

THE NUMBERED HEAD TOGETHER LEARNING MODEL ON THE CRITICAL THINKING ABILITY OF IV CLASS SD STUDENTS

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Article Information

Article History:

Accepted: 05-07-2023

Revised: 19-04-2024

Published: 31-05-2024

Key words:

Numbered Heads Together
Critical thinking skills

ABSTRACT

The low critical thinking abilities of students are caused by the application of non-innovative learning models. Learning is still teacher-centered so that students cannot develop critical thinking skills to the maximum. The aim of this research is to determine differences in critical thinking abilities of students who are *treated* using the Numbered Heads Together learning model. This research is quantitative research with the type of experimental research. The research was conducted in class IV of SD N 10 Gondosari. Data analysis was carried out using the t-test (Paired T Test). Based on the results of the T Test (Paired T Test) calculations, the Sig value is obtained. (2-tailed) is 0.000 which means Sig. (2-tailed) < 0.05. From these calculations, the T test results were less than the significance level. It can be concluded that there is a difference in the average test results before and after the *Numbered Head Together* (NHT) learning model is implemented. There are significant differences in critical thinking abilities between students taught using the *Numbered Heads Together learning model*.

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1. INTRODUCTION

Education is the most important part of national development. Quality education produces people who think intelligently and have noble character. The progress of a nation is determined by the quality of its human resources. A country with reliable and high-quality human resources can survive in global competition. In line with the opinion (Ermawati & Amalia, 2023) *Education is important and inseparable from human life. Education will make human life more directed, and their skills can be optimized for the future.*

Education is not a process of imposing the teacher's will on students, but rather an effort to create conducive conditions for students. Providing relevant education refers to the educational process that takes place throughout a child's life and is characterized by continuous changes from one situation to another in the mechanisms between existing educational aspects. The place of education is the school as a place where learning process activities are held.

Learning is essentially a process between child and child, child and learning resources and child and educator. This learning is beneficial for children if it is carried out in a comfortable environment and provides a sense of security for children. The learning process is not just about memorizing concepts or facts but is an activity of combining concepts into a complete understanding, so that the concepts studied are well understood and not easily forgotten. The teaching and learning process becomes even better if both parties, namely the teacher and students, actively carry it out so that there is a balance between the two. Meaningful learning occurs

when students are actively involved in the learning process and are ultimately able to decide what they want to learn and how to learn it. Mathematics learning in elementary schools is usually dominated by teachers who practice lecture methods with conventional teaching, making students bored and lacking in learning. Apart from that, learning mathematics in elementary school is a basic concept that forms the basis for learning at the next level. In line with the opinion of (Ermawati & Riswari, 2020) mathematics is a very important science to study and understand at every level of education. One of the life skills that must be developed during the education process is the ability to think. A person's ability to succeed in life is determined by their ability to think critically, especially in solving problems. (Denensi et al., 2021) state that mathematics is a scientific discipline that can improve thinking and reasoning power, encourage solving daily and work problems, and support the development of science and technology.

Critical thinking is a conscious process designed to interpret or reflect on information and behavioral experiences. Students know how to identify the main problem, compare similarities and differences, formulate and create questions accurately and find the causes of problem events, evaluate consequences, predict the consequences of events, find simple solutions and think about the value or behavior of these events. So that students know how to solve social problems, because basically students live in a society full of potential problems (Setyorini et al., 2022) . In line with the opinion of (Setyawan et al., 2023) Students can use critical thinking to improve their work and help them face problems that may arise in real life in the future. Additionally, it can be used to produce more useful learning outcomes.

Based on the results of observations carried out by researchers on May 20, 2023, at SDN 10 Gondosari with class IV teachers, it was found that at this elementary school teachers had difficulty delivering material containing hot questions with the right learning model, apart from that teachers were still confused. in choosing the right media as a teaching medium in delivering material that can attract students' interest and train students to improve their critical thinking skills in learning. The results of interviews conducted with one of the class IV students at SDN 10 Gondosari found that the student had difficulty understanding the material taught by the teacher. The students felt confused by the questions asked by the teacher to them, the questions asked by the teacher were considered difficult and in the learning process they rarely used learning media.

