

**THE EFFECTIVENESS OF ELABORATION STRATEGY  
IN IMPROVING STUDENT'S  
LEARNING ACHIEVEMENT**

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**Abstract**

Type of this research is an experiment that involve two groups that were given different treatment. The purpose of this research are to (1) analyze the differences of learning achievement between students are taught using elaboration strategy and students who are taught using the conventional strategy, (2) determine the effectiveness of elaboration strategies in improving students' learning achievement on grade X senior high school (3) know that the learning achievement of students who are taught mathematics using elaboration strategy more effective than students who are taught mathematics using a conventional strategy. The population of this research is all students of grade X senior high school in the even semester 2010/2011 academic year and two classes are selected randomly, as the experimental unit that are year X<sub>3</sub> and X<sub>4</sub>. Year X<sub>3</sub> is given conventional strategy and year X<sub>4</sub> is given elaboration strategy. Techniques of data analysis consist of descriptive and inferential statistics. The results of this research showed that: (1) mean of students' mathematics learning achievement before being taught with the conventional strategy was in the very low category, but after being taught with the conventional strategy has an average are in the high category, (2) as well as the control class, the mean of students' mathematics learning achievement on grade X before taught using the strategy of elaboration on the three-dimensional topic was in a very low category, but after taught with the elaboration strategy had an average in the high category (3) the results of inferential statistical analysis obtained the conclusion, there are differences in mathematics learning achievement between students who are taught by elaboration strategy and the students that is taught with the conventional strategy. From the results of this research can be concluded that the students' mathematics learning achievement who are taught using elaboration strategy more effective than students who are taught using conventional strategy.

Key words: Elaboration strategy, Learning Achievement.

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## A. Introduction

Education is one of the most decisive factors in the progress and success of a Nation. Education in Indonesia is instrumental in achieving national goals of Indonesia. The world of education is now required to constantly make innovations in learning, in its various aspects, ranging from vision, mission, goals, programs, services, methods, technologies, processes, until evaluation (Bravo, 2009).

Mathematics is a subject that studied of students from elementary to high school and even college. Mathematics is taught not only to know and understand what is contained in the mathematics itself, but the mathematics is taught aims to train mindset of students to solve the problem with the critical, logical, meticulous and precise ways. In addition, mathematics is taught to form student's personality and skillful to use mathematics in everyday life because mathematics is always used in all facets of life.

Now a days there is no something data or facts that can be used as evidence that the learning of mathematics in Indonesia has done well. Some indicators from the average value of the final exam, graduation national boundaries, the more in international forums *International Mathematical Olympiad (IMO)* such as, the results still show that far from encouraging.

At this time Low of mathematics learning in Indonesia due to a lack of understanding of the students' concept. Students in doing the task given by the teacher so easy they do it, because it is still in accordance with the examples given, but if students find difficult problem, students are unable to do it. This is because the lack of students' mathematical concept. Teachers still do not invest good math concepts to students.

Based on the above explanation, the planting of mathematical concepts appropriately and correctly should be done early, that since the child still in elementary school. Therefore, they were required to obtain the understanding, definition, calculation and operation of the mathematics correctly, because it will become a stepping-stone to studying mathematics in higher education.

In addition, students are also easy to forget with the material taught by teachers, the students can understand when explained properly, their memory was still last up to several days. However, if few weeks they have forgotten with the material

that been taught, this is because students just keep the subject matter in the short-term memory and less understanding with mathematics concepts by students.

Rendahnya hasil pembelajaran Matematika ini dikarenakan oleh rendahnya kualitas pendidikan yang diselenggarakan oleh guru di sekolah. Mathematics learning achievements are low due to the low quality of education held by teachers at school. The low quality of education in schools is caused by many things, one of which is less precise in determining teacher's learning strategy in class to develop syllabus and learning scenario are formulated, so the less effectiveness of the learning done in the class.

For a teacher to select model and learning strategy should be done carefully, so the choice was appropriate or relevant to the various other aspects of learning, efficient and attractive (Bravo, 2009). Moreover, many experts stating that no matter how well prepared course material without being accompanied by a model and learning strategy appropriate, learning will not bring maximum results.

To teach students to learn is a very important educational goal and is a major goal of education. According to Nur (1996), it is important for teachers to help their students mastering the learning strategies. Learning strategies used to help students learn how to learn. Good teaching involves teaching students how to learn, how to remember, how to think, and how to motivate themselves.

