

THE EFFECT OF THE NUMBERED HEAD TOGETHER LEARNING MODEL ON THE MATHEMATICS LEARNING OUTCOMES OF GRADE IV STUDENTS AT UPTD SD NEGERI 124394 PEMATANGSIANTAR

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Abstract

The purpose of this study was to determine the Effect of the Numbered Head Together Learning Model on the Mathematics Learning Outcomes of Fourth Grade Students at the UPTD of State Elementary School 124394 Pematangsiantar. This study uses a quantitative research type using an experimental method (pre-experimental design). Data analysis is quantitative/statistical, with the aim of testing the established hypothesis. The study population was 23 students in the UPTD of State Elementary School 124394 Pematangsiantar located on Jl Tongkol Pematangsiantar. The sample in this study was taken from one class used as a One Group Pretest-Posttest class so that the sample in this study was all fourth grade students of UPTD of State Elementary School 124394 Pematangsiantar. The data analysis technique used was the N-Gain test and Hypothesis Test. The results of the study obtained were an increase in students' creative thinking abilities, namely with an average posttest of 83.91 while the pretest was 41.95. This can be seen from the results of the N-Gain test, there is an influence of the Numbered Head Together Learning Model on the Mathematics Learning Outcomes of Class IV Students at the UPTD of SD Negeri 124394 Pematangsiantar.

Keywords: *Numbered Heads Together Learning Model, Learning Outcomes, Mathematics*

INTRODUCTION

Education is a crucial process in shaping individual character and abilities, fostering attitudes and behavior within society. Education is a crucial aspect that we cannot ignore. It plays a crucial role in fostering intelligence, developing human personality, character, and dignity (Dwi 2021). Education through school learning has a significant impact on students' development and potential, transforming them into individuals who are faithful and devoted to God Almighty, possess noble character, are healthy, knowledgeable, agile, creative, independent, and responsible citizens of a democratic nation. Article 1 paragraph 1 of Law Number 20 of 2003 concerning the National Education System (hereinafter referred to as the National Education System Law) states, "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals and skills needed by themselves, society, nation and state. Educators play a very important role in shaping students' personalities and thinking skills, as well as developing the potential within us. In the world of education today, schools have used or implemented the Independent Curriculum. The Independent Curriculum is a curriculum developed by the Indonesian Ministry of Education, Culture, Research, and Technology (Kementerianbudristek), which began to be implemented in stages since 2021 (Idris et al., 2023). This curriculum emphasizes freedom of learning, learning differentiation, character building and student activeness, with the aim of creating learning that is relevant to the needs of students.

In the context of mathematics, the Merdeka curriculum introduces several important changes that focus on developing holistic competencies, not just self-mastery. In mathematics, the Merdeka curriculum also requires students to be more active, creative, and able to master the material. Therefore, in mathematics instruction, teachers are required to be able to use engaging learning models to make mathematics less boring. Mathematics is a science that discusses numbers and their calculations, discusses numerical problems, regarding quantity and magnitude, studies the relationships between patterns, shapes and structures, means of thinking, collections of systems, structures and tools (Novita et al. 2021). This means that the objects discussed in mathematics are only problems with numbers,

both in problems with numbers that have value and as a means of solving a problem. Mathematics also requires students to think about how to solve problems used to obtain precise and correct answers. In mathematics learning, teachers must also use interesting learning models so that mathematics is easy for students to understand. Mathematics that seems uninteresting can also be the result of the use of inappropriate learning methods or models. As a teacher, you must be able to use a variety of appropriate learning models for each material presented. In reality, many schools still do not use a variety of learning models, which results in a lack of student activeness in the learning process, resulting in low student understanding of the material presented by educators, and thus low student learning outcomes. Based on observations at the UPTD SD NEGERI 124394 Pematangsiantar, there are problems in learning: teachers tend to use a teacher-centered learning model, meaning the learning process tends to be dominated by the teacher. The lecture-dominated learning model does not encourage students to play an active role in learning. This situation results in students being less active, lacking interaction with the teacher and fellow students, which leads to boredom, resulting in low mathematics learning outcomes.

**Table 1. Mathematics exam results for grade IV UPTD students
Public Elementary School 124394 Pematangsiantar**

No.	Mark	Criteria	Number of Students	Presentation
1	≤ 70	Not yet finished	16	72.72%
2	≥ 70	Completed	7	30.43%
Completed			23	100%

(Source: UPTD SD Negeri 124394 Pematangsiantar)

Based on table 1 above, the data obtained shows that 72.72% of students have not achieved the minimum completion criteria and 30.47% of students have achieved the minimum completion criteria, more than 50% of students have not achieved the specified KKTP score, so efforts are needed to improve learning outcomes in order to encourage students' interest in learning, so that student grades increase. One of these efforts is determining the right learning model, where the right learning model can be a success factor in the learning process. One of the learning models that is suitable for improving student learning outcomes is the Numbered Head Together (NHT) type cooperative learning model. The Numbered Head Together model is a learning model that involves students in small groups to learn and solve problems together. This model also emphasizes cooperation and responsibility both collectively and individually, and actively involves students in the learning process (Khoiriyah, 2018).