Based on the problems explained above, there needs to be an appropriate solution in selecting learning models and teaching media that will be able to help students improve their critical thinking skills in solving story problem-based hot spots. Therefore, an appropriate learning model is needed that will help students improve their critical thinking skills. In line with the opinion (Ermawati & Zuliana, 2020) *Mathematical problem-solving ability is a very important ability in mathematics learning because in its learning activities students learn about mathematical concepts while paying attention to the development of students' ways of thinking*. One learning model that is appropriate and can be used is the *Numbered Head Together* (NHT) learning model.

Numbered Head Together learning model is a type of cooperative learning that emphasizes a certain structure which aims to influence student interaction patterns, thereby increasing academic mastery. Each student in the group is deliberately given a number to facilitate group work, organize material, for presentations and receive responses from other groups (Dadri et al., 2019) . In line with the opinion of Lestari and Yudhanegara in (Nugraha et al., 2015) , *the Numbered Head Together* (NHT) learning model is a learning model that makes students think in groups, where each student receives a number and each has the same opportunity to solve it. answers to the problems that arise. The teacher calls out numbers randomly, and each student is responsible individually. Because the teacher will point to a number then students will answer the teacher's questions and student learning outcomes will improve later. The *Numbered Head Together* (NHT) learning model can be used to improve students' critical thinking to understand learning subjects (Prafitaria et al., 2023) . The stages of *the Numbered Head Together* (NHT) model have the syntax: (1) Numbering, (2) Giving assignments, (3) Discussing or discussing a problem, (4) Calling member numbers or answering questions, (5) Providing responses from friends, teachers referring to another number, (6) Drawing conclusions (Nurdyanto et al., 2017) .

Based on the results of previous research (Mare et al., 2018) , it shows that students' critical thinking skills reached 70.47%, which is classified as a good score, rxy 0.862 indicates a complete score. Apart from that, research (Parameswari & Azizah, 2020) and (Nahdiyah & Azizah, 2018) explains that improving students' critical thinking requires students' active participation in teaching and learning activities using the *Numbered Head Together* (NHT) learning model. Based on this description, the researcher acted by applying the *Numbered Head Together* (NHT) learning model to mathematics sentences and calculations to improve students' critical thinking skills.

2. RESEARCH METHODS

This research is quantitative research using the ex-experimental type of research . Experimental research is research conducted to determine the causal relationship between variables. One of the main

characteristics of experimental research is the treatment *given* to subjects or research objects (Alvin Kurnain & Andrijanto, 2019). The subjects in this research were 13 class IV students at SDN 10 Gondosari. The research was conducted at SD 10 Gondosari, Gebog District, Kudus Regency. The research was carried out in May 2023 in Semester 2 of the 2022/2023 academic year. In this research, data collection instruments were used in the form of observation sheets, interview sheets and tests. The data collection technique was carried out using test questions (Pretest and Posttest) which aimed to determine student learning outcomes after and before using the *Numbered Head Together* (NHT) learning model. The data analysis technique uses the Paired Sample T Test. The data will be processed using SPSS (*Statistical Program for Social Science*) Spreadsheet version 23.0.

3. RESULTS AND DISCUSSION

The research was carried out directly by researchers in Class IV of SD Negeri 10 Gondosari. The *Numbered Heads Together* learning model was used in this research to see and test students' critical thinking abilities. Before the action is carried out, interviews and observations are carried out. Researchers gave a pretest which aimed to determine students' basic abilities before teaching the subject. Students are given an initial test (pretest) in the form of 5 essay questions (descriptions). Meanwhile, the final test (posttest) was carried out to determine students' abilities after using the *Numbered Heads Together* (NHT) learning model. The final test (posttest) consisting of 5 essay questions (descriptions) is given to students. The majority of students from the pretest results are still below the KKM, namely 75.

