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Comparison of the Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students

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ABSTRAK

Penelitian ini bertujuan untuk mengkaji dan mengetahui perbedaan kemampuan pemecahan masalah IPA siswa antara penerapan model pembelajaran Numbered Heads Together (NHT) dan Think Pair Share (TPS) pada materi bunyi kelas IV SDN Batu Ampar 02 Pagi Jakarta Timur. Penelitian ini adalah penelitian eksperimen dengan menggunakan metode Quasy Eksperimental Design, dengan pengambilan data skor dengan menggunakan tipe Non Equivalen Control Group Posttest Design. Penelitian dilaksanakan di SDN Batu Ampar 02 Pagi Jakarta Timur. Populasi dalam penelitian ini adalah siswa kelas IV SDN Batu Ampar 02 Pagi Jakarta Timur. Pengambilan sampel dilakukan dengan teknik sampel jenuh pada kelas IV A dengan jumlah 28 siswa sebagai kelas yang diberi perlakuan Numbered Heads Together (NHT) dan Kelas IV B dengan jumlah siswa 30 yang diberi perlakuan Think Pair Share (TPS). Berdasarkan hasil dari analisis data (posttest) menggunakan uji-t diperoleh $t_{hitung} = 4,21$ serta $t_{tabel} = 2,00$ pada taraf signifikan $\alpha = 0,05$. Hal ini menunjukkan bahwa $t_{hitung} > t_{tabel}$ maka H_0 ditolak berarti terdapat perbedaan antara model pembelajaran Numbered Heads Together (NHT) dengan model pembelajaran Think Pair Share (TPS) terhadap kemampuan pemecahan masalah IPA materi bunyi siswa kelas IV SDN Batu Ampar 02 Pagi.

ABSTRACT

This study aims to examine and determine the differences in students' science problem solving abilities between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models in the fourth grade sound material at SDN Batu Ampar 02 Pagi, East Jakarta. This research is an experimental study using the Quasy Experimental Design method, with score data collection using the Non Equivalent Control Group Posttest Design type. The research was conducted at SDN Batu Ampar 02 Pagi, East Jakarta. The population in this study were fourth grade students at SDN Batu Ampar 02 Pagi, East Jakarta. Sampling was done by using a saturated sample technique in class IV A with a total of 28 students as a class treated with Numbered Heads Together (NHT) and Class IV B with a total of 30 students being treated with Think Pair Share (TPS). Based on the results of the data analysis (posttest) using the t-test obtained $T_{count} = 4.21$ and $T_{table} = 2.00$ at the significant level = 0.05. This shows that $T_{count} > T_{table}$, then H_0 is rejected, meaning that there is a difference between the Numbered Heads Together (NHT) learning model and the Think Pair Share (TPS) learning model on the science problem solving ability of the fourth grade students of SDN Batu Ampar 02 Pagi.

1. INTRODUCTION

Natural Sciences (IPA) is one of the subjects taught in elementary schools and is taken and is required at every level of education. Science subjects are one of the subjects in elementary schools that emphasize the curiosity of students scientifically. Natural Science (IPA) is a systematic way of finding out about nature, so that it is not only mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery (Shebastian et al., 2020). Therefore, the Natural Science subjects given are not only about memorizing and understanding theory, but how we act, do, and solve a problem. This definition states that science is a form of effort in various experiences that can develop process skills, understanding concepts, application of concepts, scientific attitudes, and is based on natural science learning activities on issues developed in society (Mulyaningsih et al., 2021). The process of learning science in elementary schools so far is still carried out conventionally which results in the lack of problem solving abilities in students. The implementation of the learning process that takes place is only directed at the ability to memorize and understand theory so that students find it difficult to relate it to situations in everyday life. Science learning in elementary schools is also still less emphasis on the curiosity attitude of students scientifically, but it is always about memorizing and understanding theory, so that students are lacking in how to act, do, and solve a problem. Natural Science (IPA) is a theoretical knowledge that is obtained or compiled by finding out and doing, this will help students to gain a deeper understanding which is a process (human effort to understand the universe), procedure (appropriate observations and correct procedures).), and produce a product or conclusion (Soemari et al., 2020). The implementation of the science learning process is directed at the ability to develop scientific skills and attitudes in students so that they are able to relate them to situations in everyday life. Science learning in elementary schools also emphasizes the curiosity of students scientifically, but it is always about memorizing and understanding theory, so that students can understand how to act, do, and solve a problem. The science learning process in elementary schools does not only memorize concepts, but students are expected to be able to understand, observe, analyze and solve problems which will be useful for everyday life through science subjects (Oktaviani & Tari, 2018).