This model is very suitable for use in mathematics learning where the model demands student activity both individually and in groups. The Numbered Heads Together (NHT) learning model teaches students to solve problems together and encourages all students to be more active by creating groups, where the group consists of active students and less active students so that all students play an active role in the group to solve existing problems and get the right and correct answers. This model can be used as an alternative variation of the learning model by forming heterogeneous groups, each group consists of 3-5 students, each member has a number, then the teacher asks questions to be discussed together in the group, then the teacher points to one of the numbers to present the results obtained by the group, in this model also invites students to learn and play.

This can be supported by research by Elya Sukaisih (2021) which states that the application of the Numbered Head Together (NHT) learning model can increase the activity and learning outcomes of mathematics in the Relation material.

METHOD

1. Type and Design of Research

The type of research used in this study is the experimental method. The experimental method is a research method conducted through experiments, which is a quantitative method used to determine the effect of the independent variable (treatment) on the dependent variable (outcome) under controlled conditions. The conditions are controlled so that no other variables (besides the treatment variable) affect the dependent variable. The method used in this study is the experimental method.

The research design used in this study is pre-Experimental with the form of "One-Group Pre-test post-test Design" because in this study there is a test in the form of a Pre-test where this test is carried out before the treatment and Post-test after being given treatment using the model used. So the group that was carried out was class IV UPTD SD NEGERI 124394 Pematangsiantar.

Table 2. Research Design

O1	X	O2
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(Sugiono, 2017:75)

Information:

O1: Initial test before being given the Numbered Head Together learning model.

X: Numbered Head Together model treatment learning.

O2: Test after implementing the Numbered Heads Together learning model.

2. Location and Time of Research

The research location is the object of research conducted by the researcher. This research will be conducted at the UPTD of SD Negeri 124394 Pematangsiantar. This research will be conducted in August during the odd semester of the 2025/2026 academic year.

3. Research Population and Sample

A population is the entirety of the subjects or objects of interest. Populations can be humans, animals, plants, objects, or events, which serve as the basis for data collection. The population in this study was all fourth-grade students at the UPTD of SD Negeri 124394 Pematangsiantar, consisting of 23 students in one class.

A research sample is a subset of the population being studied. The determination of the sample to be studied must be clear and detailed. The sampling technique in this study used the saturation sampling technique. According to (Sugiyono 2020: 127), a sample is a subset of the number and characteristics possessed by saturated sampling. This is a sampling technique in which the number of samples is the same as the existing population. The reason for choosing saturated sampling is because, according to (Sugiyono 2020: 127),(Tampubolon, 2023)population size is less than 100, the entire population of the research sample is all. Based on the explanation above, the sample used is all fourth grade students of UPTD SD Negeri 124394 Pematangsiantar, totaling 23 students.

4. Data Collection Techniques

Data collection techniques are a step in obtaining data. In collecting data, researchers use the following techniques:

1. Observation

Observation is a technique used to observe or find out about a learning model that is used to adjust the implementation of the learning model. *Numbered Heads Together* This technique is carried out directly, namely by visiting the research location to find out the conditions, population size and samples to be studied.

2. Documentation

In research, documentation is very necessary during research to collect data in the form of documents, images, and the like to strengthen the research.

3. Test

A test is a tool used to assess and measure student learning outcomes in relation to the use of materials appropriate to educational and teaching objectives. According to Sugiyono (2016: 143), a test is a tool or procedure used to determine or measure something in a specific setting, using predetermined methods and rules. Tests are used to determine student learning outcomes in the implementation of learning. The technique used in this research is to provide *pre-test* and post-test given before and after learning using the Numbered Head Together learning model.

5. Data Analysis Techniques

Data analysis techniques are methods used to process data to obtain useful and beneficial information.

1. Hypothesis Testing

Hypothesis testing is carried out to prove whether there is a significant difference in learning outcomes between *pre-test* who did not use the Numbered Head Together learning model and the post-test taught using the

Numbered Head Together learning model. The t-test using the paired sample t-test formula with the help of the SPSS application program. To determine the t table, namely with sample data based on the t table value of the hypothesis test with a significance level of 0.05. The testing criteria compare the significance value with $\alpha = 0.05$ with a confidence level of 95%.

The basis for making a hypothesis decision in this research is that the hypothesis is statistically accepted.