Students' low level of critical thinking can be improved by using the *Numbered Head Together* (NHT) learning model. According to Handayani (2016: 19) in (Meydiawati et al., 2020) researchers used the *Numbered Head Together* (NHT) type cooperative learning model, because learning provides more opportunities to actively involve students in working together in small groups, thinking, discussing and express his opinion. By implementing the *Numbered Head Together* (NHT) learning model, it can help students solve word problems and improve students' critical thinking because it uses an innovative and fun model and involves students in learning activities and the material presented is easier for students to understand.

3.1 Pretest and Posttest Results

Before being given treatment with the *Numbered Head Together* (NHT) Learning Model, the following is Table 3.1 showing the pretest and posttest results of class IV students at SD Negeri 10 Gondosari.

Table 1 3.1.1 *Pretest and Posttest Results*

	Mark		
	Highest	Lowest	Average
Pretest	90	35	60.38
Posttest	100	55	84.23

Based on Table 3.1.1, pretest and posttest data are determined. The pretest results obtained the highest score of 90, the lowest score of 35, and the average of 60.38. Meanwhile, the posttest results with the highest score were 100, the lowest score was 55, and the average was 84.23. Therefore, there are differences in the pretest and posttest data values.

3.2 Results of Critical Thinking Indicator Achievement

Based on the results of the students' pretest and posttest, the achievement of critical thinking indicators in the Mathematical Sentences and Calculations material was obtained as follows:

Table 1 3.2.1 *Results of Achievement of Critical Thinking Indicators*

Indicator	Pretest		Posttest	
	Average	Criteria	Average	Criteria
Understand the problem	60.38	Enough	86.15	Very good
Plan the solution	49.23	Low	81.54	Very good
Problem solving according to plan	50.77	Enough	83.08	Very good
Re-examine procedures and	36.92	Low	73, 85	Good

results of completion				
Average amount	49,33	Enough	81,15	Very good

Based on Table 3.2.1, the average of the indicator of understanding the problem of pretest questions is 60.38 and posttest is 86.15. The pretest planning indicator for the solution averaged 49.23 while the posttest was 81.54. The indicator of problem solving according to plan with an average of 50.77 from the pretest, while from the posttest the average was 83.08. The indicator for checking the procedure again and the results of its completion on the pretest averaged 36.92, and 73.85 on the posttest. From the table above, it can be concluded that the results of critical thinking skills in the posttest results are higher than the pretest results.

From this data, the highest average is found in the pretest results for the indicator of understanding the problem, namely 60.38. Meanwhile, the highest average posttest score was for the indicator of understanding the problem, namely 86.15. The indicator of understanding the problem has the highest average because students already have a very good understanding. In line with the opinion of (Agusta, 2020) it is impossible for students to solve problems correctly if they do not understand the problem given. The indicator for this first stage is when students are able to show the principle parts of the problem, what is asked, what is known, and the prerequisites. The lowest average result on the pretest, namely the indicator of re-checking the procedure and completion results, was 36.92. Meanwhile, the lowest average posttest result was the indicator for re-checking procedures and completion results, namely 73.85. The indicator for re-checking procedures and completion results is the lowest average. In line with the opinion of (Purba, 2019) the thing that becomes an obstacle for students at this stage is that students are not used to re-examining the results they have obtained. So students are confused about rechecking the correctness of the answers. In fact, many students choose not to write anything down to check the correctness of the answers they get.

3.3 Normality test

The normality test is carried out as a prerequisite test. Based on the data from the two samples, namely the pre-test and post-test results, a normality test can be carried out as follows.

Hypothesis Formulation:

Ho = normally distributed data

Ha = data is not normally distributed

Significance level (α) = 0.05

Testing Criteria:

Ho is accepted if sig > 0.05.

