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The Influence of Reinforcement and Punishment in Mathematics Learning Achievement at the Seventh Grade Students of SMP Negeri 13 Makassar

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ABSTRACT
The objectives of this study were to know the mathematics learning achievement of the seventh-grade students of SMP Negeri 13 Makassar before and after receiving learning using of giving reinforcement and punishment and to know the influence of reinforcement and punishment in mathematics learning achievement at the seventh-grade students of SMP Negeri 13 Makassar. This study used a quantitative approach with a quasi-experimental type of research. The research design used was a non-equivalent control group design. The population of this study was all the seventh-grade students of SMP Negeri 13 Makassar. The sampling technique used is non-probability sampling. The sample in this study was class VII_D as a control class and class VII_B as an experimental class, each of which consisted of 36 students. Data collection was carried out using instruments in the form of observation sheets to observe student activities during the activity and question sheets to know students' mathematics learning achievement before and after treatment. The data that had been obtained was then analyzed using descriptive analysis and inferential analysis t-test. The descriptive analysis results show that the average increase in students' mathematics learning achievement in the experimental class is higher than the average increase in students' mathematics learning achievement in the control class. The result of the inferential analysis shows that (1) the percentage of students' mathematics learning achievement before treatment was lower than the percentage of students' mathematics learning achievement after the treatment was given in the form of learning using of giving reinforcement and punishment (2) there was an influence of giving reinforcement and punishment in mathematics learning achievement at the seventh-grade students of SMP Negeri 13 Makassar.

Keywords: *Reinforcement, Punishment, Mathematics Learning Achievement.*

1. INTRODUCTION

Education is the right of everyone without exception. Every human being has the right to proper education, not to be stupid, impoverished, and enslaved. Education was chosen as the main alternative for developing the nation's culture and character because education builds a new generation of the country. Through education, it is hoped that an increase in the quality of the nation's young age can be realized, which can minimize the causes of various cultural problems and the character of the country [1].

Of course, in the world of education, the teacher is an essential factor in world progress education. Teachers cannot be separated from students; with the rapid development of technology, students sometimes find out more about life forms far away or around them. Appreciation in education is essential and must be done to provide a new atmosphere that is enthusiastic about seeking achievements for the future. The problem is how to persuade students to develop their learning motivation to get optimal learning achievement. By looking at mathematics as one of the compulsory subjects at all school levels, students' knowledge should below about math needs attention so that later it doesn't become a bigger problem.

The low learning achievement of students is

caused by learning conditions that do not touch the potential of students themselves, namely how learning can see the potential of different students. The low mathematics achievement of students is evidenced by the results of a survey conducted by Trends in International Mathematics and Science Study (TIMSS) in 2015; Indonesia ranks 45th out of 50 countries with an average score of 397 [2].

The teacher's efforts to foster students' enthusiasm for learning and assist students in improving learning achievement indeed cannot be separated from the learning model, which significantly influences student activity and response in the classroom. But what is happening today, most teachers in the classroom only use a direct learning model that is only teacher-oriented. This doesn't seem right when the teacher expects students to be active in the learning process. However, the learning model selection is still inappropriate and not varied, and the method used is only limited to questions and answers. In fact, in today's era, many learning models can be used by teachers in supporting student learning success, one of which is the cooperative learning model.

The cooperative learning model is a broader concept encompassing all types of group work, including more teacher-led or teacher-directed forms. The collaborative learning model is believed to foster effective learning. It is characterized by making it easier for students to learn valuable things such as facts, skills, values, concepts, and how to live in harmony with others. Also, knowledge, values, and abilities are recognized by those who are competent to judge. One cooperative learning model often applied in schools is the Student Teams Achievement Division (STAD) type of collaborative learning model [3].

Robert Slavin and his friends developed the STAD type learning model at Johns Hopkins University. Students in a particular class are divided into groups of 4-5 members. Try to make each group heterogeneous, consisting of men and women, from various ethnic groups having high, medium, and low abilities. Team members use activity sheets or other learning tools to complete the subject matter and then help each other understand the lesson material through discussions and quizzes.

In STAD learning, students are given group awards based on the scores obtained by the group and group scores obtained from individual improvement in each quiz. For the awards received by students to continue to act as educational tools to encourage students who receive them, teachers must be good at choosing the suitable awards and understand the right way to give recognition to students, because awards are given not only to students who have high scores but also to students who have high scores. Also moderate or low. So that to further increase student activity, passion, attention, and achievement, teachers should not only use cooperative learning models that tie rewards in them, such as the STAD type cooperative learning model but effectively collaborate cooperative learning models with unique learning methods of rewarding such as methods of giving reinforcement and punishment [4].

The method of reinforcement and punishment is a form of reinforcement originating from behavioristic theory. According to Behavioristic theory, learning is a change in behavior due to the interaction between stimulus and response [5].

As a method of education, both reinforcement and punishment are intended as a person's response to his actions. Giving reinforcement is a positive response, while punishment is a negative response, both of which have the same goal, namely wanting to change a person's behavior (student) [6].

