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The Effect Of The Numbered Head Together (Nht) Learning Model On Students' Learning Outcomes In The Subject Of Science In Grade IV

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Abstract

This study aims to determine the effect of the application of the Numbered Head Together (NHT) learning model on student learning outcomes in the subject of science in grade IV of elementary school. The study used an experimental method with the type of Pre-Experimental Design, through the design of One Group Pretest-Posttest Design. The subjects of the study were all fourth-grade students of SD Negeri 098166 Perumnas Batu VI, totaling 28 people. Data were collected through observation and tests. The results showed an average pretest score of 48.86 and a posttest of 79.29. Thus, it can be concluded that the NHT learning model has an effect on student learning outcomes in the subject of science in grade IV of SD Negeri 098166 Perumnas Batu VI.

Keywords: The Effect of the Numbered Head Together (NHT) Learning Model, Learning Outcomes

INTRODUCTION

Education is the primary foundation for developing intelligent, well-mannered individuals who are ready to face future challenges. This ensures a country can have a system capable of producing superior Human Resources (HR). This process significantly impacts a country's economic growth (Putra, Darsana, & Darmayanti, 2017). Its impact is not only seen in increased productivity but also in the capabilities of society as a whole. Through education, human resources can more quickly understand and prepare for change and development in their country. This learning process encompasses knowledge, skills, and habits passed down from one generation to the next through teaching, training, and research (Chamalia, 2016).

Low-quality education is a major obstacle to human resource development and national progress. In the long term, countries will struggle to achieve stable economic growth, and innovation in technology and science will be hampered. Furthermore, low levels of education also impact political awareness and low citizen participation in democracy, as well as increasing social problems such as crime and poor health. Therefore, quality education is a crucial foundation for a nation's development. Education plays a

crucial role in the advancement of the younger generation because it can guide change toward higher quality and greater intelligence (Vivi Muliandari, 2019).

Referring to Law No. 20 of 2003 concerning the National Education System, 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, and the country. Ki Hajar Dewantara also put forward the definition of Education as an effort to advance the growth of character, mind, and body of children. According to Oemar Hamalik (2024:4) education is an activity in order to influence students to adapt as well as possible in the environment, and from this adaptation effort changes arise in themselves so that they can easily carry out their functions in community life (Erfan, Sari, Suarni, Maulyda, & Indraswati, 2020). This view influences students according to their needs to survive in the social environment of society. Educational goals can be achieved more effectively if teachers are active and creative in the learning process. Active teachers will continue to strive to understand student needs, update teaching models, and build good communication in the classroom.

The independent curriculum was introduced as a response to the need for more flexible, contextual, and student-centered learning. The independent curriculum emphasizes student-centered learning, differentiation, and character building through the Pancasila student profile project. Teachers are no longer bound by rigid material targets but are instead given the freedom to adapt learning to students' abilities and needs. One important change in the independent curriculum is the space provided for teachers to develop active, innovative, and collaborative learning models. These learning models are capable of improving student engagement and learning outcomes, particularly in integrative subjects such as Social Sciences (IPAS) (Nurwadani, Syarifuddin, Gunawan, & Dusalan, 2021).

Science is a new subject in elementary school that combines elements of science and social science to help students understand holistic phenomena. One of the topics taught in fourth-grade science is Changes in the State of Matter, such as melting, freezing, evaporation, condensation, and sublimation. This topic is important because it relates to everyday phenomena that students can easily observe, such as boiling water, melting ice, and so on. Although this topic is relatively close to students' lives, many students still have difficulty understanding these concepts comprehensively (Wilanda & Iman, 2018). This can be caused by a lack of active learning experiences that allow students to observe, discuss, and draw conclusions independently. One learning model that is considered appropriate to support this is the Numbered Heads Together (NHT) model (Riadin & Jailani, 2021).

