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The Effect of Logan Avenue Problem Solving - Heuristic Model on the Students'Critical Thinking Skills

Danny Ajar Baskoro[1] Budi Eko Soetjipto[2] Ludiwishnu Wardana[2]
1.Graduate Program of Business and Management Education, State University of Malang, Indonesia
2.Faculty of Economics, State University of Malang, Indonesia

Abstract
The purpose of this research is to know the effect of Logan Avenue Problem Solving (LAPS) model - Heuristic on the students' critical thinking ability who takes Course of Learning Evaluation, Office Administration Education at Faculty of Economics, State University of Malang. The type of this research is quantitative research with experimental research type using Quasi-Experimental Designs research. The object studied is divided into two classes, namely experiment class and control class. The experimental class is treated by applying LAPS - Heuristic. The control class is not treated and continues to apply the lecture learning model. The result of the research shows the difference of students' critical thinking ability between the experimental class and the control class. Hypothesis test analysis data show that students 'critical thinking ability using LAPS - Heuristic is higher than students' critical thinking ability by using lecture. Advantages of LAPS - Heuristic is that students have been accustomed to being exposed to problems and analyzing problems so as to effectively train students' critical thinking skills.
Keywords: Model of Logan Avenue Problem Solving (LAPS) – Heuristic, Critical Thinking

Education is the spearhead in improving the quality of human resources. Through education, people can increase knowledge, intelligence, skill, and form good character. Related to this case, the Government of the Republic of Indonesia has given positive attention to the world of education with efforts to improve the quality of national education. As a concrete form of attention, the government issued Law no. 20 of 2003 on National Education System. The Act shows that education has a function and purpose that is very important for the life of a nation. Adapting education to the needs of the times must also be one of the steps taken by educators in improving the quality of human resources. One of the efforts that can be done now is to develop critical thinking skills; students who are able to think critically have been able to use rational logic by empirically verifying what is being learned (Musfiqon & Nurdyansyah, 2015). As is known, Indonesia is an independent country but most of the country's wealth is under the control of foreign countries. So it takes the next generation of Indonesia is smart, skilled, character, and have critical thinking for the future of the nation's fortunes can be controlled itself well.

The most appropriate learning model for students is Student-Center Learning. Student-Center Learning is a learning strategy that places students as active and independent learners with psychological conditions as learners, fully responsible for their learning, and able to learn outside the classroom. To support Student-Center Learning, a scientific approach that is observed, question, try reason and communicate in various subjects (Sani, 2014). One criterion of the imitation approach is the learner in this case the lecturer is able to encourage and inspire the learner to think critically, analytically and appropriately in identifying, understanding, solving problems, and applying the substance or learning materials (Musfiqon & Nurdyansyah, 2015).

Program study of the Office Administration State University of Malang is a study program that creates students into prospective teachers Vocational High School in Office Administration. As we know a teacher is required to make planning, strategy, and Evaluation of learning. With the enactment of the 2013 curriculum then there is a change in the standard assessment on SMK that is not only a cognitive assessment but psychomotor assessment.

With the development of the curriculum as mentioned above, the Program study of the Office Administration State University of Malang that creates the prospective teachers of Vocational High School should prepare its graduates who are able to design and make cognitive and psychomotor judgments. The ability of students to design and make this assessment formulated in the learning objectives of the Office Administration Learning Evaluation Course.

As an educator, the learning model is a powerful solution. Lecturers should be able to build a classroom atmosphere and animate students' thinking in order to form a learning interaction. Especially in the course of Evaluation of Learning office administration that requires students more active in cognitive, affective, and psychomotor. The course of Learning Evaluation Office Administration is a course that requires students to think more actively and critically. The course of Learning Evaluation Office Administration is a course of working expertise to join in these course students must have taken courses Statistics I and Statistics II. This course serves to support the course Research. This course contains the understanding, purpose, and function of the assessment, the use of the results of the assessment in education in general and in the learning in particular, the assessment tool development procedure, the requirements of the assessment tool and the item analysis, the way of scoring

and converting it with the PAP and PAN approach. Exercise to compile questions, score and analyze and convert into value Therefore students are required to master the concept of assessment in detail and ability to make a problem and analyze the results. In addition, it can create an instrument for assessment in non-test form.

So in this course, students are expected to have critical thinking skills in solving problems related to the preparation of an assessment of learning outcomes.

