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THE STUDENT TEAMS LEARNING MODEL *ACHIEVEMENT DIVISION (STAD) THROUGH USE DOWNLOADING BOARD PROPS MATHEMATICS LEARNING OUTCOMES*

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ABSTRACT

The direction or aim of the research is to determine the effectiveness of *Student Teams Achievement Division learning* through the use of derivative board teaching aids on mathematics learning outcomes. The research approach used is a quantitative approach and the research design used is a non-equivalent pretest posttest quasi-experimental design. The population of this research was class XI students at SMA N 5 Tegal City. Random sampling was taken by lottery with class XI IPA 1 students as *the trial group* , XI IPA 2 as *the control group* , and XI IPA 3 as *the experimental group* . In testing validity , *point biserial correlation* is used . For reliability testing, kr 20 is used . The prerequisite test is carried out using a normality test using the *Liliefors test.* Then the f test is carried out as a homogeneity test. The testing carried out resulted in 30 valid questions out of the 35 questions created. The results of research on the hypothesis obtained $F_{count} = 5.46$ and $F_{table} = 3.98$ so *the calculated* F is greater than *the* F_{table} , namely $5.46 > 3.98$, so it can be concluded that there is a difference in the learning outcomes of students in the STAD learning model using derivative board teaching aids and the conventional learning model.

Keywords : STAD Learning Model, Derived Board Teaching Aids, Mathematics Learning Outcomes **.**

INTRODUCTION

Mathematics is a subject that is not easy for some students which results in low mathematics learning outcomes. According to Jamal (2014) in Savitri (2021:1611-1622) regarding the analysis of difficulties in learning mathematics, the use of incorrect formulas and poor understanding of mathematical concepts in solving a problem is the cause of difficulties understanding the material.

One of the mathematics educators at SMA N 5 Tegal City, students experienced difficult mathematics learning, resulting in declining mathematics scores. The decline in mathematics scores is proven by research by Anggraeni et al (2020) in Savitri (2021:1611-1622) concluding that internal factors and external factors are the cause of difficulties in learning mathematics. Internal factors are (1) when learning mathematics students have a negative attitude, (2) there is low interest in learning, (3) weak motivation to learn, and (4) they have deficiencies in sensing. Meanwhile, external factors are (1) monotonous teacher learning, (2) lack of learning equipment, (3) the family environment is less supportive, (4) in a busy community environment and the average level of community education is still low.

To be able to solve these problems, it is necessary to use cooperative learning so that you can realize better understanding *skills* . Using the right learning method, one of which is *the Student Teams Achievement Division* learning model , can make students improve their mathematics results. According to Slavin (2011:4) learning STADis a cooperative type model by dividing the group into four to five students who have different *skills* .

Apart from that, it is also necessary to use teaching aids to make it easier to understand concepts where students are able to practice problem solving and find out new ideas after knowing the concepts being studied (Suherman, 1994: 274). The derivative board teaching aid is a medium that functions to support learning for material derived from algebraic functions.

According to research by Sukendra et al (2022:247-257), at STAD students are more active in carrying out activities such as discussions so that their mathematics learning outcomes are better. To further optimize learning outcomes, it is necessary to use mathematical media. The media used in the research is a derivative board. Meanwhile (Aji, 2016) in Wulandari (2021:124-133) the ability to understand concepts assisted by demonstration media compared to just using conventional learning is better and results increase.

Based on the background of the problem, the problem formulation is: Is *the Student Teams Achievement Division* learning model through the use of derivative board props more effective than the conventional learning model for mathematics learning outcomes?

The hypothesis formulated in this research is that learning with *the student teams achievement division learning model* using derivative board teaching aids is more effective than using conventional learning models on mathematics learning outcomes,

From the description of the problem, it can be seen that the aim of the research is to determine the effectiveness of the *Student Teams Achievement Division learning model* through the use of derivative board teaching aids on mathematics learning outcomes.

RESEARCH METHODS

The research took place over a period of one month, namely April 10 2023 to May 8 2023. The research location was at SMA Negeri 5 Tegal City

In this method, a quantitative approach is applied. The definition of a quantitative approach put forward by Sunyoto (2016:21) is a research approach in the form of numbers or figures used to facilitate research in concluding understanding. This research uses *a quasi experimental design type pretest posttest nonequivalent* .