The selection of learning tools is a crucial role for teachers. Typical learning tools include syllabuses, annual programs (Prota), semester programs (Prosem), lesson plans (RPP) or teaching modules, learning media, learning models and methods, and other learning tools (Awaliyah, 2021). Teachers need to implement a variety of learning models to make the learning process more adaptive, enjoyable, impactful, and less boring. In fact, many teachers have not tried various learning models and remain stuck with the same methods. This also aligns with Pratiwi's opinion that learning tools that are not optimally

designed and do not suit student needs have the potential to cause boredom and reduce student learning participation (Diana, Arif, Stefany, & Aini, 2023)/

The emergence of student boredom can create a sense of laziness that reduces interest in learning, student activeness and makes students feel uninterested in seeking information. This is in line with the theory put forward by Sani Susanti, et. Al. (Lagur, Makur, & Ramda, 2018) that the application of monotonous learning methods or models without providing variation can have a negative impact on student learning interest. When students are continuously exposed to monotonous learning approaches, they are at risk of experiencing saturation and boredom which can ultimately hinder the effectiveness of the learning process. In choosing a learning model, one must consider the characteristics of students, the material being taught, as well as the condition of the class and learning environment. In choosing a learning method or model, there are things that must be considered such as the objectives to be achieved in learning, the abilities and backgrounds of students, the abilities and backgrounds of teachers, the conditions of the ongoing learning process, the tools or facilities available (Setiawati, Prayitno, & Subarinah, 2020).

A variety of learning models serve to create a more engaging learning process, enabling students to be more active, understand the material in depth, and develop critical, creative, and collaborative thinking skills. Furthermore, teachers need to adapt learning models to the curriculum and technological developments to make the learning process more relevant and engaging. A learning model is a method or pattern used by teachers to organize and implement the teaching and learning process in the classroom so that students can learn effectively. According to Joice & Wells, as quoted by Agus Purnomo (Ningsih, 2019) a learning model is a conceptual framework used as a guideline in conducting learning that is systematically structured to achieve learning objectives concerning syntax, social systems, reaction principles, and support systems.

The researcher chose the Numbered Head Together (NHT) cooperative learning model as the main pillar in carrying out this thesis. The NHT (Number Head Together) cooperative learning model can also be called a form of numbering thinking together, which is a form of cooperative teaching which is a learning structured in 4 parts to be carried out to show the truth and seek basic understanding in order to organize relationships with students (Vhalery, 2019).

According to Slavin (Kusumawati, 2022) Numbered Heads Together is a cooperative learning model that involves students in small groups with different member numbers. Each member is responsible for understanding the material and preparing to answer questions posed by the teacher randomly to a specific number in the group. The Numbered Heads Together model encourages students to discuss and work together in small groups so that all members understand the subject matter. By calling on group members randomly by number, this model increases individual accountability and group collaboration (Lase & Lase, 2023).

The researcher chose this title based on its relevance to the learning conditions at the school where the research took place, particularly regarding the lack of variation in the use of learning models. The researcher believes that the implementation of the Numbered Heads Together (NHT) model has the potential to improve student learning outcomes

through an active and cooperative approach. Furthermore, this model aligns with the principles of the Independent Curriculum, which emphasizes student-centered learning and character building through the Pancasila student profile project. This curriculum provides teachers with the flexibility to design more flexible learning that is tailored to students' needs and abilities.

Previous studies have shown that the Numbered Heads Together (NHT) learning model is effective in improving student learning outcomes. Research conducted by Muliandari Putu Tia Vivi (Husniarti, 2022) demonstrated that the use of the Numbered Heads Together (NHT) model had a positive impact on students' mathematics learning outcomes, as evidenced by the increase in average grades.

As a student of Elementary School Teacher Education (PGSD), this research is expected to contribute to improving the quality of learning in elementary schools, particularly in designing active, innovative learning models that are appropriate to student characteristics. The Numbered Heads Together (NHT) learning model is believed to be able to foster enthusiasm for learning, increase interaction between students, and strengthen understanding of the science and science material on the topic of Changes in State of Matter. This research is also expected to provide provisions for prospective elementary school teachers in developing learning in accordance with the principles of the Independent Curriculum, namely learning that is student-centered, flexible, and enjoyable (ZANJABILLA, Laihat, & Usman, 2019).