Problem solving ability is the activity of higher order thinking skills to solve a problem in accepting new problems. Problem solving ability is the ability of a person to use the inspiration of his deep thinking so as to encourage scientific thinking which is expected in the learning process (Mayrati et al., 2019). Problem solving leads to the efforts needed by students for the problems experienced and how students act to determine a way out in solving a problem. According to (Yandhari et al., 2019) problem solving indicators include clarifying concept terms which means classifying information in solving problems to get an overview of the things contained in the problem. Second, formulating problems and analyzing problems which means compiling several steps according to information and data from a problem. Third, building ideas systematically means carrying out problem solving based on steps that have been thoroughly designed. Fourth, seeking new information through other sources, which means that after the completion stage is reached, it is necessary to add new ideas to strengthen the concept. Thus this study observes the problem solving ability of students in learning science content. Therefore, an experiment has been carried out using one of the methods for researching science content learning in elementary schools. The methods used are Numbered Heads Together (NHT) and Think Pair Share (TPS) methods. Numbered Head Together (NHT) is a cooperative learning model by discussing in groups where each student is given a number and has the same opportunity to answer questions by calling the number randomly proposed by the teacher (Siti Muawanah & Nizaruddin, 2019). In the Numbered Head Together (NHT) cooperative learning model, students are directed to be able to participate actively by using numbered heads in their groups. Research with learning techniques and learning steps in Numbered Heads Together (NHT), the first is numbering. Students are divided into groups of 4-5 people, each student in each group gets a number. Second, asking questions (questioning) The teacher gives assignments and each group does it. Third, think together (heads

together) The group discusses the correct answer and ensures that each group member can do it or know the answer. Fourth, giving answers (answering) the teacher randomly calls one of the student numbers with the number called to report the results of their discussion. And fifth, the conclusion (Iskandar & Leonard, 2018). In learning by applying the Numbered Heads Together (NHT) model, students study in groups where each member is responsible for the group's work. Through these activities, the application of Numbered Heads Together (NHT) as a cooperative learning model which during the learning process involves students in implementing a learning process (Yuniarti et al., 2021). The Numbered Heads Together (NHT) learning model is expected to activate students, motivate students, and invite students to think creatively in solving problems. According to (Haniyah, 2019) the Numbered Head Together (NHT) Cooperative Learning model is a type of cooperative learning designed to influence student interaction patterns and as an alternative to traditional classroom structures.

While the Think Pair Share (TPS) model is a learning model that requires students to think and find answers in pairs (Rahayu et al., 2021). The Think Pair Share (TPS) cooperative learning model emphasizes that students are first given the opportunity to think individually, then students discuss with their partners and then present the results of their thoughts. According to (Rizqi et al., 2021) the Think Pair Share (TPS) learning model is thinking in pairs in interacting with other students to appreciate any differences that exist and be responsible for learning activities. Think Pair Share (TPS) is a cooperative learning model that is applied to students to give time to think, respond and together help each other in group learning. This model presents inspiration such as thinking time or waiting time as a strong aspect in increasing students' skills in responding to problems. Learning techniques and learning steps in the Think Pair Share (TPS) model are, Session one, think (thinking), Session two, pair (pairs), and the third session, share (sharing). Problem solving ability is an activity of thinking and reasoning in solving problems through problems that have previously been encountered to encourage students to be able to solve these problems. Problem solving ability is a process of practicing previously acquired knowledge into a new, unknown atmosphere (Risman et al., 2020). Indicators of problem solving include (1) Clarifying concept terms. That is, classifying information in solving problems to get a picture of something that is contained in the problem. (2) Formulate the problem and analyze the problem. That is, compiling several steps according to information and data from a problem. (3) Build ideas systematically. That is, carrying out problem solving based on steps that have been designed thoroughly. (4) Seeking new information through other sources. That is, after the completion stage is reached, it is necessary to add new ideas to strengthen the concept (Yandhari et al., 2019).

