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the Effect of Problem-Based Learning Toward the Upgrading of Student's Critical Thinking Skills in Geography Study at Class XII Al Kautsar Senior High School Bandar Lampung

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Abstract — **The purpose of this study is to examine the effect of problem-based learning tothe upgrading of students critical thinking skills in Geography study. Design in learning is an experimental One Group Pretest-Posttest Design. Pretest is carried out before learning and posttest is carried out after learning using the Problem-Based Learning model. The conclusion of the research results that problem-based learning has an effect on upgrading students critical thinking skills with t_{count} = 10,116 ≥ t_{table} = 2,02. The indicator of students critical thinking skills has upgraded after learning, namely the ability to analyze category has upgraded about 10,32; the ability to synthesize category about 18,09; the ability to make conclusions category about 14,29; the ability to make decision has upgraded about 16,11.**

Keywords — **Effect, Problem Based Learning, Critical Thinking, Geography Study, Senior High School**

I. INTRODUCTION

Based on the results of international studies, the Programme for International Student Assessment (PISA) shows the reading literacy, mathematical literacy and scientific literacy achieved by Indonesian students is very low. In general the ability of Indonesian students is very low in: (1) understanding complex information; (2) theory, analysis and problem solving; (3) the use of tools, procedures and problem solving; and (4) investigating. Based on those facts, it is necessary to change the system in learning and assessment. The assessment developed by the teacher is expected to encourage the upgrading of higher order thinking skills (HOTS), upgrade creativity, and build student independence to solve problems (Kemdikbud, 2017: 1).

These conditions must be a challenge for all parties as an effort to upgrade the competitiveness skillsof the nation's future generations in the future, especially for educators, school management, parents, students and the government to improve the quality of Indonesia's education so that it is not far behind compared with other countries. The ability to think at a higher level is one of the skills that must be developed in learners through learning, so that students have the ability to adapt to changes that occur and be able to determine appropriate actions in accordance with the times.

According to Vygotsky in Rusmono (2014:13) learning takes place through social interactions with teachers and peers. With appropriate challenges and assistance from more capable teachers or peers, students move forward into their closest development zone where new learning occurs. Another view of Vygotsky is scaffolding, which is giving a number of student assistance during the initial stages of learning, then reducing assistance and providing opportunities to take on greater responsibility after they can do it. Scaffolding according to Vygotsky is an important thing in modern constructivism thinking, because it is anassistance given to students to learn and solve problems. The assistance can be in the form of instructions, encouragement, and warnings, describe the problem in the steps of solving, provide examples, and other actions that enable students to learn independently.

Moffit in Rusman (2014: 241), argues that Problem-Based Learning is a learning approach that uses real world problems as a context for students to learn about critical thinking and problem solving skills as well as to obtain essential knowledge and concepts from subject matter.

The purposes of Problem-BasedLearning are to convey knowledge to students and to develop critical thinking skills as well as student ability to solve a problem. This is as

expressed by Ibrahim and Nur (2002) in Rusman (2014: 242), that the goals of problem-based learning are (1) helping students develop thinking and problem solving skills; (2) learning various adult roles through their involvement in the real world; (3) becoming autonomous students. According to Ennis in Sapriya (2009: 144), critical thinking is a reflective and rational thinking activity focused on determining what to believe and do. Another opinion put forward by Johnson in Sapriya (2009: 144), concludes the substance of critical thinking from experts, such as (1) critical thinking requires a number of cognitive abilities; (2) critical thinking requires a certain amount of information and knowledge; (3) critical thinking includes affective dimensions which all explain and emphasize differently.

II. METHOD

This study uses an experimental design namely One-Group Pre-test-Post-test Design.

O_1 X O_2

Fig 1. One-Group Pre-test–Post-test Design

O_1 is the pre-test score before being given treatment, while O_2 is the post-test score after being given treatment (Sugiyono, 2015: 110). The subjects in this study are XII grade students of Al Kautsar Senior High School Bandar Lampung from the Sciences department who has a cross-interest curriculum structure in Geography and Social department with a total of 126 research subjects. Systematic sampling technique (systematic sampling) is a technique of taking samples of research in a particular sequence of population members who have been numbered and registered. Furthermore students who have sequence numbers 3,6,9,12,15 and so on until sequence number 126 becomes the subject in this study which amounts to 42 students.

