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The Influence of the NHT (Numbered Heads Together) Model on Students' Learning Outcomes in the IPAS Subject

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Abstract: The cooperative learning model of the Numbered Heads Together (NHT) type is essentially a variation of group discussion, characterized by the teacher selecting only one student to represent their group. The problem in this study is the lack of implementation of learning models in teaching and learning activities. The purpose of this research is to determine the influence of the NHT (Numbered Heads Together) model on learning outcomes in the IPAS subject. This study is experimental research with a one-group pretest-posttest design. The population of this research includes all first to sixth-grade students at SDN 054/VIII Sungai Keruh in the 2023/2024 academic year, totaling 211 students. The research sample consists of 29 students. The data collection technique used was a test technique. Based on the results of the paired samples t-test, the significance value obtained was 0.000 < 0.05, which means that H_0 is rejected and H_a is accepted. It is concluded that the NHT (Numbered Heads Together) model has an impact on the IPAS subject in terms of the learning outcomes of fourth-grade students at SDN 054/VIII Sungai Keruh. Based on this study, the NHT (Numbered Heads Together) model can have a very positive influence on students' learning outcomes in IPAS.

Keywords: IPAS; Learning Outcomes; NHT (Numbered Heads Together)

Introduction

Education is a conscious and planned effort to create a learning environment and learning process that enables students to actively develop their potential. This includes fostering spiritual and religious strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, the nation, and the state. In line with this, the learning process involves several essential aspects, such as teaching methods and learning media used during instruction. The most commonly used teaching method at SDN 54/VIII Sungai Keruh is the conventional method, which limits students' creativity in learning IPAS.

Due to this, the researcher conducted an experiment on fourth-grade students at SDN 54/VIII Sungai Keruh using the Numbered Heads Together (NHT) learning model. The cooperative learning model of the NHT type is essentially a variation of group discussion, where the teacher selects only one student to represent their group. NHT is a learning model that emphasizes student activity in searching for, processing, and reporting information from various sources, which is then presented in front of the class (Imam et al., 2022; Nurramadhoan, 2022; Radjak et al., 2023). According to Rohmah (2020), NHT is an approach developed by Spencer Kagan to engage more students in reviewing various learning materials and to assess their understanding of the content. Additionally, Nourhasanah et al. (2022) and Sitorus et al. (2022), state that NHT is a group learning model that fosters positive relationships and collaboration skills in classrooms, where groups consist of 4-5 students to improve learning outcomes. The purpose of forming NHT groups is to provide students with opportunities to actively engage in thinking and learning activities (Bayu et al., 2023).

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During the research at SDN 54/VIII Sungai Keruh, the researcher encountered challenges in the learning process, particularly the lack of teachers or educators implementing the NHT learning model. Instead, learning was primarily conducted using conventional or lecture-based methods, making classroom activities less engaging and inactive. Therefore, the NHT learning model is expected to make students more active during lessons and enhance their learning outcomes. Based on observations conducted during the midterm exams, approximately 70% of students had not yet achieved mastery. Many students' scores were still below the Minimum Competency Criteria (KKTP) in the IPAS subject. The main factor affecting low student achievement is the continued reliance on conventional teaching methods, where students remain passive and only listen to the teacher's explanations. This approach fails to create an engaging learning atmosphere due to the lack of balanced interaction between teachers and students. One way to address the issue of low learning outcomes in the IPAS subject is by implementing the Numbered Heads Together (NHT) learning model.

To provide an engaging IPAS learning experience and build students' confidence, an appropriate learning model is required—one that fosters self-assurance, such as the NHT learning model. This model is expected to help students achieve optimal learning outcomes. This aligns with previous research, which suggests that the NHT model can improve students' learning outcomes, as demonstrated in the study by Salsabila et al. (2023). Their research on the NHT model in Natural and Social Sciences (IPAS) learning for fourth-grade students at SD Muhammadiyah 26 Surabaya showed that the NHT model enhanced students' motivation, deepened their understanding, trained them to be confident, responsible, and disciplined, and fostered creativity in the IPAS learning process. IPAS is one of the essential subjects in elementary schools. According to Siregar (2020), IPAS requires a deep understanding of concepts to achieve optimal learning outcomes. This subject is closely related to nature and society, making it challenging for students due to its abstract nature. Furthermore, Suwantin (2023) states that Natural and Social Sciences (IPAS) plays a crucial role in preparing high-quality human resources. Putra et al. (2023) define IPAS as a systematic body of knowledge comprising concepts, principles, theories, and laws.

Additionally, Sudewiputri et al. (2021) found in their research that there is a significant difference in students' learning motivation and outcomes between those taught using the NHT model and those taught using conventional learning methods. Their study concluded that students who were taught using the NHT model showed higher learning motivation and better academic performance in IPAS compared to those who received conventional instruction. Furthermore, the research demonstrated that learning motivation and academic achievement improved simultaneously when using the NHT model.