Learning Numbered Heads Together (NHT) and Think Pair Share (TPS) during the COVID-19 pandemic has made teaching and learning activities carried out online. In order to reduce and suppress the spread of the virus, the learning that was originally carried out in schools was diverted by changing all educational activities into learning at home via online or online. Learning through online or online using digital technology, namely zoom meetings. According to (Riyan Rizaldi & Fatimah, 2020) Zoom meetings are one of the online platforms or applications that are often used to carry out online or remote activities such as meetings, dialogues and virtual or not face-to-face learning and distance education. Zoom meeting is an application that basically fits the demands of the industrial revolution 4.0 by emphasizing on system digitization or technology-based. Teachers are required to understand information and communication technology in order to make it easier for teachers to provide direction to students in learning (Zaenuri & Prastowo, 2021). The position of the teacher in the online learning process must be more optimal, so that students become learning activists because teachers must be able to make the basis of a constructivist approach in which students are learning subjects. The zoom meeting application is an application that has developed in helping the online learning process. Zoom meetings are one of the applications or platforms that are very supportive in the needs of communication, interaction and remote education processes that can still be done virtually or not face-to-face. According to (Eko Yulianto et al., 2020) learning is through zoom meetings, where educators and students can meet face-to-face and interact properly so as to make it easier and at the same time help teachers to interact with students in the process of distance teaching and learning activities. Learning through zoom meetings is considered more efficient, because if teachers cannot attend, zoom meetings are an option for teachers and students to continue to carry out the distance learning process (Haqien & Rahman, 2020). Learning is not just remembering, but broader than that, namely experiencing.

2. METHOD

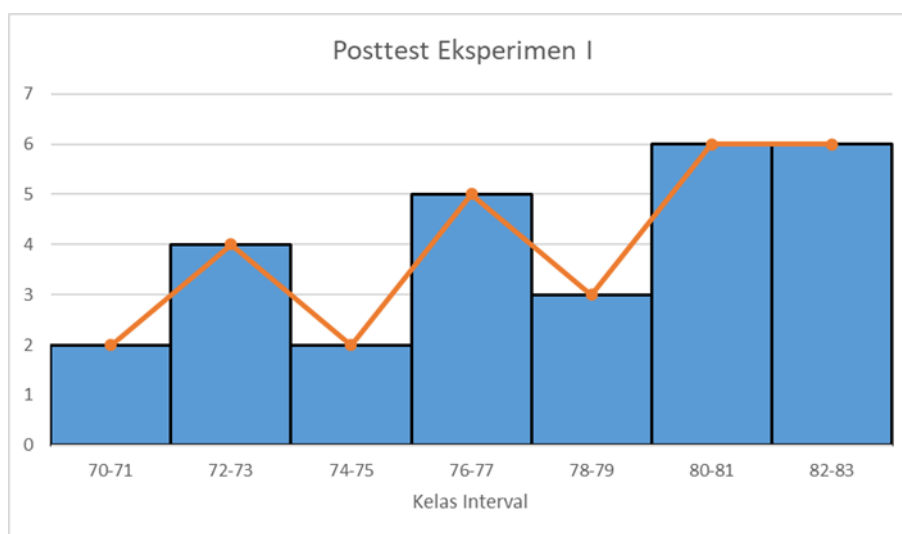
The population in this study were fourth grade students at SDN Batu Ampar 02 Pagi, East Jakarta. With a total of 58 students, divided into 32 male students and 26 female students. The sample of this study using the Quasy Experimental Design method was carried out with the saturated sample technique in class IV A by being treated with Numbered Heads Together (NHT) and Class IV B by being treated with Think Pair Share (TPS). The data collection technique in this study used a subjective test method in the form of a posttest. In the experimental class I was given Numbered Heads Together (NHT) treatment, while the experimental class II was given Think Pair Share (TPS) treatment. After the two classes were given different

treatments, they were then given a final test to determine students' understanding after being given treatment. The results of the final test were then compared to test the differences using statistical tests on students' problem solving abilities.

3. RESULT AND DISCUSSION

Result

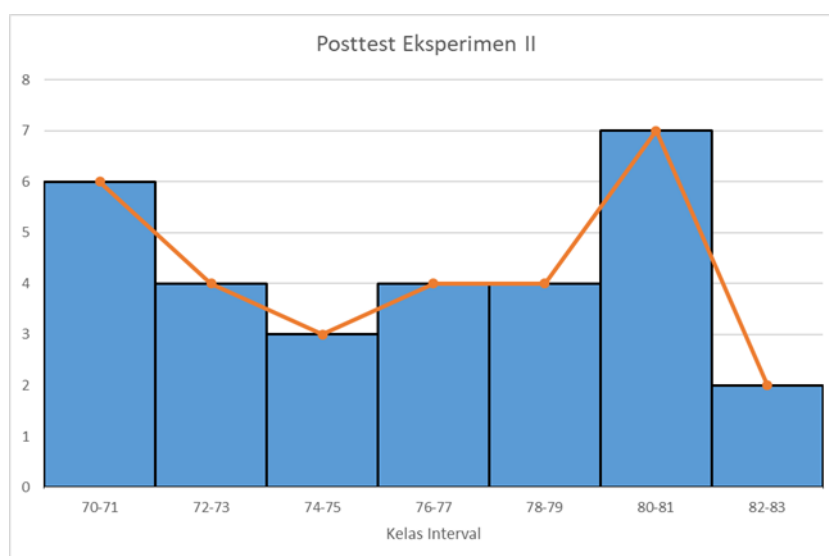
The results of data analysis (Post-Test) conducted on fourth grade students at SDN Batu Ampar 02 Pagi East Jakarta, involving class IV A as the experimental class I which was treated with the Numbered Heads Together (NHT) model and class IV B as the experimental class II. given the Think Pair Share (TPS) model treatment as follows:



Gambar 1.