Based on that researcher will conduct research by applying a learning strategy that is expected to be effective in improving students' mathematics learning achievement. Researcher estimates that elaboration-learning strategy into an alternative learning strategy is quite effective in improving learning achievement.

Based on the opinion of Uno (2010), learning strategy is selected each activity, one that can provide facilities or assistance to students towards the achievement of specific learning objectives. For the teachers, the strategy can be used as guidance and reference in the implementation of a systematic act of learning. For the student (user of learning strategy) to facilitate the learning process (facilitate and accelerate the understanding of learning content), because each learning strategy designed to facilitate students' learning process.

Elaboration strategies are categorized as macro-level organizing strategy. Strategy elaboration starts the learning from the presentation of content on a general

level to more specific directions. Sequence of learning content from a general to details to be done by displaying epitome and further part of epitome will be elaborated more detail.

There are seven components elaboration suggested by Reigeluth (1993) that are: (a) elaborate sequence, (b). the order of prerequisite learning, (c). summarize, (d). synthesis, (e). analogy, (f). activation of cognitive strategies, and g. study control.

There have been many studies done on the elaboration of strategies in all educational levels and different types of subject matter. In general, the results of the study concluded that implementation of elaboration strategy in learning effective to improve quality and learning achievement.

Based on the description of background above, can be formulated the problem as follow: Is the elaboration strategy more effective than conventional strategy in improving learning achievement of students on grade X?

Based on the problem that have been formulated, then the purpose of this research are: 1). to analysis the differences in learning achievement between students who are taught by using elaboration strategy and students who are taught with the conventional strategy. 2). to determine the effectiveness of elaboration strategies in improving the learning achievement of students on grade X.

## **B. Theoretical Description**

### **1. Elaboration Strategy**

Learning strategies are classified into three, namely:(a) Organizational strategy, (b) Delivery strategy, and (c) Management strategy.

Associated with the strategy of elaboration is organizing strategy. In Wena (2009) organizing strategy is a way to make sequencing and synthesizing the facts, concepts, procedures, and principles relating to a learning content. Sequencing associated with ways of making the order of presentation the contents of a topic, and synthesizing related to how to demonstrate to students the relationship/linkages between facts, concepts, procedures, or principles of a learning content.

Organizational strategy is divided into two that are the strategy of micro and macro strategies. In Uno (2010) micro strategy refers to the organization of learning content with a single concept, procedure, or principle. Macro strategy refers to the

organization of learning content involving more than one concept, procedure, or principle. Furthermore, macro strategies are related to how to select, arrange the sequence, make a synthesis and summary of the contents of instruction (if that concept, procedure, or principle) related.

Elaboration strategies are categorized as macro-level organizing strategy. Strategy elaboration starts learning from the presentation of content on a general level to more specific directions. Sequencing the learning content of a general nature to details to be done by displaying Epitome and further elaborated that there are parts in greater detail in the Epitome. By Ormrod (1995) elaboration strategy is a strategy that adds additional ideas for new information based on what is already known.

According to Reigeluth (1983) main goal of this strategy is to help select and sort the contents of learning in a way to optimize the achievement of learning objectives. Strategy is intended for the type of cognitive and psychomotor learning from the middle to the complex. But not on the affective domain.

There are seven components elaboration suggested by Reigeluth that are: (a). Elaborate sequence, (b). Learning prerequisite sequence, (c). Summary, (d). Synthesis, (e). Analogy, (f). Activation of cognitive strategies, and (g). Learning control.

#### **a. Elaborative sequence**

Elaborate sequence is a sequence of learning content that is simple to complex or general to specific. In the normal sequence of elaborate, must consider:

1. Presentation the content of subject matter at a general level epitomize content section more detailed
2. Epitomasi dibuat atas dasar satu tipe struktur isi bidang studi Epitome made on the basis of one type of structure the contents of subject matter In Wena (2009) Epitome can be paired with *frame content* that includes only a small part of a very important topic. Epitome should only have one type of subject: concepts, procedures, or principles.

Epitome ini berbeda dengan rangkuman, epitome hanya mencakup sebagian kecil dari isi pembelajaran yang paling penting dan yang umum saja, epitome serupa dengan skemata. Epitome is different from the summary; Epitome only

covers a small part of the contents of the most important learning and a general course, Epitome similar to schemata. Summary covers almost all important learning content.

