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Implementation of the Numbered Head Together Learning Model to Improve Students' Science Learning Outcomes

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Abstract

The scientific knowledge acquired by elementary school students is subpar. Difficulty comprehending the material and the adoption of inefficient learning paradigms both contribute to students' poor performance in class. Moreover, efficient learning models might be of great assistance in the journey toward one's educational goals. The Numbered Head Together (NHT) method is one example of such a framework. The study's overarching goal is to ascertain whether or not using the Numbered Heads Together learning paradigm improves student performance. In this work, quantitative methods were used with a quasi-experimental strategy. Non-probability sampling was used as the methodology. A total of 51 students participated in the research (26 in the experimental group and 25 in the control group). The testing instrument is being used in this investigation. The average for the experimental group was 75.38, whereas the norm for the control group was 63.00. In general, the experimental group outperformed the control group. Findings showed that the experimental class that employed the Numbered Head Together paradigm did better on tests than the control group. This illustrates that incorporating Numbered Head Together into the classroom may boost students' knowledge retention and application.

Keywords: Numbered head together, learning outcomes, natural science

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INTRODUCTION

Learning is an individual's ability to regulate behavior and interactions with those around him. It is supported that individuals who make an effort to achieve the transformation of the behavior of the individual's own expertise in interactions with a new and comprehensive environment can also be referred to as learning (Masgumelar & Mustafa, 2021). Therefore, each individual will learn to carry out a transformation from ignorance, incompetence, passivity, and no or lack of understanding to an individual who understands, is capable, active and understands. (Festiawan, 2020). This is not only complex in terms of increasing knowledge, but also complex in the form of abilities, skills, behavior, insight, position, desire, character and self-habituation.(Herawati, 2018). In addition, learning without material skills tends to be unable to remember in the long term (Siraits 2019). Therefore, learning is considered successful when students are able to actively participate actively in the learning process and achieve good learning outcomes. (Muamanah 2020).

Natural science disciplines are among those that must be understood at the elementary school level. This states that one of the subjects that solves solutions related to natural reality is science subjects. Students in elementary schools who have understanding, thinking, and structured schemes are students who study natural conditions by exploring, testing, solving, and forming schemes in natural sciences (Rinawati, 2022). This proves that science learning

can be realized in everyday life. It is stated that science at the elementary school level focuses on understanding phenomena, schemes, understanding science and increasing skills by utilizing scientific methods and scientific behavior in an effort to solve real life problems (Pamungkas et al., 2017). In this case, Natural Sciences gives individuals the duration of learning to independently explore the substance of the material they have obtained (Mahmud et al., 2018).

Student learning outcomes in science topics are not considered to be excellent. The statement that low student learning outcomes at school supports this (Rosna, 2016). One explanation of low student learning outcomes is difficulty understanding the topic and a lack of willingness to learn (Nabillah & Abadi, 2019). The learning process carried out by students produces value as a result of learning through exams (Pioke et al., 2022). Students are said to be successful in their learning activities because they comprise cognitive, emotional, and psychomotor components that can be interpreted as learning outcomes (Khoimatun, 2022). Furthermore, in order to achieve learning objectives, an effective learning model is very useful in the learning process. (Asyafah, 2019).

One such paradigm is the Numbered Head Together (NHT) learning model. The NHT cooperative learning approach stresses a particular framework meant to impact student interaction patterns in the learning process with the goal of mastering the topic (Khoerunnisa et al., 2020). The implementation of appropriate learning models for students can have an impact on their learning outcomes. As a result, there is a demand for learning activities that leverage student-centered learning to improve learning outcomes (Awe & Benge, 2017). The mnemonic device known as Numbered Head Together (NHT) is useful in the realm of science education. Responding to students' interactional patterns, the Numbered Head Together learning model may be used in the field of Natural Sciences education via the use of specialized forms (Ramlah, 2021). The Numbered Head Together technique is also said to be used in groups with other students (Alimin, Djuwairiyah, & Aeni 2022).

This study contains some interesting research findings. This demonstrates that using the NHT paradigm enhances student learning results in mathematics (Khoimatun, 2022). This was also supported by prior study, which found an impact on science learning outcomes when the STAD type cooperative learning approach was used (Putu et al., 2017). The difference in this study is due to the NHT learning paradigm and student science learning outcomes.

