# THE EFFECTIVENESS OF MATHEMATICS LEARNING USING THE SYNTHETIC ANALYTIC APPROACH OF MATHEMATICS LEARNING OUTCOME AT ELEVEN GRADE STUDENT

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**ABSTRACT**

Lacking students actively in the learning process will affect the student learning outcomes, especially in mathematics. Using the Synthetic Analytic Approach is expected to increase students' attractiveness towards mathematics learning to accomplish mathematics problems. Results of mathematics learning students' class XI Social Sciences (IPS) MAN 1 Garut are still low because no students who meet the Minimum Completeness Criteria (MCC) have been determined school. This study aims to determine the effectiveness of learning using Synthetic Analytic Approach of mathematics learning outcomes at Eleven Grade Student of State Islamic Senior high School (MAN) 1 Garut even semester in the Academic year 2016/2017 on the subject of Peluang. This study's population were all students of class eleven grade Student of MAN 1 Garut even semester in 2016/2017. The sample's selection was made using Random Sampling of the class, the class taking the sample by lottery. The sample is a class XI IPS 5 as class Experiment and class XI IPS 4 as class Control. The data collection method used is the method of documentation and testing. The instrument used in mathematics learning outcomes test. The Analyzing of the data in this hypothesis is a t-test. This research on the significance level of 5% and dk = 66 indicates that: (1) There are differences in the mathematics learning outcomes that use the Synthetic Analytic Approach and the use of Expository Approach. It can be seen that $t_{count} = 2.1687$ is bigger than $t_{table}$ = 1.99826. (2) mathematics learning using the Synthetic Analytic Approach is more effective than the use of the Expository Approach. It can be seen that $t_{count} = 2.1687$ is bigger than $t_{table}$ = 1.66931.

**Keywords:** Effectiveness, Synthetic Analytic Approach, Mathematics Learning Outcome.

## INTRODUCTION

Education has a critical role in the development of every individual, especially for national and state development. In education, it takes several stages to form a character. The educational process cannot be separated from the development process itself. Education is one of the essential things for human life. So that every time education is always developing under the times, as well as science, for this reason, there need to be more varied learning innovations so that they can be used to solve existing problems.

Learning done optimally will facilitate the implementation of activities to achieve the specified goals. Learning not only involves fact-based interpretation but also represents learning outcomes. Learning is closely related to teaching, where a person will learn from what he learns. Learning can be effective if students understand the teacher's learning process towards a comfortable and conducive classroom environment.

Problem-solving is seen as a process of finding a combination of rules applied to overcome a new situation. Problem-solving is not just a form of applying the rules that have been mastered through previous learning activities. On the other hand, it is a process to get a set of rules at a higher level. Using appropriate learning strategies, students can improve learning outcomes in mathematics in the learning process. Students will be more active in the learning process so that learning can take place effectively in achieving competency.

Based on interviews with mathematics teachers in class XI IPS MAN 1 Garut, many students are still less active in the learning process. Only some students dare to ask if students experience

problems. Students' mathematics ability is still relatively low if adjusted to the MCC determined by the school. As shown in Table 1 follows.

**Table 1.** Summary of Midterm (UTS) Mathematics Grade Students of Class XI IPS MAN 1 Garut Odd Semester 2016/2017 Academic Year

| Value | Class | | | | | Amount | % |
|---|---|---|---|---|---|---|---|
| | XI IPS 1 | XI IPS 2 | XI IPS 3 | XI IPS 4 | XI IPS 5 | | |
| ≥ MCC | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| < MCC | 34 | 36 | 36 | 32 | 36 | 174 | 100% |
| Total | 34 | 36 | 36 | 32 | 36 | 174 | 100% |

*Source: MAN 1 Garut*

Based on Table 1 above, it can be seen that the odd semester midterms grades in mathematics subjects in class XI IPS MAN 1 Garut are still low. There are no students who meet the MCC determined by the school. This proves that mathematics is a subject that is difficult to learn by students.

From the observations above, it can be seen that the learning carried out is not optimal. This contrasts with the learning model used and the condition of students at the school. To respond to these problems requires innovation in learning.