The instrument used for data collection is an essay form test with a total of 10 items and maximum score of 100. The critical thinking skills test lattice consisted of four indicators such as the ability to analyze, the ability to synthesize, the ability to make conclusions, and the ability to make decisions.

TABLE 1
LATTICE TESTS for CRITICAL THINKING SKILLS

Indicators of Critical Thinking	Sub-Indicators of Critical Thinking	Indicator of Achievement Competency (GPA)	Realm Cognitive	Score
The ability to analyze	• To analyze the subject problem • To analyze the caused of a problem • To provide proof	• To analyze the types of problem in rural and urban areas • To analyze the caused of problem in rural and urban areas • To provide proof of a problem in rural and urban areas	C4	10 10 10
The ability to synthesize	• To forecast a problem • To describe a problem	• To forecast a problem that will happen in rural and urban areas due to urbanization • To describe the interaction problem among areas	C5	10 10
The ability to make conclusions	• To summarize the exact problem • Making a sistematic sequence	• Summing up the strengths of interaction among areas • To describe the efforts in solving urbanization problem systematically	C5	10 10
Making strategies and tactics (decision making)	• To compare the alternative of problem solving • To take the exact decision	• To decide the alternative of problem solving for rural and urban areas • To make the exact decision in solving problem in rural and urban areas	C6	10 20

Data analysis techniques to determine the results of research with experimental design pre-test and post-test one group design used the t-test formula (Arikunto, 2014:349). The steps used to determine students critical thinking skills from each indicator are:

1) Check the student answer sheet so that a score in each indicator of critical thinking skills is obtained.
2) Convert the score obtained from the assessment results to a percentage compared to the maximum score (Karim et al., 2015: 96).
3) Determine the category of student critical thinking ablity into 3 categories: high, medium and low. Guidelines in determining the categories of studentcritical thinking skills are based on Suharsimi Arikunto's opinion in (Yunita et al., 2018: 34), as shown in Table 2.

TABLE 2
THE LEVEL of CRITICAL THINKING SKILLS

No	Skills Level	Percentage (%)
1	High	76-100
2	Medium	60-75
3	Low	0-59

Source: Yunita (2018)

III. RESULT AND DISCUSSION

Research Result

Treatment in learning by using problem-based learning models could provide changes in student critical thinking skills. Changes in student abilities could be seen from each indicator of critical thinking skills carried out by analyzing the assessment items used in research. A description of the percentage of achievement and comparison of student critical thinking skills from each indicator before and after being given treatment in learning by using problem-based learning models could be seen in Table 3.

TABLE 3

COMPARISON of STUDENT SKILLS in EACH CRITICAL THINKING INDICATOR

Indikator	Category of Critical Thinking Skills											
	High				Medium				Low			
	Pretest		Posttest		Pretest		Posttest		Pretest		Posttest	
	f	%	F	%	f	%	F	%	f	%	f	%
To analyze	9	21,43	19	45,24	19	45,24	17	40,28	14	33,33	6	14,29
To synthesize	3	7,14	17	40,28	16	38,10	19	45,24	23	54,76	6	14,29
To conclude	4	9,52	17	40,28	21	50,00	19	45,24	17	40,48	6	14,29
To decide	3	7,14	18	42,86	19	45,24	15	35,71	20	47,62	9	21,43

Source:Research Data Processing

Table 3 provided an illustration of the pretest results that showed student critical thinking skills seen from the indicator of the ability to analyze fromall research subject. From 42 students, the most had the ability to analyze in mediumcategory about 19 students or 45.24 percent, students had the ability to analyze in low categories about 14 students or 33.33 percent, and students had the ability to analyze in high categories about 9 students or 21.43 percent. The posttest results showed that most students had the ability to analyze in high category about 19 students or 45.24 percent, students had the ability to analyze in mediumcategory about 17 students or 40.48 percent and students had the ability to analyze in low category about 6 students or 14,29 percent.