The ability to think critically is one of the higher-order thinking skills in addition to problem-solving, decision-making, and creative thinking skills (Facione, 1990). Critical thinking is reflective and reasoned thinking that focuses on determining what is believed or done (Ennis, 1997). Cottrell (2005) states that critical thinking skills have several benefits: (1) improving attention and observation, (2) more focus on reading, (3) enhancing the ability to identify key points in a text or other message than confused with less important material, (4) enhancing the ability to respond to the statements of others, (5) knowledgeable in finding their own points of interest easily, (6) as well as analytical skills that can be chosen to be applied in diverse situations. In addition, Agboeze et al (2013) say that Critical Thinking will help students to acquire characteristics such as diligence, flexibility, meta cognition, open-mindedness, knowledge transfer, a problem-solving orientation, quality usage and independence of the desired characteristics of the modern workforce.

According to the results of interviews with the lecturers Office Administration that teaching Learning Evaluation Course, that the 4th semester Office Administration students who take the course earning evaluation of Office Administration have average critical thinking ability was still lacking. So, the need for a gradual treatment in order to improve the ability of critical thinking, then the learner should use a good learning model and support. The learning model used should be in accordance with the condition of the students. One of the learning models that are in line with Student-Center Learning is Problem Solving. Problem Solving is a learning model that requires students to actively manage mental and mind, students are faced with problems and students are required to find solutions to solve problems.

One of the most effective Problem Solving learning models used for beginners is the Logan Avenue Problem Solving (LAPS) learning model. LAPS -Heuristic is a constructivist learning model. A heuristic is a series of questions that are guiding in order to find a solution problem (Adiarta, 2014). LAPS -Heuristic will facilitate students in analyzing a problem coherently and quickly so that students' critical thinking skills can increase. This learning model is very suitable for low semester students who are still in the process of guidance for critical thinking.

METHOD

This research is a comparative research that will examine the effect of LAPS - Heuristic model of critical thinking ability and the influence of learning model of a lecture on critical thinking ability. According to Polya in Amalia (2012), in problem-solving on the LAPS-Heuristic model there are four steps to be taken: (1) understanding the problem, (2) planning the solution, (3) completing the steps according to plan, and (4) checking again results have been obtained.

This research was conducted through three stages: (1) Planning Stage, (a) Preliminary observation/reflection, the initial meeting with Office Administration Program Coordinator as well as Lecturer of Constitutional Courses Learning Evaluation Office Administration.This meeting was conducted to seek information as well as express the intent of research planning. (b) Literature study on LAPS - Heuristic and Problem-solving of books and scientific journals. (c) Material identification and formulation of research objectives. (d) Prepare the research instrument (e) Instrument Validation (2) Implementation Phase (a) Determine the experimental class and control class by conducting equality test. (b) Provide treatment to the experimental class by applying LAPS - Heuristic and control classes in the form of a lecture learning model. (c) Post-tests in the experimental class and control class. (3) Final Stage (a) Processing research data. (b) Analyze and discuss research findings. (c) Drawing Conclusions.

RESULTS AND DISCUSSION

Post-test of students' critical thinking skills is carried out for 60 minutes. The data of post-test value of critical thinking ability of experimental class and control class can be seen in Table 1

Table 1 Post-Test Data Critical Thinking Ability

Parameter	Experimental Class	Control class
N	35	35
$\bar{X}$	80.01	65,45

Source: Researcher (2018)

Post-test data of critical thinking ability above shows that level of students' critical thinking ability in experiment class is higher than control class. The average value in the experimental class is 80.01 while the mean value in the control class is 65.45. The critical thinking ability can be seen in Table 2.

Table 2 Criteria of Critical Thinking Ability

Qualification Score	Information
87,50 - 100	Very Critical
75,00 - 87,49	Critical
50,00 -74,9	Quite Critical
0,0 – 49,99	Less Critical

Source: Purwanto (2012)

The mean value data on each indicator of students' critical thinking ability in the experimental class and control class can be seen in Table 3.

Table 3 Frequency Distribution of Critical Thinking Skills

Indicators	Experiment		Controls	
	Value	Information	Value	Information
Focus on questions	75,00	Critical	65,00	Quite critical
Ask and answer questions that need a reason	66,18	Quite critical	80,00	Critical
Doing deduction	80,36	Critical	65,13	Quite critical
Doing induction	70,13	Quite critical	45,01	Quite critical
Analyzing the reasons	85,00	Critical	70,00	Quite critical
Make decision value	88,94	Very critical	77,77	Critical

Source: Researcher (2018)

Table 3 shows that the results of the post-test of critical thinking skills as a whole of the experimental class are superior to the criteria very critical, critical, and quite critical. In the result class control results are on critical criteria, quite critical, and less critical.