Distribusi frekuensi hasil nilai kemampuan pemecahan masalah IPA siswa pada kelas Eksperimen I

Based on the results of the Experiment I class research as many as 28 students using the Numbered Heads Together (NHT) learning model, the results data (Post-Test) obtained the lowest score of 70 and the highest score of 82. Frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment I class using the Numbered Heads Together (NHT) model on the sound properties material, the score ranges from 70 to 82 with a total of 28 students as respondents.



Gambar 2.

Distribusi frekuensi hasil nilai kemampuan pemecahan masalah IPA siswa pada kelas Eksperimen II

Based on the tables and figures for the frequency distribution of the results of students'

science problem solving ability scores for the post-test in the Experiment II class using the Think Pair Share (TPS) model on the material properties of sound, the score ranges from 70 to 82 with a total of 30 students as respondents. The data on the value of the results of problem solving abilities in the Experiment II class by applying the Think Pair Share (TPS) model obtained the result data (Post-Test) which obtained the lowest score of 70 and the highest score of 82.

Tabel 1. Hasil Uji Statistik Deskriptif *Post Test* Kemampuan Pemecahan Masalah

Statistik Deskriptif	Kelas Eksperimen I	Kelas Eksperimen II
N	28	30
Nilai Tertinggi	82	82
Nilai Terendah	70	70
Mean	78,7	76,16

Table 1 shows that the experimental class I with 28 students (N) has an average of 78.7, the lowest score is 70 and the highest score is 82 with. Meanwhile, in the experimental class II with 30 students (N) the average score was 76.16, the lowest score was 70 and the highest score was 82. From table 1, it can be seen that there is a difference in the Posttest average, which is 2.54. Before analyzing the data, the researcher first conducted a normality test and a homogeneity test on the post test. Normality test is presented in Table 2.

Tabel 2. Hasil Uji Normalitas

Perlakuan	N	L_{hitung}	L_{tabel}
<i>Numbered Heads Together</i> (NHT)	28	0,119	0,167
<i>Think Pair Share</i> (TPS)	30	0,146	0,161

Based on Table 2, the calculation of the normality test for the Experiment I class (Post-Test) with the *Numbered Heads Together* (NHT) learning model, it was obtained that $0.119 < 0.167$ at the real level = 0.05 with $n = 28$. It can be concluded that the Post-Test Experiment I data normally distributed. While the calculation of the normality test for the Experiment II class (Post-Test) with the *Think Pair Share* (TPS) learning model, it was obtained that $0.146 < 0.161$ at the real level = 0.05 with $n = 30$. It can be concluded that the Post-Test Experiment II data is normally distributed. The homogeneity test for the experimental class I and the experimental class II can be seen in Table 3.

Tabel 3. Hasil Uji Homogenitas

Perlakuan	F_{hitung}	F_{tabel}
<i>Numbered Heads Together</i> (NHT)	1,06621	1,87513
<i>Think Pair Share</i> (TPS)		

Based on Table 3, the homogeneity test or the similarity test of two population variances from two groups was carried out using Fisher's exact test. From the test results obtained and = at a significant level of 0.05. Because it does not exceed the variance of the two groups is homogeneous.

Tabel 4. Hasil Uji T

Kelompok	α	t_{hitung}	t_{tabel}	Keputusan	Kesimpulan
Eksperimen	0,05	4,21	2,00	H_a diterima	Terdapat perbedaan kemampuan pemecahan masalah IPA siswa