Critical thinking skills of students in the pretest activity could be seen from the indicator of the ability to synthesize.From 42 research subject, thes most had the ability to synthesize in low category about 23 students or 54.76 percent, students had the ability to synthesize in medium category about 16 students or 38.10 percent, and students who had the ability to synthesize in high categories were only 3 students or 7.14 percent. The posttest results showed students ability to synthesize, the most in mediumcategory about 19 students or 45.24 percent, students hadthe ability to synthesize in high category about 17 students or 40.48 percent and students had the ability to synthesize in low category about 6 students or 14, 29 percent.

Student critical thinking skills in pretest activities can be seen from the indicators of the ability to make conclusions.From 42 research subjects, the most had the ability to make conclusions in medium category about 21 students or 50.00 percent, students had the ability to conclude in low category about 17 students or 40.48

percent, and students had the ability to conclude in high categories were only 4 students or 9.52 percent. The posttest results showed students ability to make conclusions, the most inmedium category about 19 students or 45.24 percent, students had the ability to make conclusions in high category about 17 students or 40.48 percent and students had the ability to make conclusions in low category about 6 students or 14.29 percent.

Student critical thinking skills in pretest activities can be seen from the indicators of the ability to make decisions.From 42 research subjects, the most had ability to make decisions in low category about 20 students or 47.62 percent, students had the ability to decide in medium category about 19 students or 45.24 percent, and students had the ability to decide in high categories were only 3 students or 7.14 percent. The posttest results showed student ability to make decision,the most in high category about 18 students or 42.86 percent, students had the ability to make decisions in medium category about 15 students or 35.71 percent and students had the ability to make decisions in low category about 9 students or 21.43 percent

The use of problem-based learning models contributed to the upgrading of student critical thinking skills from each indicator. More clearly the upgrading average of student ability of each indicator of critical thinking can be seen in Figure 2.

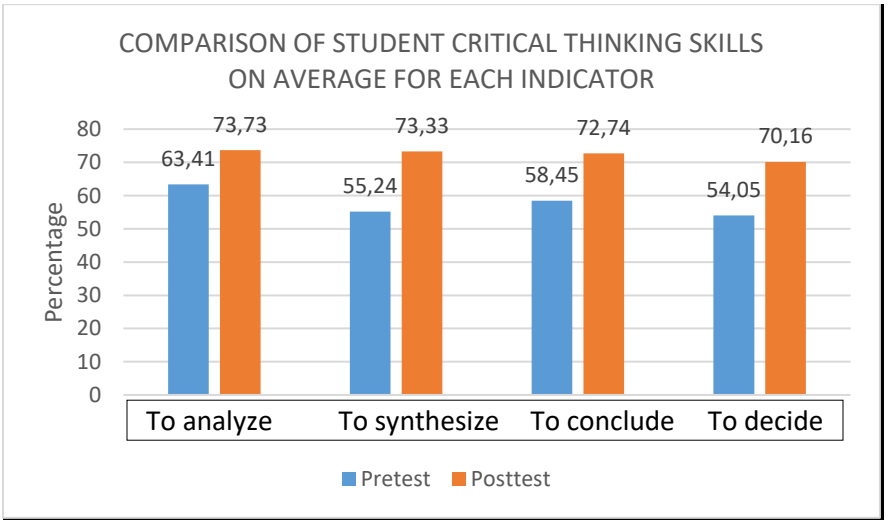

Fig 2. Comparison of Student Critical Thinking Skills on Average for Each Indicator

Figure 2 showed that the critical thinking skills of students seen from the ability to analyze had upgraded before given treatment in learning, the results obtained an average percentage value of 63.41 percent included in mediumcategory of critical thinking skillsbecame 73.73 percent, this means that it occured an upgrading value of 10.32 percent after being given treatment in learning by using a problem-based learning model.