The opinion formulated by Sugiyono (2017:215) is that population is a generalized area with a quantity or *certain character* used to absorb the conclusions. This population has been applied to the class

According to the opinion formulated by Sugiyono (2016:118), sample means part of the population in the form of numbers and characteristics. In this research, samples were obtained by drawing lots so that the results were class XI IPA 1 students as *trial groups* , XI IPA 2 as *control groups* , and XI IPA 3 as *experimental groups* .

Variables are aspects in the form of objects selected in research to seek conclusions (Sugiyono , 2015: 138). The variables formulated are divided into 2, namely *dependent* and *independent variables* . *The independent variable* determined is the STAD model using derivative board media (*X*). Meanwhile, *the dependent variable* is the result of learning mathematics (*Y*).

Ridwan (2010:51), states that a procedural method that can be carried out in collecting data is called data collection techniques. There are various procedures that can be used to collect data, namely tests and documentation

In testing validity, *point biserial correlation is* used because it is dichotonomic, meaning there are two categories, namely the true and false categories. Meanwhile, in testing the reliability of the questions, *Kr 20 is used* because it is a dichotomous. Question difficulty items can be determined by the percentage of subjects who answered correctly. Then a different power test was carried out

As a prerequisite, a normality test is carried out using the *Lilifors test.* Then the f test is carried out as a homogeneity test. According to the research objectives, the calculations use *one tailed t test* with the calculations below.

$$t = \frac{\overline{Y_E} - \overline{Y_K}}{s\sqrt{\frac{1}{n_E} + \frac{1}{n_K}}}$$

Information:

$\overline{Y_E}$ = mean experiment *group*

$\overline{Y_K}$ = mean control *group*

s = overall standard deviation

n_E = experimental *group sample*

n_K = *group* control sample

RESULTS AND DISCUSSION

After carrying out validity test calculations, it was found that 5 items were invalid out of the 35 items created. Valid questions can be used to measure mathematics learning outcomes. In the reliability test of the

calculations, the value $r_{xx} > r_{table}$ *is produced* namely 0.84 > 0.70, it can be stated that the test results of the trial class are reliable. According to the calculation of the level of difficulty, 35 items were studied resulting in 9 items in the easy category, 15 items in the medium category, and 11 items in the difficult category.

The calculation of the normality test before and after research using the *Liliefors test* is below.

Table 1 Posttest Normality Test

No	Group	L_{count}	L_{table}	Note
1	Experiment	0.072	0.149	normal
2	Control	0.086	0.149	normal

At significance = 5%, looking at the results of the normality test using the *Liliefors test, the data above* is produced by looking at the *calculated L value* < $L_{table.}$ So it can be concluded that the data is normally distributed.

After carrying out the normality test, proceed with the homogeneity test which is produced in the following table.

Table 2 Homogeneity Test

No	Data	F_{count}	F_{table}	Note
1	Pretest	1,668	1,772	Homogeneous
2	Posttest	1,660	1,772	Homogeneous

At significance = 5%, look at the table above using the f test with pretest and posttest data in both the experimental class and control class showing $f_{count} < f_{table}$ so that it shows a homogeneous sample.

Hypothesis testing in this research uses the t test one right side. For t_{table} with $dk = (n_e + n_k) - 2 = (35+35)-2 = 68$ with a significance level $\propto = 0{,}05$so that t_{table} is 1.67 while the *calculated* t is 2.27. Look at the calculations carried out $t_{count} > t_{table}$ namely 2.27 > 1.67, so it can be concluded that *the student teams achievement division* learning model through the use of derivative board teaching aids is more effective than the conventional learning model.

CONCLUSION

The conclusion of this research is that the STAD learning model

using derivative board teaching aids is effective learning for mathematics learning outcomes.

Suggestion

1. For Students

   The application of the STAD model using derivative board teaching aids to students requires positive communication to be able to exchange ideas in solving mathematical problems

2. For Educators

   Educators need to apply the STAD model using derivative board teaching aids because it has improved learning outcomes, increased enthusiasm for learning and improved students' understanding abilities.

3. For Schools

   Pay more attention to the teaching system in the classroom by continuing to carry out evaluations of the system so that learning skills in school are better.

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