From the results of the calculation of the price = 4.21 and = 2.00 at the significant level = 0.05. This shows that $>$ then H_0 is rejected, meaning that there is a significant difference in students' science problem solving abilities between the application of the *Numbered Heads Together* (NHT) and *Think Pair Share* (TPS) learning models in class IV SDN Batu Ampar 02 Pagi, East Jakarta. The difference in the problem solving abilities of fourth grade students between students who follow the *Numbered Heads Together* (NHT) model learning process and students who follow the *Think Pair Share* (TPS) model learning process is because there are differences in the stages of learning activities and delivery of material. The *Numbered Heads Together* (NHT) model in its implementation has distinctive characteristics with the numbering of heads in groups of students where each group consisting of 4-5 students who are given a head number can emphasize learning activities by playing an active role through group discussions and developing problem solving skills. Learning using the *Numbered Heads Together* (NHT) model creates joint activities that stimulate the curiosity of

students with other group members, namely by providing problems or problems related to everyday life, and students finding out how these problems can be solved. While the learning process of the Think Pair Share (TPS) model in its implementation in groups of students is carried out in pairs, students together help each other in group study. This model presents inspiration such as thinking time or waiting time as a strong aspect in increasing students' skills in responding to problems. By providing problems or problems related to everyday life, opportunities for students to carry out learning activities are to work alone and collaborate with their group mates in finding out how these problems can be solved. So that in this process, students need more time to think, respond and together help each other in their groups. According to (Nugroho & Wardani, 2019) it was revealed from the results of the study that the class that was treated with the application of the Numbered Heads Together (NHT) model proved that there was a better effect on students' problem-solving abilities. Learning from the Numbered Heads Together (NHT) model makes all students more active in learning. The use of the Numbered Heads Together (NHT) model can encourage student activities. Seen in group discussions through the activity of exchanging opinions and giving suggestions in solving problems, where each student will help each other so that all group members are ready to be more enthusiastic in learning. This is also reinforced by (Pakpahan & History, 2016) the Numbered Heads Together (NHT) model can encourage students to be more active in developing ideas when conducting group discussions, namely by helping one another with students who do not master the subject matter. By helping each other and sharing knowledge, students can have open insights when exchanging their respective opinions.

Discussion

Based on the results of the research that has been explained that in research on students' science problem solving abilities there are differences between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models in class IV SDN Batu Ampar 02 Pagi, East Jakarta. The results of the calculation of the hypothesis test show that $t = 4.21$ and $t_{table} = 2.00$ at the significant level $= 0.05$. This shows that it is greater than ($4.21 > 2.00$) then H_0 is rejected. It means that there are differences in students' science problem solving abilities between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models for class IV sound at SDN Batu Ampar 02 Pagi, East Jakarta. According to (Pakpahan & History, 2016) states that learning outcomes using the Heads Together (NHT) type of cooperative learning model are better than the Think Pair Share (TPS) type. Through the Numbered Heads Together (NHT) model in learning can encourage students to be more active in learning because Numbered Heads Together has a characteristic that is numbering where the teacher appoints one student according to the numbering to represent the group. This method aims to involve all students in teaching and learning activities. The group must ensure that each member of the group is able to master the material given by the teacher, this can make students exchange ideas or opinions to find the most appropriate answer collaboratively and train students' responsibility to try to master the material from the teacher. when conducting group discussions, students can share the knowledge they get and can exchange opinions with each other. According to (Nugroho & Wardani, 2019) stating that the learning model in the experimental class 1 using Numbered Head Together (NHT) is superior to the use of Think Pair Share (TPS) in the experimental class 2. In the use of the Numbered Head Together (NHT) model students are better and effective compared to the Think Pair Share (TPS) cooperative learning model. In the Numbered Head Together (NHT) model, students tend to be more active and more focused, which makes students' insights more open to lessons. The Numbered Head Together (NHT) model also provides students with active learning so that they are encouraged to think, work together and prepare themselves in mastering the material. According to (Asniwati et al., 2019) stated that student learning activities through the Think Numbered Heads Together (NHT) model improve student learning outcomes. Through the Numbered Head Together (NHT) model, the improvement in learning outcomes takes place because students work together with groups so that they can share data and the teacher also emphasizes students to be more careful in working on the questions that have been given. Information on student learning outcomes is obtained from assessment tests that are tried at the end of each meeting with the aim of sharing an overview of students' skills in understanding learning. The implication of the results of this study is that the Numbered Head Together (NHT) model has a better effect, superior to the use of Think Pair Share (TPS) on students' problem-solving abilities which can affect the learning, and can make students improve their interactions with fellow friends in exchanging opinions. and provide input or criticism.

4. CONCLUSION

Research that has been conducted at SDN Batu Ampar 02 Pagi East Jakarta, it can be concluded that there are differences in students' science problem solving abilities between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models assisted by Zoom Meeting on sound material. More effective learning with the Numbered Heads Together (NHT) model that is applied has more effect on students' problem solving abilities in the teaching and learning process compared to learning the

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**2. Bukti Konfirmasi Review dan Hasil Review
Pertama
(3 Juni 2022)**

[IJEE] Editor Decision

Ejournal Undiksha <ejournal@undiksha.ac.id>
To: Sri Lestari Handayani <srilestarih@uhamka.ac.id>

Fri, Jun 3, 2022 at 11:29 AM

Sri Lestari Handayani:

We have reached a decision regarding your submission to International Journal of Elementary Education, "Comparison of the Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students".