Applying the right learning model is hoped that it can improve students' abilities in mathematics learning outcomes. The learning model applied to transform old learning into new learning has been carried out. One alternative learning model that can be applied in mathematics learning is a synthetic, analytic approach. Using the right model will make the learning process more effective. With the right model, students will better understand and deeply understand the material being studied.

Synthetic Analytic Approach is an approach by dividing given and unknown problems and then writing the actual equation after using word meanings in mathematics, algebraic manipulation, and arithmetic calculations (Mulyana, Tatang.2008). The characteristics of the synthetic, analytic approach are (1) learning begins by proposing mathematical problems to students so that there will be a cognitive conflict between the initial scheme and the new scheme due to given problems; (2) problems are analyzed from general things to be more specific; (3) the conjecture and the proof of the conjecture are synthesized by students in groups using the inductive-deductive approach; (4) giving intervention from the teacher when analyzing the problem, synthesizing the conjecture and proving the conjecture and when solving the problem; (5) presents the results of the analysis and synthesis activities in the class forum; (6) applying the theorems that have been obtained in solving problems, especially the types of analysis, synthesis, and evaluation.

By developing learning variations by using this approach, students are expected to be active, communicative and improve their learning achievement. The formulation of the problem in this study are: 1) Is there a difference in learning outcomes in mathematics that the learner uses a synthetic, analytic approach with learning using an expository approach in class XI IPS MAN 1 student in Garut even semester 2016/2017 Academic Year? 2) Which is more effective between learning using a synthetic, analytic approach and learning using an expository approach in class XI IPS MAN 1 student in Garut even semester 2016/2017 Academic Year?

Based on the above problem formulation, the objectives to be achieved from this study are 1) To find out whether or not there are differences in learning outcomes in mathematics learning using a synthetic, analytic approach to learning using an expository approach in class XI IPS MAN 1 Garut even semester 2016/2017 Academic Year. 2) To determine the effectiveness of learning using a synthetic, analytic approach to learning using an expository approach to students of class XI IPS MAN 1 Garut even semester 2016/2017 Academic Year.

## METHODS

This research is a type of comparative research. According to Van Delen in Arikunto, Suharsimi (2013: 311), comparative research is deliberately conducted to compare two different conditions by looking at the causes. Whether the two conditions are the same or there are differences,

and if there are differences, which conditions be better. The treatment that arises is learning with synthetic, analytic approaches, and expository approaches in learning mathematics.

The design in this study used two classes, namely the experimental class and the control class. In the experimental class, learning is carried out using a synthetic, analytic approach. In control, class learning is carried out using an expository approach. The experimental class and the control class in this study used the same learning outcomes test (posttest). According to Sugiyono (2013: 117), the population is a generalization area consisting of objects/subjects with specific qualities and characteristics determined by researchers to be studied and then conclusions drawn. The population in this study were all students of class XI IPS MAN 1 Garut, which consisted of class 5 classes, namely XI IPS 1, XI IPS 2, XI IPS 3, XI IPS 4, XI IPS 5, where all classes were considered homogeneous because the ability of students from each - each class is balanced.

In this study, the sampling was carried out using a random sampling of the class, randomly taking the sample class. Obtained class XI IPS 5 as an experimental class and XI IPS 4 as a control class. This study's variables were the learning model and learning outcomes of class XI IPS MAN 1 Garut in the even semester of the 2016/2017 school year. Data collection techniques used in this study are data documentation techniques and test techniques. The type of test that will be used is the posttest. The form of learning outcomes test instrument used is a descriptive test. This study uses descriptive questions consisting of 4 items with the subject matter of class XI opportunities.

Analysis of the data used in this study is the test for normality, homogeneity, and hypothesis testing (t-test). The first hypothesis test is conducted to determine the hypothesis that there are differences in mathematics learning outcomes using a synthetic, analytical approach with mathematical learning outcomes using an expository approach. The second hypothesis test is conducted to prove that learning using a synthetic, analytic approach is more effective than learning using an expository approach.

## RESULTS AND DISCUSSION

Description of Mathematics Learning Outcomes Values are presented in Table 2 below.