Based on these previous studies, it can be concluded that the NHT learning model can enhance students' learning outcomes in IPAS. Although three previous studies have shown similar findings, the main difference lies in the specific learning content, while all remain within the scope of IPAS learning. Therefore, further research is needed to better understand the impact of the NHT model on students' learning outcomes in IPAS by facilitating students with an appropriate learning model. The purpose of this study is to analyze the influence of the NHT model on students' learning outcomes.

Addressing the issues mentioned above, it is essential to implement an engaging and suitable learning model to enhance students' learning outcomes. Observations during classroom learning activities indicate that students often feel bored, which negatively affects their learning achievements. Therefore, a well-structured learning approach, such as the NHT model, is needed to increase student engagement and improve their academic performance.

Method

This research was conducted using a quantitative approach. The quantitative research method is based on positivism philosophy and is used to study a specific population or sample. The sampling technique is generally random, data collection is conducted using research instruments, and data analysis is quantitative/statistical, aiming to test predefined hypotheses (Sugiyono, 2019). This study employs an experimental research design, specifically a pre-experimental design with a one-group pre-test-post-test design. The research was carried out at SDN 054/VIII Sungai Keruh in fourth grade. The selection of SDN 054/VIII Sungai Keruh as the research site was based on the fact that it serves as both the researcher's workplace and initial observation site. The study was conducted during the even semester of the 2023/2024 academic year. The population of this study consists of all first to sixth-grade students at SDN 054/VIII Sungai Keruh in the 2023/2024 academic year, totaling 211 students. The sample for this study was the fourth-grade class, consisting of 29 students. The data collection techniques used in this study included tests and documentation. The data analysis techniques applied were normality tests and T-tests.

Results and Discussion

This research was conducted in fourth grade at SDN 054/VIII Sungai Keruh, with a sample size of 29 students. The selected sample underwent both pretest and posttest assessments. However, before the posttest, the students were given treatment in the form of learning activities using the flipped classroom model in the science subject (IPA). After receiving the treatment, students were given a 30-item multiple-choice test in IPAS learning, and the results were compared with their initial pretest scores before the intervention. The pretest and posttest results are presented in the table 1.

Table 1. Pretest and Posttest Results

Data Description	Pretest	Posttest
N	29	29
$\Sigma \chi$	1784	2210
$\bar{x}$	61.51	76.20
Xmax	84	90
Xmin	44	60
Achieved	6	18
Not Achieved	23	11

The table above shows the pretest and posttest results of the sample class in the IPAS subject using the NHT model with a total of 29 students. The highest pretest score was 84, while the highest posttest score was 90. Meanwhile, the lowest pretest score was 44, and the lowest posttest score was 60. The average pretest score was 61.51, while the average posttest score was 76.20.

The figure 1 illustrates the comparison of the average pretest and posttest scores of fourth-grade students at SDN 054/VIII Sungai Keruh. The average pretest score was 60, whereas the average posttest score was 71. This indicates a difference of 11 points between the pretest and posttest scores. The comparison shows that before the intervention (pretest), most students' scores were below the Minimum Competency Criteria (KKM). However, after the treatment, the posttest scores improved, with more students achieving the KKM.

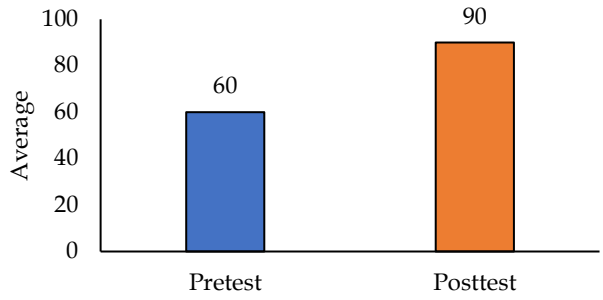

Figure 1. Comparison of pretest and posttest results

Before conducting the hypothesis test, one of the essential prerequisite analyses is to ensure that the data follows a normal distribution, as parametric tests require normally distributed data. Therefore, a normality test was conducted. The normality test determines whether the data obtained in the research follows a normal distribution. Once the data is confirmed to be normally distributed, the hypothesis test can be performed. In this study, the normality test was conducted using SPSS 22 with the Kolmogorov-Smirnov test. The criteria for the test are as follows: If the significance value is greater than 0.05, the data is normally distributed. If the significance value is less than 0.05, the data is not normally distributed. The results of the normality test for the pretest and posttest in this study can be seen in the table 2.

Table 2. Normality Test Results

Class		Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Learning Outcomes	Pre-test	.165	29	.043	.944	29	.126
	Post-test	.174	29	.025	.933	29	.068

Based on the table above, the significance value for the pretest data is 0.126 > 0.05, and the significance value for the posttest data is 0.068 > 0.05, meaning that the pretest and posttest data for fourth-grade students at SDN 054/VIII Sungai Keruh are normally distributed.

Hypothesis Testing

Hypothesis testing is conducted to determine whether the proposed hypothesis is accepted or rejected. Since the pretest and posttest data for students' IPAS learning outcomes are normally distributed, the next step is to conduct hypothesis testing. The researcher used the paired sample t-test, which aims to determine whether there is an influence on students' learning outcomes when using the Numbered Heads Together (NHT) learning model in the teaching and learning process for fourth-grade students. The results of the paired sample t-test are presented in the table 3.