Our decision is to: revision required

International Journal of
Elementary Education <http://ejournal.undiksha.ac.id/index.php/IJSD>

2 attachments



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Comparison of the Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students

Sri Lestari Handayani^{1*}, Muamar Isyanto², Khairil Ibrahim³, Kusmajid⁴

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ABSTRAK

Penelitian ini bertujuan untuk mengkaji dan mengetahui perbedaan kemampuan pemecahan masalah IPA siswa antara penerapan model pembelajaran Numbered Heads Together (NHT) dan Think Pair Share (TPS) pada materi bunyi kelas IV SDN Batu Ampar 02 Pagi Jakarta Timur. Penelitian ini adalah penelitian eksperimen dengan menggunakan metode Quasy Eksperimental Design, dengan pengambilan data skor dengan menggunakan tipe Non Equivalen Control Group Posttest Design. Penelitian dilaksanakan di SDN Batu Ampar 02 Pagi Jakarta Timur. Populasi dalam penelitian ini adalah siswa kelas IV SDN Batu Ampar 02 Pagi Jakarta Timur. Pengambilan sampel dilakukan dengan teknik sampel jenuh pada kelas IV A dengan jumlah 28 siswa sebagai kelas yang diberi perlakuan Numbered Heads Together (NHT) dan Kelas IV B dengan jumlah siswa 30 yang diberi perlakuan Think Pair Share (TPS). Berdasarkan hasil dari analisis data (posttest) menggunakan uji-t diperoleh $t_{hitung} = 4,21$ serta $t_{tabel} = 2,00$ pada taraf signifikan $\alpha = 0,05$. Hal ini menunjukkan bahwa $t_{hitung} > t_{tabel}$ maka H_0 ditolak berarti terdapat perbedaan antara model pembelajaran Numbered Heads Together (NHT) dengan model pembelajaran Think Pair Share (TPS) terhadap kemampuan pemecahan masalah IPA materi bunyi siswa kelas IV SDN Batu Ampar 02 Pagi.

Commented [RV1]: TITLE:

made as attractive as possible, to make it look new. not general in nature, reflecting research results

Commented [RV2]: ABSTRACT:

150 words

1. Start by writing a 2-sentence research problem
2. State one main objective of the research, use KKO (operational verb) with higher cognitive level,
3. Type of research, and research design (1 sentence is sufficient)
4. Research subjects,
5. Data collection methods and research instruments.
6. Analysis of the data used,
7. Results are in line with the main goal
8. Conclusions, are general in nature and answer research problems.
9. The place of research/data collection does not need to

be written in the abstract

ABSTRACT

This study aims to examine and determine the differences in students' science problem solving abilities between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models in the fourth grade sound material at SDN Batu Ampar 02 Pagi, East Jakarta. This research is an experimental study using the Quasy Experimental Design method, with score data collection using the Non Equivalent Control Group Posttest Design type. The research was conducted at SDN Batu Ampar 02 Pagi, East Jakarta. The population in this study were fourth grade students at SDN Batu Ampar 02 Pagi, East Jakarta. Sampling was done by using a saturated sample technique in class IV A with a total of 28 students as a class treated with Numbered Heads Together (NHT) and Class IV B with a total of 30 students being treated with Think Pair Share (TPS). Based on the results of the data analysis (posttest) using the t-test obtained $T_{count} = 4.21$ and $T_{table} = 2.00$ at the significant level = 0.05. This shows that $T_{count} > T_{table}$, then H_0 is rejected, meaning that there is a difference between the Numbered Heads Together (NHT) learning model and the Think Pair Share (TPS) learning model on the science problem solving ability of the fourth grade students of SDN Batu Ampar 02 Pagi.

1.