**b. Learning prerequisite sequence**

Made By Wena (2009) Learning prerequisite sequence is the structure or sequence between the concepts, procedures, or principles which are studied in advance before the concepts, procedures, or other principles learned.

**c. Summary**

By Wena (2009) Summary is a review of what has been learned. Summary is a brief statement about the content of subject that has been studied by students.

In elaboration summary divided into two: a summary of internal and external. Internal summary is a summary of which is conducted every finished doing learning or summarize the contents of the new learning is taught. External summary given after doing some time teaching or in other words summarize all content that has been studied in several times teaching.

**d. Synthesize**

Synthesize function to find connections between concepts, procedures, or principles that are taught in the opinion of Wena (2009). Synthesize is very important because the link between the concepts, procedures, or principles of a learning content to facilitate student understanding, and gives motivational for students by linking the new knowledge will be received with knowledge that has been learned.

**e. Analogy**

The analogy can be made to facilitate students' understanding of new knowledge by comparing with the knowledge that has been known by the students according to the opinion of Reigeluth (1983). Analogy related by comparing the new knowledge will be obtained of students with the other knowledge that they already knew outside of lessons to be taught. This analogy is used to explain what it are concepts, procedures, or principles that will be studied to be easily understood students. This strategy is more effective when used in early learning.

**f. Activation of cognitive strategies**

By Wena (2009) a cognitive strategy is the necessary skills of students to manage its internal processes as learning, remembering, and thinking. This strategy should be always activated in teaching and learning process. Instructional will be effective if teachers could motivate students to use appropriate cognitive strategies.

**g. Learning Control**

Learning Control by Merrill (1979), associated with student freedom in choosing the sequence of the learning contents of which are first to learn, about the learning speed of which are compatible with self-esteem, learning strategies component which one to use, as well as cognitive strategies where appropriate.

The Opinions of Trianto and Richard are emphasis on memory students. Strategy elaboration by Richard (1997) is moving the material from short-term memory into long-term by linking new material with material that has been known.

There are seven principles developed in the elaboration learning strategy that are as follows:

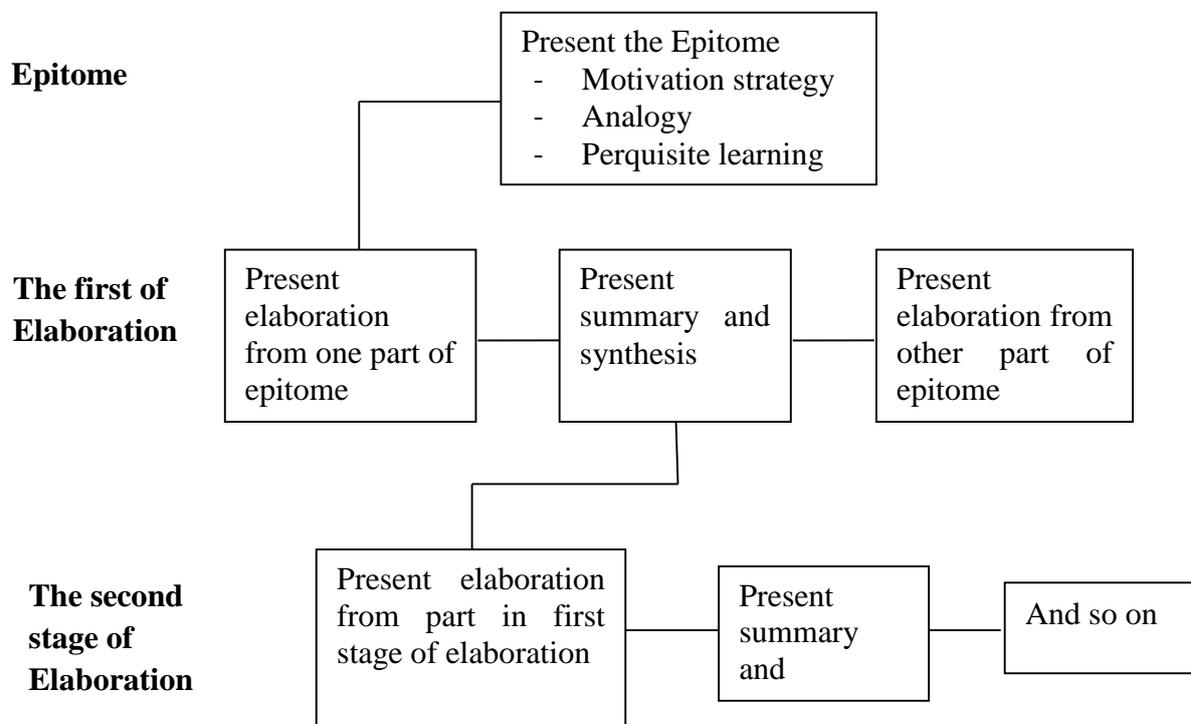
1. Presentation of the content framework
2. Gradually of elaboration
3. The most important part was first presented
4. Optimal Coverage elaboration
5. Presentation the synthesise gradually
6. Presentation type synthesise
7. Stages of granting summary