Indicators of student critical thinking skillsto synthesize hadupgraded. From the results of the average value before being given treatment about 55.24 percent had a low category then became medium category with an average valueabout 73.33 percent. This means that it occured an upgradingvalue about 18.09 after being given treatment in learning by using a problem-based learning model.

Indicators of student critical thinking skillsto make conclusions hadupgraded. From the results of the average value before being given treatment about 58.45 percent hadlow category the becamemedium category with an average valueabout 72.74 percent. This means that it occuredan upgrading value about 14.29 after being given treatment in learning by using a problem-based learning model.

Indicators of student critical thinking skillstomake decisions had upgared.From the results of the average value before being given treatment avout 54.05 percent had low category then became medium category with an average value of 70.16 percent. This means that it occured an upgrading value about 16.11 after being given treatment in learning by using a problem-based learning model.

The use of problem-based learning models could also provided a change in student critical thinking skillsclassically. The score of the pre-test and post-test results of the research subjects that was 42 students in each category of critical thinking skillscould be seen in Table 4.

TABLE 4
SCORE of PRE-TEST AND POST-TESTIN EACH CRITICAL THINKING CATEGORY

Percentage (%)	Critical Thinking Category	Pre-test		Post-test	
		f	%	f	%
76-100	High	3	7,14	19	45,24
60-75	Medium	16	38,10	17	40,48
0-59	Low	23	54,76	6	14,29
Total		42	100	42	100

Source: Research Data Processing

Table 4 showed that the results of the assessment of learning activities before using the problem-based learning model (pre-test) of the entire research subjects as many as 42 students, majority had critical thinking skills with low category about 23 students or 54,76 percent, students had critical thinking skills withmediumcategory about 16 students or 38,10 percent and students had critical thinking skills with high categorywere only 3 students or 7,14 percent. Assessment on learning activities after using the problem-based learning model (post-test) there was a significant upgrading in student critical thinking skills.From 42 students, there were 19 students or 45,24 percent had critical thinking skills with high category and students had critical thinking skills with mediumcategory about 40,48 percent or about 17 students and students who had critical thinking skills with low category were only 14,29 percent or about 6 students.

Discussion

Based on the results of the research above, it could be stated that the treatment in learning using the Problem-Based Learning model especially on the material Spatial Structure and Interaction of Villages and Cities could improve student critical thinking skills. The sequence of achieving the highest critical thinking skills of students were the ability to synthesize, the ability to make decisions, the ability to make conclusions and the ability to analyze. Based on these findings, it could be said that for student critical thinking skills, the most prominent indicator in this study was the ability of students to synthesize. The findings in this field were in accordance with the constructivism approach, which stated that, constructivism was the process of building or compiling new knowledge in student cognitive structures based on experience (Sanjaya, 2005: 18).

In line with the theory of constructivism, the learning strategy with problem-based learning models was considered to be able to train students in upgrading student critical thinking skills. With problem-based learning, students learned to build their own knowledge, find ideas so as to be able to build student critical thinking skills. This was as Dewey's opinion in Trianto (2009:31) that the reflective method of solving problems was an active, careful thinking process, which was based on the process of thinking towards definitive conclusions, including through the steps of students in recognize the problem.

Another opinion expressed by Moffit in Rusman (2014:241) suggested that problem-based learning was a learning approach that used real world problems as a context for students to learn about critical thinking and problem solving ability as well as to gain knowledge and concepts that were essential from the material lesson.

IV. CONCLUSION

The conclusion of the research was that there were differences in student critical thinking skills before and after using problem-based learning models in PBM XII grade students of Senior High School Al Kautsar Bandar Lampung, especially material of the Spatial Structure and Village and City Interaction with the results of the t test (Paired samples t-test) was $10,116 \geq t_{table} = 2,02$.

All indicators of studentcritical thinking skillshadupgraded after learning by using problem-based learning models, namely the ability to analyze hadupgraded about 10,32; the ability to synthesize category about 18,09; the ability to make conclusions categoryabout 14,29; and the ability to make decision hadupgraded about 16,11.

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