This research was conducted in a fourth-grade class selected by the researcher as the object of study. Because in this school, especially the fourth-grade class, the researcher saw that students in that class needed new learning methods to increase student activeness in the learning process. The lack of diversity of learning models used in the teaching and learning process encouraged the researcher to conduct this research in a fourth-grade class, with the aim of improving the quality of innovative learning for students and teachers. The researcher chose science subjects because these subjects are closely related to students in honing their ability to understand material, both regarding natural phenomena and learning in the classroom (Vivi Muliandari, 2019).

The researcher conducted the research at SD Negeri 098166 Perumnas Batu VI. The researcher's interest in this school is based on the observation that there are problems in the learning process, especially related to the lack of student activity during teaching and learning activities. So the researcher will provide a different learning model from the previous one to class IV by using the Numbered Head Together (NHT) model to improve the quality of learning at the school. Through this research, the researcher will make a good contribution to improving the quality of learning for students, teachers and schools as well as providing something new by using this model to be able to increase student activity during the learning process, working together, being responsible for themselves and their groups who can participate in teaching and learning activities, so that the teaching and learning process can be carried out effectively for both students, teachers, and schools (Gracia & Anugraheni, 2021).

Based on the background facts of the problem above, the researcher determined an alternative action by applying the Numbered Head Together (NHT) learning model as a

solution to overcome the problem and improve the quality of science learning for class IV of SD Negeri 098166 Perumnas Batu VI and conducted research to solve the problem with the title "The Effect of the Numbered Head Together (NHT) Learning Model on Student Learning Outcomes in Science Subjects in Class IV of SD Negeri 098166 Perum Batu VI".

METHOD E

This study used an experimental research method with a quantitative descriptive approach. This method was chosen based on the goal of controlling variables that influence the research results, so that the causal relationship between variables can be more clearly understood. Through a quantitative experimental approach, the research results are expected to be accurate, objective, and reliable in testing hypotheses and answering research questions. According to Sugiyono (Sakban & Wahyudin, 2019) the experimental research method can be defined as a research method used to determine the effect of certain treatments on others under controlled conditions (Agustina, Setiadi, & Fitrian, 2020).

The research design applied is Pre-Experimental Design, which was chosen based on the limited number of samples available. The study used the One Group Pretest-Posttest design to determine the extent to which the Numbered Head Together (NHT) learning model influences the learning outcomes of the Science subject. The location of this research will be carried out at SD Negeri 098166 Perumnas Batu VI. This school is located on Jl Rambutan Raya Perumnas Batu VI, Siantar District, Simalungun Regency, North Sumatra Province.

The research was conducted in August of the odd semester of the 2025/2026 academic year. According to Sugiyono (Pangestu & Kadir, 2019) population is a generalization area consisting of: objects/subjects that have certain qualities and characteristics determined by the researcher to be studied and then conclusions drawn and the population in this study is all fourth grade students. The class consists of 28 people at SD Negeri 098166 Perumnas Batu VI Siantar.

According to Sugiyono (Restikawati, Santosa, & William, 2020)a sample is a part of the number and characteristics possessed by the population. The sample in this study was all fourth-grade students of SD Negeri 098166 Perum Batu VI with a total of 28 students. According to Redinger quoted by Sugiyono (Murwanto, 2020) a variable is a construct or characteristic to be studied. In this study, the researcher took the title of the influence of the Numbered Head Together (NHT) learning model on student learning outcomes in the subject of Science in fourth-grade SD Negeri 098166 Perumnas Batu VI.