Reigeluth (1983) suggests in organizing the teaching of elaboration should be by looking steps following activities:

1. Presentation epitome, which presents the structure of teaching content in the form of an overview of the most basic, most important, and most can understand.
2. Elaboration of the first phase, which explains the descriptions of each section that are shown in Epitome. Starting from the most important part to other parts in sequence. Elaboration of each section ends with a summary and synthesis.

3. Granting summary and synthesis of inter division, in this part of the final elaboration of the first stage, given the sum of all parts and inter synthesis that has been elaborated.
4. Elaboration of the second stage, more detailed elaboration of this sub-subsection of the first stage of elaboration. The way it works the same as the first stage of elaboration,
5. Summary and final synthesis, in this stage, doing the summary and synthesis of content in teaching structure that has been given.

The following scheme illustrates the steps of teaching based on the strategy of elaboration according to Reigeluth (1983).



Implementation of the strategy elaboration in learning three-dimensional space:

1. Convey to students in early learning that in the learning process students are required to write the essentials or the important material.
2. Convey to the students to activate their cognitive strategy that is how the way students in recording the material so that they can understand what they noted. Using a schema, tables, pictures, etc.
3. Teacher provides framework content (Epitome) which will be studied in the main of learning.
4. Next the teacher asks the students to read material that will be studied according to the topics presented in the Epitome. Students were asked to create a question on the new familiar or material that it deems is not understood.
5. Teacher does the first stage of elaboration by explaining the parts of the Epitome have been provided. Teachers start of the most important part.
6. Teacher explains to students with a clear concept.
7. At the end of learning teacher together students summarize and synthesize the material that has been learned.
8. And so on until the end of the research. In the final stage students are asked to summarize and synthesize all the material that has been studied from beginning to end.

## **2. Learning Achievement**

There are several definitions of learning achievement expressed by experts are as follows:

- a. According Dalyana (2011) learning achievement appear as a change in student behavior that can be observed and measured in the changes of knowledge attitudes and skills.
- b. According Hamalik (2002) learning achievement itself can be defined as the level of students' success in learn the subject matter, which is expressed in the form of scores obtained from tests on a particular subject matter.
- c. According Dimiyati & Mudjiono (1999) learning achievement are the result of an interaction have not learned and not taught.

Learning achievement was measured by using tests; the results are contained in report cards or diplomas. By learning students will experience a change that is from not knowing to knowing, from not understanding to be understood. The final result of the decision makers high and low score of a student during the learning is learning achievement.

#### **h. Hypothesis**

After reviewing literature from various sources, then it can be formulated hypothesis that to be tested in this research, as follow: Implementation of the elaboration learning strategy effective can improve learning achievement of students on grade X.

### **C. Methods**

This research is an experiment that conducted and planned by researcher to collect fact that has related to the hypothesis. The type of experimental research that are used in this research is *quasi experimental research*, because not all variables that appear and experimental conditions can be strictly controlled (*full Randomization*). One characteristic of this research is the inability placed of subjects randomly in the experimental group or control group (Furchan, 2004). This research conducted in SMA. This research has been done at even semester of the school year 2010/2011.

In this research the instruments that will be used were as follows:

1. Initial tests before implementing the conventional and the elaboration strategy of the learning process (*pretest*).
2. Worksheet (student activity sheet) during the learning process.
3. Achievement test after participating in the learning process using conventional strategy and elaboration strategy.

Instrument used in this research is an instrument that will be developed. For that to be aware of the quality of the instrument whether it is proper to be used in particular by testing instruments that is Content Validity.