The benefits of using the Number Head Together (NHT) learning model are as follows: 1) this model needs all students to be involved; 2) students are also forced to conduct serious debates with this learning model. 3) Astute students can assist students who are in need (Juliartini et al., 2017). The Numbered Heads Together model also encourages student collaboration and activity in finding, processing, and reporting facts from various sources of information presented to the front of the class, and encourages students to actively relate learning assessments and outcomes. It also supports being able to encourage people to work proactively, attractive.

The following descriptions will be used by a researcher to investigate whether or not the Numbered Head Together learning paradigm is effective in enhancing third graders' scientific knowledge and skills. The goal of this research was to see whether using Numbered Head Together led to better results for students studying science. This study has several differences and novelty compared to previous studies. Following are some of the differences and novelties of this study. This study uses the Numbered Head Together (NHT) Learning Model. NHT is a cooperative learning model that involves students work in small groups with each member having a number. During the discussion, the teacher will ask a question and announce a random number, and the student who has the number must answer. This approach encourages active participation and collaboration among students. This difference is different from previous research which may have used conventional learning models or other cooperative approaches, such as TGT (Teams-Games-Tournament) or Jigsaw. This research focused on improving students' science learning outcomes. This means that this research seeks to improve students'

understanding of science concepts, critical thinking skills, and practical skills in the context of learning science. Several previous studies may have discussed the application of NHT in other learning contexts, such as language or mathematics.

This study may differ in terms of the population of students studied and the sample used. The novelty of this research may lie in selecting a wider and more representative sample of students, or in including groups of students with special characteristics, such as students with special needs or from low socioeconomic backgrounds. Differences can also be found in the context of this research. For example, previous research might have been conducted in different school environments, at different educational levels, or using different science learning materials. This research can adopt different research methods and use unique measurement tools to evaluate the effectiveness of the NHT Learning Model in improving students' science learning outcomes. This research can integrate new measurement tools or adapt existing measuring tools for the purposes of this research. The novelty of this research can provide new insights and contributions to previous research literature, particularly in identifying the effectiveness of the NHT Learning Model to improve students' science learning. By focusing on science learning outcomes, this research can provide practical recommendations for educators to improve their teaching methods and support the development of more effective curricula in the context of learning science.

METHOD

In this work, quantitative methods and a hybrid experimental design were used. Non-probability sampling was employed in this analysis. There were fifty-one pupils in the course. There were 26 pupils in the sample from the third grade experimental class, and 25 in the sample from the control class. The testing instrument is being used in this investigation. A multiple choice test on the material Changes in Substance Forms was utilized to collect data in this study. As for the research steps: 1) Make a research instrument, 2) the instrument is given to students, 3) The results of the instrument that has been given to students are tested for validity and reliability, 4) Carry out a normality test, homogeneity and T test, 5) Hypothesis results processed using SPSS. The research instrument was tested for validation and reliability tests.

Table 1. Instrument Validation

Item	R count	R Table	Annotation
1	0,570962	0,3961	Valid
2	0,593032	0,3961	Valid
3	0,570962	0,3961	Valid
4	0,477441	0,3961	Valid
5	0,523996	0,3961	Valid
6	0,463434	0,3961	Valid
7	0,584559	0,3961	Valid
8	0,451471	0,3961	Valid
9	0,535237	0,3961	Valid
10	0,523996	0,3961	Valid

According to Table 1 shows the validity test results consisting of 10 instrument items. It can be seen that all the instrument questions are stated to be valid. Furthermore, the reliability test is shown in Table 2.

Table 2. Instrument Reability

Cronbach's Alpha	Item
0,85498	10

Based on Table 2. The reliability test findings show that the instrument is dependable, with a Cronbach's alpha value of 0.85498 > 0.80, and hence appropriate for use in research instruments.

RESULTS AND DISCUSSION

This research was conducted after testing the validity and reliability tests. Respondent data is shown in Table 3.

Table 3. Statistical description

		Pre-Exp	Post-Exp	Pre-Control	Post- Control
N	Valid	26	26	25	25
	Missing	0	0	1	1
Mean		59,23	75,38	52,00	63,60
Std. Error of Mean		3,505	2,786	4,082	4,430
Median		60,00	75,00	50,00	70,00
Mode		70	70[a]	50	40[a]
Std. Deviation		17,871	14,207	20,412	22,151
Variance		319,385	201,846	416,667	490,667
Range		70	50	70	70
Minimum		20	50	20	30
Maximum		80	100	70	80
Sum		1540	1960	1300	1590

As seen in Table 1. The experimental group consisted of 26 pupils, whereas the control group included 25. The average of the experimental group is often greater than that of the control group. The variance and standard deviation of the control group's results are much larger than those of the experimental group. Pretest control values of 20, posttest control values of 30, and experimental values of at least 50 are required. The highest possible scores are 100 on the post-experiment test, 80 on the pre-experiment test, 70 on the pre-control test, and 80 on the post-control test. Table 4 contains the homogeneity test.