Based on the table above, the significance value of the paired sample t-test is 0.000 < 0.05, meaning that H_0 is rejected and H_a is accepted. Thus, it can be concluded that the NHT (Numbered Heads Together) model significantly impacts students' learning outcomes in the IPAS subject for fourth-grade students at SDN 054/VIII Sungai Keruh.

Table 3. Paired Sample T-Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	df	Sig. (2-tailed)
Pair 1	Pre-test Post-test	-14.690	15.300	2.841	-20.509	-8.870	-5.170	28	.000

The study was conducted at SDN 054/VIII Sungai Keruh, involving 29 students. It was found that many students struggled to understand the IPAS material on different forms of force in our surroundings. Additionally, students were not actively engaged during the learning activities, particularly when grouped into teams. Many students played around and paid little attention during the lessons. The NHT model is expected to address these issues (Anse et al., 2018; Palupi et al., 2022). Moreover, other studies also support this claim. Pendy et al. (2020) and Rohmanurmeta (2020) describe the cooperative learning model of the NHT type as a model that encourages students to actively seek, process, and report information from various sources, which is then presented in front of the class. Additionally, Sofiatun et al. (2023) explain that the cooperative learning model of the NHT type encourages students to think collaboratively in groups. In this model, each student is assigned a number, and everyone has an equal opportunity to answer questions posed by the teacher, with responses selected randomly.

The NHT model can introduce a new learning approach for students, especially in discussion activities, to enhance their learning abilities. Throughout the research process, the researcher followed several steps, starting with the pretest, treatment, and posttest, using the NHT learning model in the IPAS subject. The study also used 30 multiple-choice questions for both the pretest and posttest.

After completing the research in fourth grade at SDN 054/VIII Sungai Keruh, the pretest and posttest data were collected, as shown in Table 2. The average pretest score was 60, while the average posttest score was 71. The pretest and posttest data were then tested for normality, with the results showing a significance value of 0.126 > 0.05 for the pretest and 0.068 > 0.05 for the posttest, meaning that the data were normally distributed. Once the data distribution was confirmed as normal, hypothesis testing was conducted using the paired sample t-test. The results showed a significance value of 0.000 < 0.05, indicating that there was a significant effect of using the NHT (Numbered Heads Together) learning model in the IPAS subject for fourth-grade students at SDN 054/VIII Sungai Keruh.

The learning process in this study was carried out over three sessions, and despite some minor challenges, the lessons proceeded smoothly. Additionally, students responded positively to the learning activities. The activities in the classroom were conducted according to a lesson plan tailored to the NHT model in the IPAS subject. After conducting the pretest using multiple-choice questions, the next session involved the treatment using the NHT learning model. Finally, on the following day, the posttest was conducted using the same 30 multiple-choice questions at SDN 054/VIII Sungai Keruh, where the fourth-grade class consisted of 30 students. The posttest results indicated an improvement in students' learning outcomes.

This finding is consistent with previous research by Nanditha et al. (2023), which stated that the NHT learning model can enhance students' learning outcomes. Their research findings showed that H_0 was rejected and H_a was accepted, confirming a significant influence of the cooperative learning model (NHT) supported by picture card media on science learning outcomes. Similarly, a study by Pahmi et al. (2021) also reported that H_0 was rejected and H_1 was accepted, indicating that the NHT model had a significant impact on IPAS learning. From the findings above, it can be concluded that there is a notable difference between students' learning outcomes before and after using the NHT model in the IPAS subject.

Conclusion

Based on the research conducted in fourth grade at SDN 054/VIII Sungai Keruh, the pretest and posttest data indicate an increase in students' learning outcomes after implementing the Numbered Heads Together (NHT) learning model in the IPAS subject. The average pretest score was 60, while the average posttest score increased to 71. A normality test on the pretest and posttest data showed that the data followed a normal distribution, with a significance value of 0.0126 > 0.05 for the pretest and 0.068 > 0.05 for the posttest. Furthermore, the paired sample t-test resulted in a significance value of 0.000 < 0.05, indicating a significant effect of using the NHT model on students' learning outcomes. The learning process using the NHT model took place over three sessions and was conducted successfully, despite some minor challenges. Students responded positively to the learning activities and actively participated in classroom discussions. The teaching process followed a Lesson Plan (RPP) specifically designed to align with the NHT model, making the learning experience more structured and interactive. The posttest results after

implementing the NHT model showed a notable improvement in students' understanding, as reflected in the significant increase in average scores. Therefore, it can be concluded that the Numbered Heads Together (NHT) learning model has a positive impact on improving students' learning outcomes in the IPAS subject in fourth grade at SDN 054/VIII Sungai Keruh.

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Author Contributions
The research team contributed to the writing of this scientific work as follows: DP: Conceptualization, data collection, data analysis, interpretation of results, and manuscript writing. ZKP & JJ: Supervision and guidance in article writing. DP & ANS: Funding acquisition.

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