The implementation of the learning was conducted four times and one post-test. Implementation of learning is carried out appropriately with the lesson plan which has been made both in experimental classes and control classes. Experimental classes have been administered by researchers using LAPS - Heuristic learning model. While the control class was not given treatment and remained at the lecture learning as commonly used in the form of variation lecture model. The results of studying well on the activities of the researcher and student activity during the two meetings in the experimental class are shown in Table.

Table 4 Data on Learning Implementation

Observer	Researcher's Activities		Student's Activity	
	Meeting 1	Meeting 2	Meeting 1	Meeting 2
	87,5%	87,5%	95,83%	91,67%

Source: Researcher (2018)

From Table 4 it can be seen that the average learning performance can be categorized well, so it can be concluded that the implementation of learning during the two meetings has been successful with good and excellent predicates.

Before doing the hypothesis test, the critical thinking ability data was needed to test the prerequisite analysis i.e. normality test and homogeneity test. Normality test function to know data on normal distribution or not. The normality test is used by kolmogorov-smirnov technique. While the homogeneity test is used to know the similarities between variants of the group. Homogeneity tests were used with Levene test. The data are categorized as normal if the value is sig> 0, 05, while the variance among the groups is homogeneous if the value is sig> 0, 05. The data used in the following normality test is a post-test data critical thinking ability of the experimental class and control class. The results of the test are shown in Table 5.

Table 5 Evaluation Test Results Post-Test Critical Thinking Capability

Statistics	Class	
	Experiment	Control
N	35	35
Significance	0,884	0,641

Source: Researcher (2018)

Table 6 Results of Post-Test Homogeneity Test of Critical Thinking Capability

Statistics		
	F count	Sig
	3.463	0.132

Source: Researcher (2018)

From the results of the normality test above, it can be concluded that the data from each class both the experimental class and the control class have a normal distribution. This is evident from the result of the

experimental class signification and the control class greater than 0.05. After doing the test of normality, hypothesis test will be performed using independent sample t-test with the following alternatives:

a. H_0 :There is no difference in critical thinking skills between students who are learning using Logan Avenue Problem Solving (LAPS) - Heuristic with students studying using lectures on materials Building grating assessments and materials Constructing test Results of Learning
b. H_1: There is a difference in critical thinking skills between students who are learning using Logan Avenue Problem Solving (LAPS) - Heuristic with students who learn to use lectures on materials developing grating assessments and materials Constructing Learning Outcomes tests.

Hypothesis test of post test critical thinking ability of experimental class and control class shown in Table 6

Table 6 Hypothesis Test of Post-Test Critical Thinking Capability

Class	N	$\bar{X}$	Mean Difference	Sig. T_{count}
Experiment	35	80.01	14.56	0,000
Controls	35	65.45		

Source: Researcher (2018)

Based on the hypothesis test in Table 6 it can be seen that the value of tcount significance <0, 05 is 0,000 <0, 05. This indicates that H0 is rejected. Thus, there is a difference in critical thinking skills among students who are learning using Logan Avenue Problem Solving (LAPS) - Heuristic with students who are learning to use lectures on ADP Learning Evaluation courses.

From the hypothesis test, it is known that there is a difference in critical thinking ability between experimental class and control class. The students' critical thinking ability in the experimental class is higher than the students' critical thinking ability in the control class. This shows that LAPS - Heuristic learning model significantly affects students' critical thinking ability. So, LAPS - Heuristic learning model is effective for use in teaching and learning activities in order to improve students' critical thinking skills. This is in tune with research Calucag (2016) which states that one of the need to be an effective problem solver is the heuristic repertoire that may be useful in a variety of problem situations and the scientific heuristic method is superior to the direct instruction method, Rahyubi (2012) stating in his book that the lecture method can be regarded as the only most economical method to convey information but make passive students and (Duron, 2006) It is very difficult to improve students' critical thinking skills with the lecture format, because students tend to memorize the material.

CONCLUSION

Based on the research result, it can be concluded that the application of LAPS - Heuristic model has the influence on the critical thinking ability of the Student Program of Office Administration Education onLearning Evaluation Office Administration, construct assessment component and construct test learning outcome. This is demonstrated by the results of post-test critical thinking ability of experimental classroom students higher than the control class.

RECOMMENDATION

Based on the results of the research that has been obtained, the recommendation can be given as follows. LAPS learning model - Heuristic is an alternative learning model that can be used to further construct student thinking, especially in the context of critical thinking training. Lecturers can apply this learning model to courses that require analysis and depth. In LAPS, it is advised that students are active in the small group or large group discussions.

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