

The Use in Active Learning Strategy of Learning Starts with a Question Type in the Mathematics Learning

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Abstract—This research was included into a quasi experimental research type. The population of this research was the students of state senior high school two sungai tarab as many as three classes. After normality test, homogeneity test, and equality test with minitab software assistance was found that the population distributed normally and had homogeneous average similarity, then taken two arbitrary classes to be used as sample class. It was class X1 as experimental class and class X3 as control class. Students activity were analyzed by percentage. It turned out that the utility of active learning strategy of learning starts with a question type in mathematics learning process can increase the students activity in every meeting. While testing the hypothesis by using one-way t-test by minitab software assistance. From the data analysis obtained 95 percent of confidence level ($\alpha = 0.05$) obtained P-value = 0.002 because of P-value is less than alpha then the research hypothesis was accepted so it might be concluded that the result of learning mathematics of students who follow the learning by using active learning strategy of Learning Starts With A Question type was better than the result of learning mathematics of students who follow the conventional learning.

Keywords—*active learning; learning starts with a question; mathematics learning component*

I. INTRODUCTION

Achievement or not the purpose of education can be seen from the success of students in understanding the subject matter. This is closely related to learning outcomes which is one indicator in measuring educational goals. Learning outcomes as a concept has encountered a revival since the beginning of the Bologna process in 1999.[1] In fact many students get low learning outcomes because teachers actively convey information while passive students receive whatever is conveyed by the teacher. As a result students get bored quickly and bored in learning. Differences between these groups concerning of experiencing boredom, their academic

achievement, and other emotional, motivational, and cognitive aspects of academic achievement situations.[2]

The circumstances above researchers observed in state senior high school two Sungai Tarab. Based on the information that researchers get from the results of interviews with teachers who teach mathematics in class X can be concluded that the strategy used by math teachers tend to one direction. The teacher explains the lesson interspersed with question and answer while some students are busy with themselves. As a result at the end of the learning process teachers are less aware of the extent to which students understand the material that has been taught. So that there are some students whose value is below minimal mastery criteria specified in the subjects of mathematics in state senior high school two Sungai Tarab is 60.00. Therefore, a teacher is required to be able to use appropriate methods and strategies and mastery of good material in order to support the achievement of optimal learning objectives of mathematics. Approaches to learning are a set of domain general skills that encompass curiosity, persistence, planning, and engagement in group learning.[3]

One of the learning strategies developed to enable students and improve learning outcomes is an active learning strategy. This study illustrates how teacher questions played a pivotal role in facilitating students access to both the content and the genre specific language of science.[4] The active learning strategy consists of 101 types. One of the active learning strategies is the type of Learning Starts with a Question (LSQ). At LSQ each student is required to ask many questions to the teacher. The teacher of automatically detecting informational or non-informational on the retrieval of best answers. [5] After the student has first investigated or studied the course material himself. Thus the teacher will know the extent to which the student has mastered the material and how the teacher perfected the students overall understanding. Materials that are difficult to understand by

students can be discussed in group discussions or class discussions. Using LSQ will be able to increase activity for students, generate student interest and cultivate student curiosity in learning mathematics.

II. METHOD

This research is categorized as quasi-experimental research proposing one or more hypotheses by stating the nature of expected variable relationships.[6] Well conducted quasi experimental studies can provide strong evidence for causal inference.[7] In this study testing the independent variables and the dependent variable performed on experimental group and control group samples. In this study the characteristics of students who were given the treatment is made equal so that no uncontrolled free variables affect the results of research. The design used in this study is the statistical design of two groups. Two groups are considered equal in all relevant aspects and differences are only present in the treatment. The result of measurement of dependent variable from both groups was compared to see the effect of the treatment. The treatment that the researcher gave was using LSQ on the experimental class, ordinary learning in the control class.

This research was conducted in state senior high school two Sungai Tarab in class X. In this study the population is all students of class X state senior high school two Sungai Tarab. The study population was the whole of the research object that became the source of the data.[8] Some of the selected population for the data source was referred to as the sample or samples.[9] The sample in this study was randomly selected to be defined as the experimental group and the contrast group, that is class X1 as the experimental class and class X.3 as the control class. Instruments used in this research are observation sheet and test result of learning. Observation sheet to see the extent of the increase in student activity in the learning process. The material tested in the test is the material given during the study. To get a good test then take a few steps: (a) Make a test grille, (b) Prepare a test based on the test grille, (c) Validation test (d) Test test. (e) Analysis of test questions by calculating: (1) Problem index questions. (2) Differentiating power of questions. (3) Problem validity. And (4) Reliability question.[10]

Technique Data analysis to draw conclusion in hypothesis testing is done statistically that is t-test. To conduct the t-test, the normality and homogeneity test of the two groups variance is done first. The homogeneity test of variance aims to see whether the two data groups have homogeneous variances or not. To test this is done with the F-test. After the normality test and homogeneity test of variance, hypothesis test. The test of this hypothesis aims to determine whether the learning outcomes of students mathematics of experimental class is better than the result of the mathematics learning of the control class students. With the hypothesis of mathematics learning outcomes of students using LSQ is the same as mathematics learning outcomes of students who use regular learning and mathematics learning outcomes of students who

use LSQ both from the results of learning mathematics students using ordinary learning. After normality and homogeneity tests were tested on both samples, both classes were normal and homogeneous distributed, then t-test was performed. If obtained then the research hypothesis is accepted P-value is less than alpha, in other words H_0 reject.