The validity of the content is the validity of the test content itself as a means of measuring learning achievement are: the extent to which achievement test as a

means of measuring student learning achievement, they have been able to represent a representative of the whole subject matter or materials that should be tested (Sudijono, 2005).

Experimental units in this research are students of class  $X_3$  and  $X_4$  from all students grade X, where the population is consist of class  $X_1$  to  $X_6$ . Class  $X_3$  as a control class and  $X_4$  as an experiment class. After researcher determines the experimental class and control class that are class  $X_3$  as a control group and  $X_4$  as an experimental group. So, the treatment of elaboration strategy is assigned to class  $X_4$  and conventional strategy is assigned to class  $X_3$ , each class consist of 32 students school year 2010/2011.

Working procedures in this research are

1. Determine school where done research
2. Conduct beginning observations in schools and class that taught with the strategy elaboration. At this initial observation which is to see what models and learning strategies used by teachers of mathematics subjects in class X SMA and see student learning achievement in the previous lesson.
3. Make research instruments for the control group and experimental group.
4. Conduct the validity test of the instrument to be used in research.
5. Provide initial test (pretest) for classes that be taught using conventional strategy and elaboration strategy.
6. Do learning activities in both classes with different time and different strategies.
7. At the end of the lesson, given achievement tests.
8. Further analyzing the data already collected from the study.

#### **D. Data Analysis Techniques**

Testing the research hypothesis are formulated and the working hypothesis (statistics) used *ANCOVA* test. This technique is used to determine the relationship between the covariate with student learning achievement. The analysis that used to test the hypothesis. The data analysis technique used was analysis of covariance (ANCOVA) one path involving two independent variables and one dependent variable.

Analysis of covariance in statistical methods that providing control to external variables that have an effect on the relationship between independent variables and the dependent variable (Furchan, 2004). According Restiawan (2011) Analysis of covariance (ANCOVA) is a multivariate statistical test which is a combination of regression analysis with analysis of variance (ANOVA). The purpose of covariance analysis is used to (1) improve the accuracy of experiments and (2) to eliminate the sources of error in experiments (Rutherford, 2001).

The hypotheses proposed in this study are:

H<sub>0</sub> : There are no significant differences to student learning achievement using the conventional strategy and strategy elaboration.

H<sub>1</sub> : There are significant differences on student learning outcomes using the conventional strategy and strategy elaboration.

Hypothesis statistics are:

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 \neq \mu_2$$

Description:

$\mu_1$  : The average student learning achievement that follows the learning by using elaboration strategies.

$\mu_2$  : The average student learning achievement that follows the learning by using conventional strategies.

The effectiveness of this research is:

- a. Significantly by using analysis ANCOVA there is difference learning achievement between the control groups with experimental group.
- b. By looking at the average of each factor can determine the effectiveness of learning strategy.
- c. Part of posttest greater than 50% has reached Minimum Mastery Criterion (MMC) that determined from the school.

The MMC who want to achieve at SMA Negeri is 75, if students are to achieve mathematics scores at least 75 then the learning can be said to be effective. The categories of data in the form of student learning achievement are as follows:

## E. Results

After considering the characteristics of variables that have been researched and pre-requisite analysis, further testing of hypothesis. For the purposes of hypothesis, testing used inferential statistics with the help of SPSS that is statistical analysis of ANCOVA. Criterion test is if the value of Probability greater than  $\alpha = 0.05$ , then  $H_0$  is accepted or  $H_1$  is rejected, it means there is no difference effect between the two treatments provided by controlling the initial ability of students. Conversely, if the value of Probability smaller than  $\alpha = 0.05$  then  $H_0$  is rejected or  $H_1$  is accepted, it means that there is a difference effect between the two treatment provided by controlling the initial ability of students.

The analysis results showed that the  $F_{\text{test}} = 4.683$  with the Probability = 0.035 because of Probability <  $\alpha = 0.05$ , then  $H_0$  is rejected or  $H_1$  is accepted. It means that after controlling the students' initial ability there is a difference between learning achievement of students who are taught elaboration strategy and learning achievement of students who are taught with the conventional strategy in three-dimensional space topic. The data ANCOVA analysis presented in Table below

Table of ANCOVA Analysis Result

**Tests of Between-Subjects Effects**

Dependent Variable: POSTEST

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1557.282 <sup>a</sup>	2	778.641	12.381	.000
Intercept	34496.004	1	34496.004	548.521	.000
PRETEST	86.250	1	86.250	1.371	.246
STRATEGI	294.526	1	294.526	4.683	.035
Error	3710.459	59	62.889		
Total	335082.000	62			
Corrected Total	5267.742	61			

a. R Squared = .296 (Adjusted R Squared = .272)

## **F. Discussion**

The result of descriptive statistics showed that there are two data groups that are students' initial ability (Pretest) and learning achievement (Posttest). In the pretest divided by control and experimental group, same with the part of posttest.

