Learning model used in this stage was discovery learning. Students were grouped into 13 discussion groups, one group consisted of four to five. Observer 1 (Eka Setyaningsih, M.Si) observed students' active role of group one to four, observer 2 (Erni Widiyastuti, M.Si) observed students' active role of group five to eight, and observer 3 (Anton Jaelani, M.Pd) observed students' active role of group nine to thirteen. Each discussion group was given the worksheets to be discussed with the

other members. Each group was given 60 minutes to complete the task. There was more time allocation given in this cycle compared to the previous cycle. Then, the results of the discussion were presented through the presentation and discussed together with the lecturers. The presentation technique of this stage was two students at once presented the results of group discussion then students from other groups responded. The result of observation sheet and the students' worksheet were analysed based on the indicators of students' active role. In addition, lecturers gave more guidance in each group in this stage.

b. Do

Here is one of the results and explanation of each indicator of students' active role of group 5-8 (Observer 2: Erni Widiyastuti, M.Si).

Figure 2. Observation result of students' active role of group 5-8.

c. See

Almost the entire learning process of Lesson Study-based Discovery Learning was in accordance with the course plans. However, there were problems found in this cycle such as there were some students who were not active and awkward to discuss with other group mates. However, the student's active role in this cycle was good. There were more active students than inactive students.

3. Cycle III

a. Plan

Based on the observation in cycle II during the learning process, the main discussion on the *plan* stage for the third cycle was to make improvement based on the feedback given by the observer during the learning cycle II. In addition, the other main discussions of this cycle were: preparing course plans on elementary function and their properties, learning model used at the *do* stage, group division for each observer, and students' worksheets. Learning model used in this

stage was discovery learning. Students were grouped into 13 discussion groups, one group consisted of four to five students. In addition, the position of the group seat was modified. The groups sat in front at the previous cycle were moved backwards while the groups sat at the middle remained at the same position. Observer 1 (Eka Setyaningsih, M.Si) observed students' active role of group one to four, observer 2 (Erni Widiyastuti, M.Si) observed students' active role of group five to eight, and observer 3 (Anton Jaelani, M.Pd) observed students' active role of group nine to thirteen. Each discussion group was given the worksheets to be discussed with the other members. Each group was given 60 minutes to complete the task. There was more time allocation given in this cycle compared to the previous cycle. Then, the results of the discussion were presented through the presentation and discussed together with the lecturers. The presentation technique of this stage was two students at once presented the results of group discussion then students from other groups responded. The result of observation sheet and the students' worksheet were analysed based on the indicators of students' active role. Dealing with the inactive students, the lecturer pointed the students in the group to answer the question.

b. Do

Here is one of the outcomes and explanations of each indicator of students' active role in group 9-13 (Observer 3: Anton Jaelani, M.Pd).

Figure 3. Observation result of students' active role of group 9-13.

c. See

The entire learning process of Lesson Study-based Discovery Learning was in accordance with the course plans. Students were active and willing to discuss with other group mates. Then, the student's active role in this cycle was good compared to the previous meetings.

IV. CONCLUSION

The learning model designed by the model lecturers and the observer lecturers is able to create an active role of the students. Based on the results and discussion in this study, it can be concluded that learning on complex variables function using lesson study-based discovery learning model can support the improvement of students' active role during the learning process. The data showed that in cycle I, cycle II, and cycle III students met the seventh indicator that students were responsible for the results of their work with the percentage of each cycle 95.31%, 96.86% and 90.63%. In addition, the improvement of more varied and multi concept questions are done in accordance with the students' needs and the aim that students are creative in solving the problems.

The results of this study provide advice for teachers and lecturers to pay attention to the following things in the learning.

1. Lecturers' attention to students should be consistent and improved;
2. Ask students to be more creative in solving math problems by understanding to the pattern of problem solving.

V. REFERENCES

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