Ha is not accepted if sig < 0.05.

Table 3.3.1 Pre-test data normality test

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	df	Sig.
pretest	.153	13	.200 *	.958	13	.724

Table 3.3.2 Post test data normality test

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
posttest	.138	13	.200 *	.927	13	.314

In table 3.3.1 the pretest data has a sig value of 0.724, which means the sig value is > 0.05, so Ha is accepted. In table 3.3.2, the post test data has a sig value of 0.314, which means the sig value is > 0.05, so Ha is accepted. It can be concluded that both data are normally distributed.

3.4 T TEST (Paired T Test)

After carrying out the second normality test, the pre-test and post-test data were normally distributed. Then proceed with the T Test (Paired T Test) to find out the average difference between the pretest and post test.

Hypothesis Formulation:

Ho = there is no difference in the average test results before and after the NHT learning model is applied

Ha = there is a difference in the average test results before and after the NHT learning model is applied

Significance level (α) = 0.05

Testing Criteria:

Ho is accepted if the Sig value. (2-tailed) > 0.05.

Ha is accepted if the Sig value. (2-tailed) < 0.05.

Table 3.4.1 Table of calculation of average pre-test and post-test scores

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pretest	60.3846	13	15.60736	4.32870
	posttest	84.2308	13	13.82120	3.83331

In table 3.4.1, it is found that the average (mean) value between the pre-test and post-test has increased. The average pretest score was 60.3846. The post test score was 84.2308. It can be concluded that the Numbered Head Together learning model can improve students' critical thinking skills.

Table 3.4.2 Correlation table of the NHT learning model and student learning outcomes.

Paired Samples Correlations					
			N	Correlation	Sig.
Pair 1	pretest & posttest		13	,600	,030

In table 3.4.2, the correlation test shows a significance value of 0.030. This value is less than 0.05. So it can be concluded that the two data are correlated.

Table 3.4.3 T Test Calculation Table (Paired T Test)

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretest - posttest	-23.84615	13.25296	3.67571	-31.85484	-15.83747	-6,487	12	,000

In table 3.4.3, from the results of the T Test (Paired T Test), the Sig value is obtained. (2-tailed) is 0.000 which means Sig. (2-tailed) < 0.05, then Ha is accepted. It can be concluded that there is a difference in the average test results before and after the *Numbered Head Together* (NHT) learning model is implemented. In this way, the *Numbered Head Together* (NHT) learning model can improve students' critical thinking skills.

4. CONCLUSION

Numbered Heads Together learning model is a learning model that can encourage students to be able to find, process and report information from various sources in front of the class. *The Numbered Heads Together* (NHT) learning stage and the assessments that will be carried out can be in the form of individual or group assessments. Based on the results of the research conducted, it can be concluded that the application of the *Numbered heads Together* (NHT) learning model can improve critical thinking skills. From the results of the T test (paired t test), the Sig value is obtained. (2-tailed) is 0.000 which means Sig. (2-tailed) < 0.05. It can be concluded that there is a difference in the average test results before and after the *Numbered Head Together* (NHT) learning model is implemented. In this way, the *Numbered Head Together* (NHT) learning model can improve students' critical thinking skills. Based on the results of this research, it is recommended that teachers be able to implement and apply the *Numbered Heads Together learning model* in the learning process to train and increase students' critical thinking power in the learning process.