1. If the value and/or sig value < 0.05 then it is rejected and accepted. $t_{hitung} > t_{tabel} H_0 H_a$
2. If the value and/or sig value > 0.05 then it is accepted or rejected. $t_{hitung} < t_{tabel} H_0 H_a$
2. N-Gain Test

N-Gain data or normalized gain is obtained from the comparison of the difference between the initial and final test scores with the difference between the Ideal Maximum Score (ISM) and the initial test. The calculation of the average N-Gain value is carried out to see the improvement in mathematics learning outcomes of fourth-grade students. The N-Gain value is calculated using the following formula:

$$N - Gain = \frac{Skor Posttest - Skor pretest}{skor Maksimal - skor Pretest}$$

(Source: Hake in Sundayana 2014: 151)

Table 3. Gain Index Criteria

N-Gain Value	Category
$G > 0.7$	Tall
$0.3 < g < 0.7$	Currently
$G < 0.3$	Low

(Source: Hake in Sundayana 2014: 151)

RESULTS AND DISCUSSION

1. Description and Location of Research

This research was conducted at the UPTD of State Elementary School 124394 Pematangsiantar which began with observations first in May 2025. The type of research used was *Pre-Experimental Design* with a One Group pretest-posttest Design. Which involved 23 students. The study was conducted on August 12-18, 2025, with a pretest as an initial step to determine students' initial abilities, then continued with learning using the Numbered Head Together model on fraction material. After learning, students were given a posttest to see changes in student learning outcomes. Data from the pretest and posttest were analyzed to determine the effect of the Numbered Head Together (NHT) learning model on students' mathematics learning outcomes.

2. Hypothesis Testing

Hypothesis testing is used to determine the influence of learning models *Numbered Heads Together* (NHT) on students' Mathematics learning outcomes.

Table 4. Hypothesis Test Results

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	76,295		8,527	.000
	Pretest Score	.182	.203	.191	.382

a. Dependent Variable: Posttest Value

(Source: Results of IBM SPSS 24 Application Processing)

Based on the table above, t is obtained_{count} = 8.527 because the average value of pretest learning outcomes is lower than the posttest learning outcomes. In this case, the negative t count can have a positive meaning, namely t count = 8.527, then determining the significance level $\alpha = 0.05$ and $tf = 23$, then t table is 2.069, then as the decision making can be concluded that H_0 is rejected and H_a is accepted because t count $>$ t table or $8.527 > 2.069$. So it can be concluded that there is an influence of the learning model *Numbered Heads Together* on the learning outcomes of fourth grade students in mathematics.

DISCUSSION

This research was conducted in the fourth grade of UPTD SD Negeri 124394 Pematangsiantar in the 2025/2026 academic year with 23 students as the research sample. The results showed that the implementation of the Numbered Head Together (NHT) learning model had a positive influence on student learning outcomes in fractions. This learning model was proven to be able to improve student understanding through group discussion activities, student involvement in understanding the material, and the delivery of discussion results in turns. The improvement in learning outcomes was also reflected in the increase in the average posttest score of 83.9 compared to the average pretest of 41.9.

The findings of this study align with the opinion of Restikawati, Santoso, and William (2020), who stated that the Numbered Heads Together (NHT) learning model is designed to improve student learning outcomes through structured group discussions and assigning responsibility to each individual to understand the material. Although the Numbered Heads Together (NHT) learning model has various advantages, such as increasing active participation and student understanding, this model also has limitations, especially in terms of time management. The group discussion process and the delivery of discussion results take quite a long time, especially if the number of students in the class is quite large.

This can be an obstacle in implementing learning that has a limited duration. Based on the results of the statistical analysis showed that the significant value was $0.000 < 0.05$ and the t-count value $> t\text{-table}$ or $8.527 > 2.069$. With H_0 rejected and H_a accepted. This means that there is a significant influence of the implementation of the Numbered Head Together (NHT) learning model on the mathematics learning outcomes of fourth-grade students.

CONCLUSION

Based on the discussion of research results in the previous section, the following conclusions can be drawn.

1. It can be seen from the post-test results that the value obtained is an average score.83.9, compared to the average pretest score of 41.9, indicates an improvement. Based on the pretest and posttest data obtained, it can be seen that using the Numbered Heads Together learning model can improve student learning outcomes and have an impact on student learning outcomes.
2. The results of the N-gain test obtained were 0.71, H_0 was rejected and H_a dreceived which indicates that there is an influence of the model *Numbered Heads Together* which is significant to the learning outcomes of students in mathematics learning for class IV at UPTD SD Negeri 124394 Pematangsiantar.
3. Based on the Hypothesis test, the negative t-count value can have a positive meaning, namely $t\text{-count} = 2.573$. Furthermore, determining the t-table with a significant level of $\alpha = 0.05$ and $tf = 23$, the t-table is 0.892, so as the decision making can be concluded that H_0 is rejected and H_1 is accepted because $t\text{-count} > t\text{-table}$ or $2.573 > 0.892$. So it can be concluded that there is a significant difference between before and after using the Numbered Head Together learning model on the learning outcomes of fourth-grade students in mathematics.
4. The Numbered Heads Together learning model is a learning model designed to influence student interaction patterns and as an alternative to traditional classroom structures. The Numbered Heads Together learning model encourages students to be more active in groups and individually. This learning model is carried out in groups where each group member has a number where each group member has their own task.

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