Natural Sciences (IPA) is one of the subjects taught in elementary schools and is taken and is required at every level of education. Science subjects are one of the subjects in elementary schools that emphasize the curiosity of students scientifically. Natural Science (IPA) is a systematic way of finding out about nature, so that it is not only mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery (Shebastian et al., 2020). Therefore, the Natural Science subjects given are not only about memorizing and understanding theory, but how we act, do, and solve a problem. This definition states that science is a form of effort in various experiences that can develop process skills, understanding concepts, application of concepts, scientific attitudes, and is based on natural science learning activities on issues developed in society (Mulyaningsih et al., 2021). The process of learning science in elementary schools so far is still carried out conventionally which results in the lack of problem solving abilities in students. The implementation of the learning process that takes place is only directed at the ability to memorize and understand theory so that students find it difficult to relate it to situations in everyday life. Science learning in elementary schools is also still less emphasis on the curiosity attitude of students scientifically, but it is always about memorizing and understanding theory, so that students are lacking in how to act, do, and solve a problem. Natural Science (IPA) is a theoretical knowledge that is obtained or compiled by finding out and doing, this will help students to gain a deeper understanding which is a process (human effort to understand the universe), procedure (appropriate observations and correct procedures).), and produce a product or conclusion (Soemari et al., 2020). The implementation of the science learning process is directed at the ability to develop scientific skills and attitudes in students so that they are able to relate them to situations in everyday life. Science learning in elementary schools also emphasizes the curiosity of students scientifically, but it is always about memorizing and understanding theory, so that students can understand how to act, do, and solve a problem. The science learning process in elementary schools does not only memorize concepts, but students are expected to be able to understand, observe, analyze and solve problems which will be useful for everyday life through science subjects (Oktaviani & Tari, 2018).

Problem solving ability is the activity of higher order thinking skills to solve a problem in accepting new problems. Problem solving ability is the ability of a person to use the inspiration of his deep thinking so as to encourage scientific thinking which is expected in the learning process (Mayrath et al., 2019). Problem solving leads to the efforts needed by students for the problems experienced and how students act to determine a way out in solving a problem. According to (Yandhari et al., 2019) problem solving indicators include clarifying concept terms which means classifying information in solving problems to get an overview of the things contained in the problem. Second, formulating problems and analyzing problems which means compiling several steps according to information and data from a problem. Third, building ideas systematically means carrying out problem solving based on steps that have been thoroughly designed. Fourth, seeking new information through other sources, which means that after the completion stage is reached, it is necessary to add new ideas to strengthen the concept. Thus this study observes the problem solving ability of students in learning science content. Therefore, an experiment has been carried out using one of the methods for researching science content learning in elementary schools. The methods used are Numbered Heads Together (NHT) and Think Pair Share (TPS) methods. Numbered Head Together (NHT) is a cooperative learning model by discussing in groups where each student is given a number and has the same opportunity to answer questions by calling the number randomly proposed by the teacher (Siti Muawanah & Nizaruddin, 2019). In the Numbered Head Together (NHT) cooperative learning model, students are directed to be able to participate actively by using numbered heads in their groups. Research with learning techniques and learning steps in Numbered

INTRODUCTION

Commented [RV3]: Refine again regarding: GAP analysis (overview of scientific developments related to the topic under study; the results of a literature review showing gaps in research findings), the urgency of research and insight into problem-solving plans, as well as the objectives of the research presented in a straightforward and clear manner.

To support the statement, use international references, one of which can be the Scopus indexed journal. Use a minimum of two citations, (Agus, 2020; Andi, 2020). Use the latest sources of references that are used with a minimum degree of reference for the last 5 to 10 years (books), while references from indexed journals, both Sinta and Scopus, are at least the last 3-5 years.

Heads Together (NHT), the first is numbering. Students are divided into groups of 4-5 people, each student in each group gets a number. Second, asking questions (questioning) The teacher gives

assignments and each group does it. Third, think together (heads together) The group discusses the correct answer and ensures that each group member can do it or know the answer. Fourth, giving answers (answering) the teacher randomly calls one of the student numbers with the number called to report the results of their discussion. And fifth, the conclusion (Iskandar & Leonard, 2018). In learning by applying the Numbered Heads Together (NHT) model, students study in groups where each member is responsible for the group's work. Through these activities, the application of Numbered Heads Together (NHT) as a cooperative learning model which during the learning process involves students in implementing a learning process (Yuniarti et al., 2021). The Numbered Heads Together (NHT) learning model is expected to activate students, motivate students, and invite students to think creatively in solving problems. According to (Haniyah, 2019) the Numbered Head Together (NHT) Cooperative Learning model is a type of cooperative learning designed to influence student interaction patterns and as an alternative to traditional classroom structures.