**Table 2.** Summary of Posttest Data Description (Mathematics Learning Outcomes)

| | **Experimentation Class (XI IPS 5)** | **Control class (XI IPS 4)** |
|---|---|---|
| The highest score | 90 | 80 |
| Lowest Value | 43 | 35 |
| Average | 62.2777 | 56.75 |
| Standard Deviation | 13.3161 | 13.6665 |
| Variance | 177.3206349 | 186.7741937 |
| Lots of Data | 36 | 32 |

Before testing the hypothesis, the data will be tested in advance. The prerequisite tests are the normality test and homogeneity test. The normality test ensures that mathematics learning outcomes in the experimental and control classes are normally distributed. With a significant level of 5% and a degree of freedom 4 for the experimental class and a degree of freedom 3 for the control class. It was shown in the experimental class that $\chi^2_{count} = 9.0433 < \chi^2_{table} = 9.488$ and in the control class $\chi^2_{count} = 2.2559 < \chi^2_{table} = 7.815$.

The homogeneity test on the mathematics learning achievement test's data value assumes that the research sample on the mathematics learning outcome data comes from the same or homogeneous conditions. With a significant level of 5% and a degree of freedom 66, the mathematics learning achievement test results prove homogeneous. This is indicated in $F_{count} = 0.9493 < F_{table} = 1.8004$.

This study is intended to calculate two hypotheses. The two hypotheses tested are: (1) The first hypothesis is obtained $t_{table} = 1.99826$ and $t_{count} = 2.1687$, so it is known that $t_{count} > t_{table}$ then $H_0$ is rejected $H_1$ is accepted. So, it can be concluded that there is a difference between mathematics learning outcomes in learning that uses a synthetic, analytical approach with learning that uses the expository

approach of students of class XI IPS MAN 1 Garut even semester 2016/2017 academic year. (2) The second hypothesis is obtained $t_{table}$ = 1.66931 and $t_{count}$ = 2.1687. It is known that $t_{count} > t_{table}$ then $H_0$ is rejected, and $H_1$ is accepted. So, it can be concluded that the synthetic, analytical approach is more effective than the expository approach to the mathematics learning outcomes of students of class XI IPS MAN 1 Garut even semester 2016/2017 school year.

From the description above, it can be seen that mathematics learning using a synthetic, analytic approach is more effective than the expository approach on the subject of opportunities. Using a synthetic, analytic approach, students take an active role during the learning process. Students are indirectly motivated to explain material or the discussion results in front of other students adequately.

By involving students directly during the learning process, students feel happier because they have a role. Using a synthetic, analytic approach, students can master the material well to be more active and creative in solving mathematical problems. Unlike the synthetic, analytic approach, the expository approach to the learning process tends to be less severe and teacher-centered. The teacher conveys explicit learning material to look less active and more likely to joke with equal friends.

The description above illustrates that learning mathematics using a synthetic, analytic approach positively influences students' abilities. Students can learn actively and understand the material well. So it can be concluded that learning mathematics using a synthetic, analytic approach is more effective than learning mathematics using an expository approach.

## CONCLUSION

Based on the results of research and discussion, the following conclusions can be drawn:

1. There is a difference between learning outcomes of mathematics in learning that uses a synthetic, analytical approach with learning that uses the expository approach of students of class XI IPS MAN 1 Garut even semester of the 2016/2017 school year. This can be seen in the hypothesis test results, wherewith a significant level of 5% and degrees of freedom 66, the value of $t_{count} = 2.1687$ and value $t_{table} = 1.99826$, it is known that $t_{count} > t_{table}$ so $H_0$ is rejected and $H_1$ is accepted.
2. Learning using a synthetic, analytical approach is more effective than learning using an expository approach to mathematics learning outcomes in XI IPS MAN 1 class in Garut even semester 2016/2017 academic year. This can be seen in the hypothesis test results, wherewith a significant level of 5% and degrees of freedom 66, the value of $t_{count} = 2.1687$ and value $t_{table} = 1.66931$, it is known that $t_{count} > t_{table}$ so $H_0$ is rejected and $H_1$ is accepted.

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