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THE EFFECT OF NUMBERED HEADS TOGETHER LEARNING MODEL ON STUDENTS' MATHEMATICAL PROBLEM SOLVING ABILITY

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Abstract

The purpose of this study was to determine the effect of the numbered head together learning model on students' mathematical problem solving abilities at MTs Unwanul Falah Kupang Rejo, Punduh Pidada District, Pesawaran Regency. This study used quasi-experimental. The population of this study were 70 students at class VIII in MTs Unwanul Falah Kupang Rejo, Punduh Pidada District, Pesawaran Regency in Academic Year 2019/2020. The sample was taken by using non-probability sampling method. The hypothesis test of this study used the t test. The result of the use of the NHT learning model had made a significant contribution to students' mathematical problem solving abilities ub mathematics. The results obtained by students' problem solving skills after being given an NHT learning model were higher than the control class wich was not given the NHT. This could be seen from students who are given the NHT. There was an effect of learning numbered head together on student' mathematical problem solving abilities in at class VIII in MTs Unwanul Falah Kupang Rejo, Punduh Pidada District, Pesawaran Regency In Academic year 2019/2020.

Keyword: *Numbered Head Together; s Problem Solving Ability*

1. INTRODUCTION

Mathematics is an important subject in education. As evidence, mathematics lessons are taught at all levels of education, from elementary school to university. Mathematics is an important element in our life, so learning mathematics is necessary.

The goals of learning mathematics in Indonesia are contained in Permendiknas Number 22 of 2006. This Regulation states that mathematics subjects at the SMP/MTs level aim that students have the ability to: 1. Understand mathematical concepts, explain the

interrelationships between concepts and apply concepts or logarithms, in a flexible, accurate, efficient and precise way, in solving problems. 2. Using reasoning on patterns and properties, performing mathematical manipulations in making generalizations, compiling evidence, or explaining mathematical ideas and statements. 3. Solve problems which include the ability to understand problems, design mathematical models, complete models and interpret the solutions obtained. 4. Communicating ideas with symbols, tables, diagrams, or other media to clarify conditions or problems. 5. Have an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, concern, and interest in learning mathematics, as well as being tenacious and confident in solving problems [1].

Based on the description above, it can be seen that one of the main focuses of the objectives of learning mathematics is problem solving ability. Mathematical problem solving ability is a skill in students so they are able to use mathematical activities to solve problems in mathematics, problems in other sciences and problems related to everyday life. [2]. Problem solving ability is very important in mathematics, not only for those who will later study or study mathematics, but also for those who will apply it in other fields of study in everyday life. [3].

One of the problems found at MTs Unwanul Falah Kupang Rejo is that student learning outcomes are still below the Minimum Completeness Criteria score, which is 70. In class VIII A there are 35 students with an average score still below the KKM, namely 63.50. Likewise in class VIII B which totaled 35 people with an average value of 62.75. This shows that students' mathematical problem solving ability is still low.

Researchers carry out observations while learning is in progress, to see in more detail the problems that exist in class VIII MTs Unwanul Falah. Based on the results of student observations and interviews with class VIII educators at MTs Unwanul Falah, it can be seen that the learning process in class VIII is less effective, many students chat

during learning, pay less attention when it is explained, lack of cooperation during learning takes place between teachers and students and students with students, and tend to be passive when learning activities take place. This was also found in research conducted by Desmayana and Hardianti. This research shows that students' understanding of mathematical concepts does not integrate one concept with another [4]. In addition, the lack of student thinking activity is caused by learning not focusing on students.

The higher the level of students' understanding of the material presented by the teacher. The higher the learning outcomes obtained by students. One of the lessons that can support students in solving mathematical problems is the Numbered Heads Together (NHT) learning model. According to Leasa, NHT emphasizes the responsibility of members to perform their duties based on their numbers [5]. students demonstrate their abilities and use any strategy to express their responsibilities. Students are also trained to understand each task comprehensively. Therefore, students' responsibilities are not only on individual projects, but also as members of a particular group. The NHT learning model is suitable for learning mathematical problem solving, this is because NHT emphasizes students to work together in groups so that each group member understands the results of their group work and is responsible for the results of this work, so that students automatically feel that they must be actively involved. in the learning process. Thus, students will feel motivated to learn so that learning activities can improve student learning outcomes. Based on this description, it is necessary to conduct research that aims to determine the effect of the NHT type cooperative learning model on the mathematical problem solving abilities of class VIII MTs Unwanul Falah Kupang Rejo odd semester of 2019/2020.

2. RESEARCH METHOD

The population in this study were all 70 grade VIII students at MTs Unwanul Falah Kupang Rejo in odd semesters for the 2019/2020 academic year, which were distributed in two classes VIII A and VIII B with relatively the same average score in mathematics (63.65). The research sample was taken by non-probability sampling in which the Sampling Technique used non-probability sampling with the aim that each population that is spread over the number of classes can be taken as a whole so that each unit in the sample has the same opportunity to be selected as a research sample. Sampling was carried out using a non-probability sampling technique, namely by selecting the sample by drawing the name or code of the respondent and then shuffling it until the number of samples was met. Students in class A are taught using the NHT model and class B using the conventional model.