III. RESULT

Descriptive statistics for all variables are presented which described in this section is observation data sheet and data of mathematics learning result of student during follow study process with LSQ at student of class X state senior high school two Sungai Tarab. It turned out that the development of activities undertaken by students with LSQ as a whole has increased. Based on the final test, the result of the students learning achievement is better than the control class in mathematics learning which is followed by all the students from the experimental class as much as 31 people and the control class as many as 30 people. From the value of the learning results obtained by each student to further calculate the average value (\bar{x}), standard deviation (s), variance (s^2). The CONCLUSION of the calculation results can be seen in the following table:

TABLE I. SAMPLE CLASS AND TEST CALCULATIONS

Class	N	\bar{x}	s	s^2
Experiment	31	63.0	10.8	116.64
Control	30	53.5	11.8	139.24

TABLE II. TOTAL NUMBER OF INDIVIDUALS AND CLASSICAL COMPLETENESS

The total number of individuals	% classical completeness
24	77.42
6	20

From the data table above can be seen the average result of mathematics value in experiment class higher than control class and classical completeness in experiment class higher than control class. While the experiment class standard deviation is smaller than the control class. This shows that students ability in the experimental class is more homogeneous than the students ability in the control class. In analyzing the data of student learning result of sample class, the following steps are taken.

A. Normality Test

To test the normality of student learning result data of sample class is used by minitab software assistance. After the normality test, the result shows that the dotted points obtained close to the straight line, then the P-value of the two sample classes is also greater than the predefined (alpha) defined level of 0.05. So it can be concluded that the scores of student learning outcomes sample class normal distribution.

B. Homogeneity Test

To test the homogeneity of the sample class is also used minitab software assistance. After the homogeneity test, it can

be seen that the confidence interval for standard deviation for both classes of samples is intersected. This shows that the two sample classes are homogeneous. This means that the final test scores of both classes of samples have the same variance or diversity.

C. Hypothesis Testing

Based on the hypothesis that has been put forward before the hypothesis test used in this study is a test of equality two averages. After normality test and homogeneity test, both samples were distributed normal and homogeneous, then t-test was done with minitab software. Result of analysis of mean value of final test showed that at 95% confidence level obtained $t = 3.31$ and $P\text{-value} = 0.002$. Based on the t-test conducted obtained P-value is less than alpha hence the research hypothesis accepted. So it can be concluded that the results of learning mathematics of students on learning LSQ better than the results of learning mathematics students on ordinary learning.

IV. DISCUSSION

Based on the results of data analysis conducted on the observation sheet and the final test it is known that LSQ in learning mathematics categorized successfully increase student activity in the learning process and the learning outcomes of experimental class better than the mathematics learning outcomes of students of the control class. This statement can be seen from the average value of the experimental class higher than the average value of the control class for the material tested. The average value for the experimental class is 63.0 whereas the average grade of the control class is 53.5. The t-test is performed to test the hypothesis using minitab software assistance. The analysis results show that at the level of confidence 95% ($\alpha = 0.05$) obtained $t = 3.31$ and $P\text{-value} = 0.002$. Based on the data it is clearly seen P-value is less than alpha, hence thus the research hypothesis is accepted. So it can be concluded that the results of learning mathematics students with LSQ better than the students mathematics learning on conventional learning.

In the control class students only listen to the teachers explanation, taking notes and receiving whatever the teacher has to say about the material learned at each meeting. Very little happened to each other arguments between students in the learning process. The discussion of homework questions in the control class is only done on questions that are difficult for the students as a whole, the students who can solve the homework problems make the results obtained in front of the class, but to the students are not asked to explain because this will be done by the teacher concerned. While explaining the teacher provides an opportunity for all students to respond and question the material described. As a result, students are more likely to be silent, most of them just take notes and accept what is given by friends and teachers in the learning process. This shows that the students learning activity in the

control class is lower than the students learning activity in the experimental class. To overcome this situation, at the next meeting each student is required to be able to solve the problem-saol given, both as training and as homework. The completion of training and homework questions solved by the student is checked every time there is a meeting and will be added value for the students. In the end the students are motivated to work and master the material themselves.

Although experimental classroom learning outcomes are better than control class outcomes, there are still students who are not thorough in learning. This happens because it is influenced by several factors such as the time spent for one meeting which is still not enough for students to understand the material and solve the problem. Students are limited to asking questions and discussing answers with friends. As a result, at the end of the learning process many students are not satisfied, although at the next meeting the teacher and students discuss the problems that can not be solved by each student as a whole.

In addition to factors above other factors that also affect the student learning outcomes at the end of the learning process that can not be separated from students and teachers who carry out the learning process. The factor of the students is the lack of desire of the students themselves to understand the material being studied. While the factor of the teacher, here is the researchers themselves who have not been too perfect to apply LSQ in the learning process. It is expected that there will be more advanced research to improve the quality and the results of learning mathematics in the future.

V. CONCLUSION

LSQ in learning mathematics successfully increase student activity in learning process. The result of learning mathematics of class X students in state senior high school two Sungai Tarab with the use of LSQ is better than student learning outcomes using conventional learning with 95% confidence level.

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