BIBLIOGRAPHY

- Agusta, ES (2020). Increasing Mathematical Problem Solving Ability through HOTS Based Learning Model. *Journal of School Mathematics Learning Research* , 4 (1), 58–64. <https://doi.org/10.21009/jrpms.041.09>
- Alvin Kurnain, B., & Andrijanto, D. (2019). The Influence of Small Games on Student Activeness in the Physical Education, Sports and Health Learning Process. *Journal of Sport and Health Education* , 7 (3), 551–556.
- Dadri, PCW, Dantes, N., & Gunamantha, I.M. (2019). The Influence of the NHT Type Cooperative Learning Model on the Critical Thinking Ability and Mathematics Learning Outcomes of Class V Students at SD Gugus III Mengwi. *Indonesian Journal of Basic Education* , 3 (2), 84–93.
- Denensi, F., Gunur, B., & Jehadus, E. (2021). The Effectiveness of the Two Stay-Two Stray Cooperative Learning Model with Numbered Heads Together on Students' Critical Thinking Ability in Mathematics. *Scientific Journal of Mathematics Education* , 5 , 49–61.
- Ermawati, D., & Amalia, N. (2023). *The Effect Of Mat Joyo Application On Students' Understanding Of Mathematical Concepts Fifth Grade Elementary School* . 9 (1), 12–22.
- Ermawati, D., & Riswari, L.A. (2020). The Influence of the PMRI Approach on Elementary School Students' Mathematical Problem Solving Abilities. *Proceedings of the 2020 National Basic Education Seminar and Discussion* , 1–9.
- Ermawati, D., & Zuliana, E. (2020). *Implementation Of Open-Ended Problems On Mathematical Problem-Solving Skills Of Elementary School Students* . 6 (2), 145–157.
- Mare, ES, Asrial, & Harizon. (2018). Analysis of the Implementation of the Number Heads Together Cooperative Learning Model and its Influence on High School Students' Critical Thinking Ability. *JISIC (Journal of the Indonesian Society of Integrated Chemistry)* , 10 (1), 12–20.
- Meydiawati, EA, Indriani, A., & Kholidah, NRJ (2020). *Comparison of NHT Type and Contextual Cooperative Learning Models on Mathematics Learning Achievement* .
- Nahtiyah, AN, & Azizah, U. (2018). Implementation of the Numbered Heads Together (NHT) Cooperative Learning Model to Train Students' Critical Thinking Skills on Acid-Base Material at SMA Negeri 3 Mojokerto City. *UNESA Journal of Chemical Education* , 7 (3), 344–349.
- Nugraha, RA, Riyadi, & Lestari, L. (2015). *Using the Numbered Heads Together (NHT) Cooperative Learning Model to Improve the Ability to Solve Mathematics Story Problems on Fraction Material in Class V Elementary School Students* . 42–51.
- Nurdyanto, HE, Indana, S., & Agustini, R. (2017). The Effect of Implementing the NHT Type Cooperative Learning Model with the Spices Continuing Approach on Critical Thinking Skills and Learning Outcomes of Middle School Students. *Journal of Science Education Research* , 2 (2), 58–65.
- Parameswari, P., & Azizah, U. (2020). NHT Remap Learning Model to Improve Students' Critical Thinking Skills on Chemical Equilibrium Material. *Zarah Journal* , 8 (1), 30–37.
- Prafitaria, A., Murtihapsari, & Surbakti, PS (2023). The Influence of the Numbered Head Together (NHT) Cooperative Learning Model on Students' Critical Thinking Skills in Electron Configuration Material. *QUANTUM: Journal of Science Education Innovation* , 14 (1), 107–119.
- Purba, A. (2019). Increasing the Mathematical Problem Solving Ability of Class XI Vocational School Students Through Contextual Learning. *MES: Journal of Mathematics Education and Science* , 5 (1), 42–50. <https://jurnal.uisu.ac.id/index.php/mesuisu/article/view/1932>
- Setyawan, NR, Wanabuliandari, S., & Ermawati, D. (2023). Improving the Critical Thinking Ability of Fourth Grade Elementary School Students Using the PBL Model Assisted by Honey Board Media. *FONDATIA: Journal of Elementary Education* , 7 , 260–270.
- Setyorini, NA, Pranoto, BA, & Triputra, DR (2022). The Influence of the NHT Type Cooperative Learning Model on Students' Critical Thinking Ability and Activeness. *Scientific Journal of Educational Vehicles* , 8 (September), 426–437.