According to Arikunto (Aan, 2019) data collection techniques are methods researchers can use to collect data. Data collection is a method used by researchers to obtain relevant data in accordance with the research objectives. Data collection in this study will be carried out in several ways, as follows:

1. Pretest

A pretest is a test given to students before learning activities begin to determine their prior knowledge of the material to be taught (Lestari & Pratiwi, 2021). This test is the initial step taken to determine the level of learning achievement of fourth-grade students at SD Negeri 098166 Perum Batu VI in science before implementing the *Numbered Heads Together* (NHT) learning model.

2. Final test (*Posttest*)

A posttest is a test administered after the learning process is completed to determine students' understanding and mastery of the material taught (Lestari & *Pratiwi* , 2021). *The posttest* is administered after students receive treatment in the form of the *Numbered Heads Together* (NHT) learning model in the science learning process. This final step is used to determine the learning outcomes of fourth-grade students at SD Negeri 098166 Perum Batu VI in the science subject.

3. Documentation

According to Safitri & Rahmawati (Simamora & Donda, 2019) documentation is a data collection technique carried out by collecting written documents, photographs, or other data relevant to the research problem. In this study, documentation was used to obtain supporting data such as school profiles, photographs of learning activities using the *Numbered Heads Together* (NHT) learning model, and other data. This technique aims to *complement* data obtained through tests and observations and to strengthen the accuracy of data collected during the research process.

According to Sugiyono (Nourhasanah & Aslam, 2022) data analysis techniques are the process of processing data into information to draw conclusions. This stage aims to process and analyze data to answer the problem formulation and test previously established hypotheses. Data obtained from *pretests* and *posttests* are analyzed quantitatively to obtain an objective picture and draw conclusions based on research findings.

RESULTS AND DISCUSSION

This research is an experimental study that presents student learning outcomes in the subject of Natural Sciences through the application of the Numbered Head Together (NHT) learning model. The research was conducted in September 2025 on fourth-grade students of SD Negeri 098166 Perumnas Batu VI. This study aims to determine the effect of the Numbered Head Together (NHT) learning model on student learning outcomes. The research instruments used were pretest and posttest to measure students' initial and final abilities in understanding the material after being given treatment. The results of the study are presented in the form of descriptions and tables which are described in detail in this chapter. The sample of this study amounted to 28 people, while the other 28 students were used for instrument trials so that the total number of participants was 56 students.

The research instrument was compiled based on a questionnaire consisting of 40 questions. After validation, 25 valid questions were obtained. The instrument was then tested for validity, reliability, discriminatory power, and difficulty level. The appropriate instrument was then administered to students. The collected data consisted of pretest and posttest scores, which were analyzed descriptively and tested using normality tests, N-Gain, and hypothesis testing (t-test) to determine improvements in learning outcomes.

The research instrument testing was conducted in August 2025 at the UPTD of Public Elementary School 125543, Jalan Farel Pasaribu No. 76, Siantar Marihat District, Pematangsiantar City, North Sumatra Province. The instrument test results listed in the appendix were used to measure the validity, reliability, difficulty level, and discriminatory power of the instruments used in this study.

Hypothesis T-Test

The t-test was conducted to determine whether there was an effect of the *Numbered Head Together* (NHT) learning model on student learning outcomes in the subject of science in grade IV of SD Negeri 098166 Perum Batu VI. The t-test used by researchers in this study was *the Paired Samples Test* using *SPSS 26.* The hypothesis in this study is:

H_a : There is a significant influence of the *Numbered Head Together* (NHT) learning model on student learning outcomes in the Natural Sciences subject on the topic of Changes in the State of Matter in class IV of SD Negeri 098166 Perumnas Batu VI in the 2025/2026 Academic Year.

H_0 : There is no significant influence of the *Numbered Head Together* (NHT) learning model on student learning outcomes in the Natural Sciences subject on the topic of Changes in the State of Matter in class IV of SD Negeri 098166 Perumnas Batu VI in the 2025/2026 Academic Year.