Reinforcement and punishment are the educational tools helpful in activating students' efforts to improve or enhance achievements that have been or will be achieved. Reinforcement is a gift, reward, educational tool given to students who have completed exemplary achievements [7].

Regarding the notion of punishment, it is an educator's act that is consciously and deliberately handed down to students who make mistakes to realize their mistakes and promise in their hearts not to repeat their mistakes [8].

It is hoped that the provision of reinforcement and punishment for mathematics teaching and learning activities can foster student motivation and response to understand better the material presented by the teacher so that student learning achievements are even better. Operant learning is defined as learning to use pleasant and unpleasant consequences in changing behavior, so it is clear that Skinner views reinforcement as an essential element in the learning process.

From the description above, the authors are interested in researching the school by raising the problems overhead. The research title is "The influence of strengthening and punishment for the mathematics learning achievement of seventh-grade students of SMP Negeri 13 Makassar".

2. RESEARCH METHODS

The type of research used is quasi-experimental (Quasi-Experimental). Quasi-experimental research

(Quasi-Experimental) is a development of True Experimental Design, which is challenging to implement. The research design used is the Non-equivalent Control Group Design. This design is almost the same as the Pretest-Posttest Control Group Design, only in this design, the experimental and control groups are not chosen randomly [9].

The two existing groups were given a pretest, the experimental group was given treatment, and finally, both groups were given a posttest [10].

This design is almost the same as the pretest-posttest control group design. The primary difference between the two designs lies in the sampling technique. The non-equivalent control group design was not chosen at random (random). The sampling technique most likely to be done using this design is purposive sampling [11].

This researcher will research SMP Negeri 13 Makassar Jl. Tamalate VII, Kassi-Kassi Village, Rappocini District, Makassar City, South Sulawesi Province. The population is the totality of all objects or individuals that have specific, clear, and complete characteristics to be studied. Thus, the population in this study was regular seventh-grade students of SMP Negeri 13 Makassar who came from 10 classes with 324 people. Each class was a homogeneous class; namely, each class's ability was the same. The sample is part of the population taken in specific ways that also have confident, clear, and complete characteristics that represent the population [12].

The technique used by the researcher is using non-probability sampling. This sampling technique does not provide equal opportunities for each member of the population to be selected as a sample. The type of non-probability sampling technique used by the researcher is a test. A test is an information-gathering tool that is more official than other tools because it is full of limitations [13].

The test used in this research is pretest-posttest. The instrument used in this study was an essay test given to the experimental class. The control class was conducted before and after being given treatment, where the questions posed were in the form of the subject matter discussed. The test instrument is made through several steps, namely determining the form of the test to be made, then creating a learning achievement test grid, compiling test questions, conducting validation, revising the items according to the input from the validator, and conducting trials to determine validity, reliability, level of difficulty and discriminating power of objects.

The data analysis technique used is descriptive statistical analysis and inferential statistical analysis. Descriptive statistics are statistics used to analyze data by describing or describing the data that has been collected as it is without intending to make conclusions that apply to the public or generalizations [14].

Inferential statistical analysis was used to test the research hypothesis, which in this study used parametric statistics with t-test analysis. But before that, the normality and homogeneity tests were carried out as prerequisite tests [15].

3. RESULTS AND DISCUSSION

3.1. Mathematics Learning Achievement of Control Class and Experiment Class Students Before Being Given Different Treatments

The pretest is given to the control class, and the experimental class aims to determine student learning achievement in each control and experimental class before being given a different treatment.

Tabel 1. Category of control class students' mathematics learning achievement

Mastery Level	**Category**	**Pretest Control Class**		**Posttest Control Class**	
		Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
$X < 33$	Low	5	13,8889	0	0
$33 \leq X \leq 67$	Medium	25	69,4444	23	63,8889
$67 \leq X$	High	6	16,6667	13	36,1111
Amount		**36**	**100**	**36**	**100**

After conducting descriptive analysis, the lowest pretest score of control class students was 22, and the highest score was 45, with a sample of 36. The average pretest score of control class students was 49.5, with a standard deviation of 13.888. In contrast, the lowest pretest score was experimental class students. That is 30, and the highest score is 77 with a sample size of 36, so that the average pretest value of the experimental class students is 49.0556 with a standard deviation of 13.2265. If the students' pretest scores are

grouped into low, medium, and high categories, the most significant percentage of the control class students' pretest scores was in the medium category with a percentage of 69.4% or 25 of 36 students. In comparison, the most significant percentage of the experimental class students' pretest scores were also in the medium category with a percentage of 61.1111% or 22 of 36 students. So it concludes that the pretest scores of the Control and experimental class students were the same.