Students' mathematics learning achievement grade X SMA Negeri before taught by elaboration as well as conventional strategy there in the very low category. Students' mathematics learning achievement grade X SMA Negeri, well that is taught with the strategy of elaboration as well as class that are taught with conventional strategy are both located in the high category, even though such class are taught by using elaboration strategy has mean is 77.81 that higher a class taught by the conventional strategy that has mean is 68.06. This is because students are taught by elaboration strategy contained in the high and very high categories, while students who are taught with the conventional strategy in the high and medium category.

In a class taught by elaboration strategy there were 21 students or 67.74% of students who reach the minimum mastery criterion (MMC) is much higher than in class taught with the conventional strategy that only 7 students or 22.58% to reach MMC.

In addition, descriptive results of students' worksheet for control group in the first meeting has mean is 70.63, in the second meeting although just a little occur increase that is 70.77, and the third meeting occur decrease of the mean to be 68.93, it is caused by the topic for this meeting very difficult. Descriptive results of students' worksheet for experiment group in the first meeting has mean is 83.85, in the second meeting occur increase for mean of students' worksheet that is 84.30, and the third meeting occur decrease of the mean be 73.66, it is caused by the topic for this meeting very difficult. Based on descriptive analysis results for students' worksheet can be concluded that the class who taught by elaboration strategy has mean higher than class who taught by conventional strategy both of in the first meeting to third meeting.

Based on the opinion Tiro (1999) the success of teaching can be seen from the increase of mean based on statistical analysis of data above, it can be concluded

that the learning process by using elaboration strategy more effective than using conventional strategy.

Inferential analysis results show that there are significant differences in mathematics learning achievement between students taught with elaboration strategy and students who are taught with the conventional strategy. This is indicated by the value of  $P = 0.035$  is smaller than  $\alpha = 0.05$ . It can be concluded that learning by using elaboration strategy more effective to improve students' mathematics learning achievement grade X SMA Negeri than conventional strategy.

According to research results above, either from descriptive or inferential analysis as well as from research results as follow: Implementation of Elaboration Strategy in the Small Group to Improve Students' Learning Achievement Grade VII SMP Negeri 2 Gamelong in the Even Semester, Experimentation of Math Learning through the Elaboration Strategy in improving Students' Learning Achievement On Linear Equation System Of Two Variables Topic (Students Grade VIII MTs N 1 Gondangrejo). As well as supported by elaboration theory that developed by Charles Reigeluth (1989) said that learning that using elaboration theory will obtain the effective learning, so can be conclude that elaboration strategy more effective in improving students' learning achievement than conventional strategy.

### **G. Conclusion And Suggestion**

Based on the results of data analysis and discussion above we can conclude that:

- a. The mean of students' mathematics learning achievement grade X before taught with the conventional strategy that are at very low category, but after being taught with the conventional strategy has mean being in the high category.
- b. Just as in the control class, the mean of students' mathematics learning achievement grade X before taught using the strategy of elaboration in the three-dimensional space topic that is at very low category, but after being taught by an elaboration strategy has also located in the high category.
- c. In the experimental class the first mean of students' learning achievement on three-dimensional space topic there is in very low category and after being taught by elaboration strategy was increasing to the high category.

- d. After doing ANCOVA, it is obtained the results that after covariates are controlled by initial ability are Probability differences in student learning achievement between the classes is taught by elaboration strategy and the class taught using the conventional strategy.
- e. Based on mean scores between the control and experimental classes, it can be concluded that the elaboration strategy is more effective to improve students' learning achievement than the conventional strategy.

After saw the results of research that has been done, the authors suggest that:

- a. Mathematics teacher of grade X SMA Negeri can utilize elaboration strategy to improve students' mathematics learning achievement, in order to be considered as an alternative in teaching and learning process.
- b. The author always make mistakes and still that are the things not controlled properly, it is advisable to conduct similar or relevant research, using a lot more time so that the analysis is expected to be better.

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