With test criteria:

1. If $t_{hitung} < t_{tabel}$ then H_0 it is rejected, with a significance level of $\alpha = 0.05$.
2. If $t_{hitung} < t_{tabel}$ then H_a it is accepted, with a sig level. < 0.05.

Table 1. Paired Sample Test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Posttest - Pretest	30.42857	13.61216	2.57246	25.15033	35.70682	11,829	27	.000

Based on the table, the Sig. (2-tailed) value is 0.000, which is smaller than the significance level of 0.05. In addition, the value t_{hitung} (11.829) is greater than t_{tabel} (2.052). Thus, H_0 rejected and H_a accepted. This means that there is a significant difference between *the pretest* and *posttest results* . This shows that the implementation of the *Numbered Heads Together* (NHT) learning model has an effect on improving student learning outcomes in the science subject of grade IV of SD Negeri 098166 Perum Batu VI.

N-Gain Test

The N-Gain test is used to determine the effectiveness of learning media by comparing pretest and posttest results. The results of the N-Gain test can be seen in the following table:

Table 2. N-Gain Test

Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Gain_score	28	.29	1.00	.6989	.19933
Gain_percent	28	26.29	92.00	64.2990	18.33877
Valid N (listwise)	28				

Based on the N-Gain calculation results in Table 4.9, the average score was 0.6989 or 64.29%. This indicates that the improvement in student learning outcomes after implementing the *Numbered Heads Together* (NHT) learning model is in the moderate to high category. Thus, it can be concluded that the *Numbered Heads Together* (NHT) learning model is effective in improving student learning outcomes in the science subject in grade IV of SD Negeri 098166 Perum Batu VI.

Discussion of Research Results

This research was conducted at SD Negeri 098166 Perumnas Batu VI in the Science lesson on the topic of Changes in the State of Matter. Before conducting the research, the researcher conducted an instrument test first at the UPTD SD Negeri 125543 Jl Farel Pasaribu Pematangsiantar to prove that the questions were suitable for use, 40 questions were distributed to students at the elementary school, then the results of the questions would be tested on the instrument. The tests carried out on the questions were Validity Test, Reliability Test, Difficulty Level Test, and Question Differentiation Power Test.

The instrument analysis results showed that of the 40 questions tested, 25 were declared valid and 15 were invalid, and therefore were not used in the study. High validity indicates that the questions used were in accordance with the learning indicators and were able to measure the intended competencies. Furthermore, the reliability test produced a coefficient of 0.877, which is included in the high category. This means that the instrument used has a good level of consistency, so that if used on different occasions, it will produce relatively similar measurement results. In terms of difficulty level, a varied distribution was obtained, namely 13 questions were classified as easy, 10 questions were moderate, and 2 questions were difficult. This variation is important because the questions not only measure basic understanding but also assess intermediate to complex abilities according to learning objectives, and prevent questions from being too easy or too difficult for students. Meanwhile, the discriminatory power analysis showed that there were 13 questions in the sufficient category, 5 questions in the good category, and 7 questions in the very good category.

Good discriminatory power indicates that the questions are able to clearly differentiate between high-ability and low-ability students, thus more accurately reflecting the level of mastery of the material. Thus, the research instrument, consisting of 25 questions, was declared to meet the criteria for validity, reliability, difficulty level, and discriminatory power (Hanafiah, Martiani, & Dewi, 2021).

The research began with *a pretest* before treatment, followed by treatment using the *Numbered Heads Together* (NHT) model, and concluded with *a posttest* . This model was chosen because it enhances conceptual understanding through group work, fosters participation, and fosters individual responsibility, as each student has the opportunity to be called based on their head number (Ertin, Bunga, & Galis, 2021a).