Tabel 2. Category of experimental class students' mathematics learning achievement

Mastery Level	**Category**	**Pretest Experiment Class**		**Posttest Experiment Class**	
		Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
$X < 33$	Low	6	16,6667	0	0
$33 \leq X \leq 67$	Medium	22	61,1111	3	8,3333
$67 \leq X$	High	8	22,2222	33	91,6667
Amount		**36**	**100**	**36**	**100**

Achievement after being given other treatments. The pretest and posttest questions are given to the control class, and the experimental class is essay-type questions with the same material coverage and number of items. After conducting descriptive analysis, the lowest posttest score of control class students was 45. The highest score was 98, with a sample of 36 students. As shown in Table 3, the average posttest score of students in the control class was 65.75, with a standard deviation of 11.2106. While the lowest posttest score of experimental class students is 45, and the highest score is 98 with a sample of 36 students. So that the average posttest score of experimental class students is 79.5 with a standard deviation of 9.3366. If students' posttest scores are grouped into low, medium, and high categories, the largest percentage of control class students' posttest scores is in the medium category with a percentage of 63.8889% or 23 of 36 students. While the percentage of posttest scores of experimental class students is in the high category with a percentage of 91.6667%, or 33 out of 36 students. To determine how significant the effect of the different treatments carried out on the control and experimental classes on students' mathematics learning achievement can be calculated by subtracting the average post-test score of the experimental class from the average post-test value of the test control class. The results are divided by the average posttest value of the control class. , then multiplied by 100% to find the percentage. So that the results obtained are 20.9125 with a low interpretation, so it can be concluded that the description of mathematics learning achievement in the experimental class is better than the description of the control class learning achievement after being given different treatments. In other words, learning with the method of providing reinforcement and punishment using the STAD cooperative learning model, which is applied to the experimental class, improves students' mathematics learning achievement with low interpretation.

Tabel 3. Average student learning achievement

Average Learning Achievement	
Control Class	Experiment Class
65,75	79,5

3.2 The Influence of Reinforcement and Punishment Using Cooperative Learning Models on Mathematics Learning Achievement of Class VII Students of SMP Negeri 13 Makassar

To test the hypothesis using the independent sample t-test, the researcher first conducted a prerequisite test, namely the normality and homogeneity tests. The normality test was analyzed using the Kolmogorov.

Smirnov test on the SPSS 22 application. The Sig value (2-tailed) pretest of control class students was 0.200> 0.05, which means the data is normally distributed and the Sig value. (2-tailed) posttest control class i.e., 0.200 > 0.05, which is also normally distributed. While the value of Sig. (2-tailed) pretest experimental class is 0.074 > 0.05, which means normally distributed and the value of Sig. (2-tailed) posttest experimental class is 0.200 > 0.05, which also means normally distributed. While the homogeneity test was analyzed using the Levene Statistical test on the SPSS 22 application. The pretest data of the control class and the experimental class had the same or

homogeneous variance with the value of Sig. (2-tailed) > 0.05 or 0.770 > 0.05. And also, obtained posttest data control class and experimental class have the same or homogeneous variance with the value of Sig. (2- tailed) > 0.05 or 0.359 > 0.05.

After knowing that the research data is usually distributed and homogeneous, it is continued by testing the difference in the average value of the pretest and posttest values in the control class and the experimental class using the independent sample t-test. Based on the analysis results on the SPSS 22, there is no significant difference in the average pretest score between classes taught using the method of giving reinforcement and punishment using the STAD type of cooperative learning model and classes that are not taught using this method. Then by using the SPSS 22 application also obtained the value of of Sig. (2-tailed) < α or 0.000 < 0.05 for the posttest value of the control class and the experimental class, so it concludes that 0 is rejected and H1 is accepted, which means that there is a significant difference in the average posttest score between classes taught with the method of giving reinforcement and punishment by using the STAD type of cooperative learning model and classes that are not taught using this method.

Based on the results of the research and discussion above, it can be concluded that there is no difference in mathematics learning achievement (pretest) between classes that are taught by the method of giving reinforcement and punishment using the STAD type of cooperative learning model and classes that are not taught using this method. However, there are significant differences in learning achievement (posttest) between classes taught using the method of providing reinforcement and punishment using the STAD type cooperative learning model and classes that are not taught using this method.

4. CONCLUSION

There are two conclusions obtained from this research. First, in the control class, the average student learning achievement value is 65.75, with a standard deviation of 11.2106. Suppose students' mathematics learning achievements are grouped into low, medium, and high. In that case, the most significant percentage of students' mathematics learning achievement control class is in the high category with a percentage of 63.8% or 23 of 36 students. The experiment obtained the average student learning achievement in class, 79.5, with a standard deviation of 9.3366. If the learning achievement of students' mathematics is grouped in categories low, medium, and high, the most significant percentage of results learning mathematics experimental class students are at the high category with a percentage of 91.6% or 33 of 36 students.

The second conclusion is that there is the effect of reinforcement and punishment on the results studying grade VII students of SMP Negeri 13 Makassar, which can be proven by the test results of the difference between the two averages the value of student learning achievement, namely the value of < or 0.000 < 0.05 which gives the conclusion H0 is rejected.

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