Table 4. Homogeneity Test of Experimental and Control Class

	Levene Statistic	df1	df2	Sig.
Based on Mean	2,544	3	96	.061
Based on Median	2,360	3	96	.076
Based on Median and with adjusted df	2,360	3	93,971	.076
Based on trimmed mean	2,528	3	96	.062

Based on the homogeneity output results obtained value sig 0.61 > 0.05, From this, we can conclude that applying the NHT learning model to scientific learning outcomes yields uniform data. The normality test Table 5 illustrates this.

Table 5. Normality Test Results

Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pre-Eksperiment	.163	25	.085	.957	25	.336
Post-Eksperiment	.149	25	.160	.941	25	.154
Pre-Control	.125	25	.200	.953	25	.290
Post-Control	.162	25	.091	.926	25	.069

The data is regularly distributed, according to the normality test. Sig 0.536 > 0.05 was found in the pre-tests of the experimental group, sig 0.154 > 0.05 was found in the post-tests, sig 0.290 > 0.05 was found in the pre-tests of the control group, and sig 0.069 > 0.05 was found in the post-tests of the control group.

Table 6. T test results

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Internal of the Difference	
		F	Sig.	t	df	Sig (2-Tailed)	Mean Difference	Std. Error Diferrence	Lower	Upper
Leaning Outcomes	Equal variances assumed	8.707	.005	2.271	49	.028	11.785	5.190	1.355	22.214
	Equal variances not assumed			2.252	40,638	.030	11.785	5.234	1.212	22.357

Using the Numbered Head Together (NHT) learning model, we find that there is a statistically significant difference in average learning outcomes between the experimental group and the control group; the t value is 2.271, the F value is 8.707, and the significance level is 0.028 > 0.05.

In this study, people took part in either the experiment or the control. The NHT model was used therapeutically with the experimental group but not with the control group. The focus of learning in experimental courses is on the individual students. The first step in the learning process is to offer students with motivation and questions on the topic of changing the shape of things. Students saw a film on melting ice cubes and were then given a quiz on the topic. Students watched the film together before breaking off into smaller groups to discuss and share their findings. Teacher assessment of student understanding of the topic of object transformation followed the presentation of group discussion outcomes.

Two groups, an experimental group and a control group, participated in this investigation. One group (the experimental group) was given the treatment of using the NHT model, whereas another group (the control group) was not. Students take the lead in their own education in experimental classrooms. At the outset of the instructional process, students are given motivation and questions to help stimulate their thinking on the topic of modifying the shape of things. A movie was shown to pupils explaining how ice cubes melt, and then they were given a quiz on the topic. Students were split up into smaller groups after seeing the film; these groups then reported on their findings. After each group presented its findings, the instructor assessed the students' mastery of the topic of object transformation via a series of questions and a final assessment.

From the research data obtained, it turns out that there is indeed an influence of the NHT (Numbered Head Together) learning model on students' learning outcomes. This is in line with the view of "Niluh Widiani (2021)" in the research titled "The Numbered Heads Together (NHT) Learning Model as an Effort to Improve Mathematics Learning Achievement of Fifth Grade Elementary School Students." Therefore, this discussion shows an improvement in learning outcomes (Alfiansyah, 2018). The above analysis results, which indicate the influence of the NHT model (Numbered Head Together), align with the findings of the conducted observations. The observation results show that students experienced changes; some students were engaged in other activities at the beginning of the lesson, while others were indifferent during the lesson (Aan, 2019). The students were not very active at the start of the class.

However, they became actively involved in the learning process when the NHT (Numbered Head Together) learning model was used (Aprilia et al., 2018).

CONCLUSION

From the research results, the experimental class that applied the NHT model had higher learning outcomes than the control class. This illustrates how NHT may be used to improve students' academic performance.

RECOMMENDATION

The researcher would like to thank lecturers, teachers and students who have participated in helping the course of this research process. Future research employing previously unstudied factors may benefit from this study's findings, it is anticipated.

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