The results of the study showed a significant increase in student learning outcomes after the implementation of the *Numbered Head Together* (NHT) learning model. This can be seen from the average student score which was originally 48.89 in the *pretest,* increasing to 79.29 in *the posttest* . This increase in score indicates that most students were able to understand the material better after participating in the learning process with the *Numbered Head Together* (NHT) model, although there were still 3 students who had not achieved learning completion because they were not serious enough and less active in the group discussion process. Based on the results of the t-test analysis, the value obtained $wast_{hitung}$ amounting to 11,829, $whilet_{tabel}$ at a significance level of 5% with a certain degree of freedom (dk) of 2.051. Since $t_{hitung} > t_{tabel}$, it can be concluded that there is a significant difference between the *pretest* and *posttest scores*(Febrianti, 2019) . These results prove that the application of the *Numbered Head Together* (NHT) learning model not only has a positive influence, but also has a significant effect on improving student learning outcomes. Thus, the *Numbered Head Together* (NHT) learning model has been proven to be effective for use in fourth-grade students in the 2025/2026 academic year of Science, because it is able to encourage active student involvement, train cooperation in groups, and improve conceptual understanding through directed discussions (Saeputri, Sutriyono, & Pratama, 2019). The application of this model is expected to be an alternative innovative learning strategy for teachers in an effort to improve the quality of the teaching and learning process and student learning outcomes in a sustainable manner (Ertin, Bunga, & Galis, 2021b).

The results of this study indicate an increase in student learning outcomes after the implementation of the *Numbered Head Together* (NHT) learning model, in line with the findings in the journal Putu Tia Vivi Muliandari (2019) which proves that the use of the *Numbered Head Together* (NHT) model has a significant effect on the Mathematics learning outcomes of elementary school students in Cluster IV Sukasada. In the study, students taught with *Numbered Head Together* (NHT) obtained higher average learning outcomes than students taught with conventional methods. This supports the results of the researcher's research, which increased from 48.86 in *the pretest* to 79.29 in *the posttest* with learning completeness also increasing significantly (Yulinda, Mustapa, & Ratman, 2020). Thus, both previous research and the results of the researcher's research both show that the implementation of the *Numbered Head Together* (NHT) model is able to create a more active, collaborative, and meaningful learning atmosphere so that it has a positive impact on improving student learning outcomes.

CONCLUSION

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

1. *Numbered Head Together (NHT)* learning model has a positive and significant effect on improving fourth grade students' learning outcomes in science. The results of the study indicate that the *Numbered Head Together* (NHT) learning model is effective in improving student learning outcomes.

2. The results of the Kolmogorov-Smirnov normality test showed a significance value of 0.172 (pretest) and 0.116 (posttest), both of which were greater than α = 0.05, so the data were normally distributed.
3. The t-test yielded a value t_{hitung} of 11.829 with a significance level of 0.000 < 0.05, indicating a significant difference between *the pretest* and *posttest* .
4. The average N-Gain of 0.6989 (64.29%) and classical completeness of 89.29% (>85%) prove that the NHT model has a positive impact on the science learning outcomes of fourth-grade students at SDN 098166 Perum Batu VI.

Suggestion

Based on the results of research conducted on the influence of the *Numbered Head Together* (NHT) learning model on student learning outcomes in the subject of science in grade IV of SD Negeri 098166 Perum Batu VI. The researcher provides suggestions in accordance with the results of the research that has been conducted as follows:

1. For educators, especially teachers at SD Negeri 098166 Perum Batu VI, they can use the *Numbered Head Together* (NHT) learning model in learning at school because the *Numbered Head Together* (NHT) learning model is able to invite students to learn more fun and actively.
2. For students of SD Negeri 098166 Perum Batu VI, during the learning process, students are expected to always be active in order to improve learning outcomes with maximum effort.
3. For schools, to be able to provide facilities and infrastructure that can support learning in order to improve student and school achievement.
4. For future researchers, this study only examined the learning model variable. Therefore, it is recommended to expand the research by examining other relevant variables, such as learning methods, learning strategies, learning facilities, learning interests, and student characteristics. This is important to understand the factors that influence learning outcomes.

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