This type of research is a quasi-experimental (quasi-experimental) with a post-test only control group design as presented in the following table.

Table 1. Post-Test Only Control Group Design

Kelompok	Perlakuan	Posttest
Eksperimen	A	P1
Kontrol	B	P2

Information:
E : Experimental class
K : Control class
A: Experimental class with NHT learning
B : Control class with conventional learning
P1 : Post-test scores of the experimental class
P2 : Post-test scores for the control class

The data in this study are quantitative data derived from instruments in the form of questions given at the end of the lesson or post-test. The data is data on the value of students' mathematical problem solving abilities obtained through the final test for the subject of number patterns. The data collection technique used is the test method. The test is used to determine students' absorption of mastery of teaching materials related to problem solving. This test is given to students individually at the end of learning (post-test) which aims to find out the results of learning about students' mathematical problem solving.

The research instrument used in this study was a test. The instrument is a set of test tools used to collect data in a study. The instrument for testing the mathematical problem solving ability used in this study is in the form of an essay. This test instrument is used to measure students' ability to understand the material provided. The test instrument can be said to meet the requirements as a tool if at least the instrument is valid and reliable. The validity and reliability of test instruments are two very important things in scientific research because they are the main characteristics that indicate whether a test is good or not. In this study the validity of the test used is content validity.

Content validity is validity in terms of the suitability of the test content with the curriculum content being measured. This validity can be used to determine whether the contents of the test questions represent the entire material that has been studied. In this study the test items were consulted with the mathematics teacher for class VIII Mts Unwanul Falah Kupang Rejo and it was found that all test items were declared according to the basic competencies and indicators measured. The instrument in this study has a reliability value of 0.698 (reliable/good) with high criteria. This is in accordance with Sugiyono's opinion, a test instrument is said to be reliable (good) if the reliability coefficient is greater than 0.60 [6].

3. RESULT AND DISCUSSION

Before the NHT cooperative learning model was applied, students did not meet the expected conditions. Less optimal learning is caused by students not getting used to the learning model that is applied and students also seem not to be independent in learning the material so they are less able to discuss with the teacher and the material presented cannot be understood optimally. Students are still accustomed to carrying out learning activities by listening to the teacher and there is no discussion between students so that the ability to discuss among students in groups about subject matter is still not good so that the learning provided is not very meaningful for students.

Based on the results of the research conducted, it can be seen that there is an influence of applying the type numbered head together (NHT) cooperative learning model to the mathematical problem solving abilities of students at MTs Unwanul Falah Kupang Rejo, Punduh Pedada District, Pesawaran Regency.

The results of the hypothesis test show that there is a significant effect on the use of the NHT cooperative learning model from problem solving abilities. This is because the application of the NHT learning model can improve student learning outcomes. The results of the research class that was given the NHT Learning Model treatment had a higher level of problem-solving ability than the class that was given conventional learning. This can be seen from the results of the data analysis test using the t test with a value $t_{count} > t_{table.}$ This can be seen also in the activity of students during learning. These results indicate that the NHT Learning Model has an effect on solving mathematical problems so that this method can be used in providing learning using different learning methods students do not feel bored participating in teaching and learning activities so that students will have motivation in following the lessons given by the teacher. Basically, children's

problem-solving abilities can be influenced by NHT because in class learning it can be seen how groups of students are mutually organized to be responsible for finding and providing answers to other groups of students. This is a positive value with the existence of NHT, learning is more active and can build independent and responsible character.

This is in line with research conducted by Al-Tabany stating that NHT or shared numbering is a type of cooperative learning designed to influence student interaction patterns and as an alternative to traditional class structures [7]. In addition, the implementation of learning with the NHT model makes students more active in class and can understand that solving problems being discussed in their groups is a shared responsibility [8].

The results of research observations in class, there are advantages of NHT, namely:

1. Students are required to be independent and proactive in responding to the questions given.
2. Students can put forward the togetherness side of other friends who don't understand and provide their understanding so that other students understand.
3. There is responsibility towards students themselves with other friends.

This is in line with Hamdani who argued that the advantages of the NHT type cooperative learning model: The advantages of the NHT type cooperative learning model [9], that are:

1. Every student becomes all ready.
2. Students can carry out discussions seriously.
3. Smart students can teach less clever students..

4. CONCLUSIONS AND RECOMMENDATIONS

NHT type cooperative learning makes students think independently and work together with their groups, where each student has the same opportunity to be better prepared and responsible for his group when his number is called. Students at MTs Unwanul Falah already have mature readiness in working on questions, students have readiness and responsibility in their groups. This can be seen when the serial number is called by the teacher, they are immediately alert and eager to answer questions posed by the teacher which have been discussed with their group mates. The results of the hypothesis test showed that the t posttest value was equal to $t_{count(3,764)} > t_{table(1,689)}$. So it can be concluded that there is an influence of the application of the Numbered Heads Together (NHT) learning model on students' mathematical problem solving abilities at MTs Unwanul Falah Kupang Rejo, Punduh Pidada District, Pesawaran Regency.

Suggestions that researchers can give to further researchers are; in order to pay attention to the steps of the NHT learning model correctly, the time spent must be in accordance with the material, and the need to prepare students carefully in order to obtain maximum results in participating in learning.

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