While the Think Pair Share (TPS) model is a learning model that requires students to think and find answers in pairs (Rahayu et al., 2021). The Think Pair Share (TPS) cooperative learning model emphasizes that students are first given the opportunity to think individually, then students discuss with their partners and then present the results of their thoughts. According to (Rizqi et al., 2021) the Think Pair Share (TPS) learning model is thinking in pairs in interacting with other students to appreciate any differences that exist and be responsible for learning activities. Think Pair Share (TPS) is a cooperative learning model that is applied to students to give time to think, respond and together help each other in group learning. This model presents inspiration such as thinking time or waiting time as a strong aspect in increasing students' skills in responding to problems. Learning techniques and learning steps in the Think Pair Share (TPS) model are, Session one, think (thinking), Session two, pair (pairs), and the third session, share (sharing). Problem solving ability is an activity of thinking and reasoning in solving problems through problems that have previously been encountered to encourage students to be able to solve these problems. Problem solving ability is a process of practicing previously acquired knowledge into a new, unknown atmosphere (Risman et al., 2020). Indicators of problem solving include (1) Clarifying concept terms. That is, classifying information in solving problems to get a picture of something that is contained in the problem. (2) Formulate the problem and analyze the problem. That is, compiling several steps according to information and data from a problem. (3) Build ideas systematically. That is, carrying out problem solving based on steps that have been designed thoroughly. (4) Seeking new information through other sources. That is, after the completion stage is reached, it is necessary to add new ideas to strengthen the concept (Yandhari et al., 2019).

Learning Numbered Heads Together (NHT) and Think Pair Share (TPS) during the COVID-19 pandemic has made teaching and learning activities carried out online. In order to reduce and suppress the spread of the virus, the learning that was originally carried out in schools was diverted by changing all educational activities into learning at home via online or online. Learning through online or online using digital technology, namely zoom meetings. According to (Riyan Rizaldi & Fatimah, 2020) Zoom meetings are one of the online platforms or applications that are often used to carry out online or remote activities such as meetings, dialogues and virtual or not face-to-face learning and distance education. Zoom meeting is an application that basically fits the demands of the industrial revolution 4.0 by emphasizing on system digitization or technology-based. Teachers are required to understand information and communication technology in order to make it easier for teachers to provide direction to students in learning (Zaenuri & Prastowo, 2021). The position of the teacher in the online learning process must be more optimal, so that students become learning activists because teachers must be able to make the basis of a constructivist approach in which students are learning subjects. The zoom meeting application is an application that has developed in helping the online learning process. Zoom meetings are one of the applications or platforms that are very supportive in the needs of communication, interaction and remote education processes that can still be done virtually or not face-to-face. According to (Eko Yulianto et al., 2020) learning is through zoom meetings, where educators and students can meet face-to-face and interact properly so as to make it easier and at the same time help teachers to interact with students in the process of distance teaching and learning activities. Learning through zoom meetings is considered more efficient, because if teachers cannot attend, zoom meetings are an option for teachers and students to continue to carry out the distance learning process (Haqien & Rahman, 2020). Learning is not just remembering, but broader than that, namely experiencing.

2.

The population in this study were fourth grade students at SDN Batu Ampar 02 Pagi, East Jakarta. With a total of 58 students, divided into 32 male students and 26 female students. The sample of this study using the Quasy Experimental Design method was carried out with the saturated sample technique in class IV A by being treated with Numbered Heads Together (NHT) and Class IV B by being treated with Think Pair Share (TPS). The data collection technique in this study used a subjective test method in the

Commented [RV4]: The METHOD needs to be explained clearly and straightforwardly, it can be described in four paragraphs which include:

1. The type and design of the research (1 paragraph) can be completed with a design chart (with clear sources)
2. Research subjects, who are involved in research
3. Data collection methods and instruments (the method used is complete with instrument grids and instrument validity tests)
4. The method of analysis, the analysis carried out.

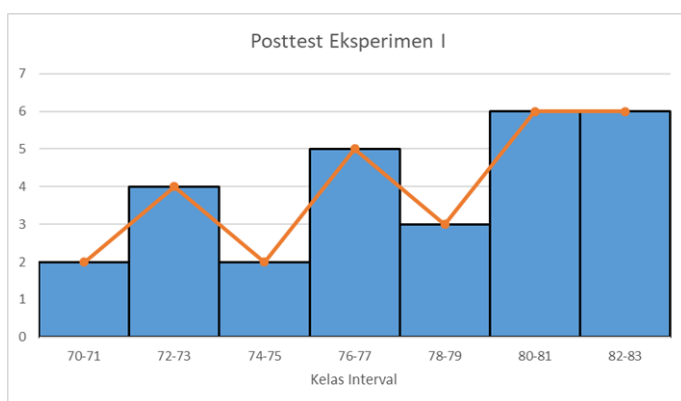
form of a posttest. In the experimental class I was given Numbered Heads Together (NHT) treatment,

while the experimental class II was given Think Pair Share (TPS) treatment. After the two classes were given different treatments, they were then given a final test to determine students' understanding after being given treatment. The results of the final test were then compared to test the differences using statistical tests on students' problem solving abilities.

3. RESULT AND DISCUSSION

Result

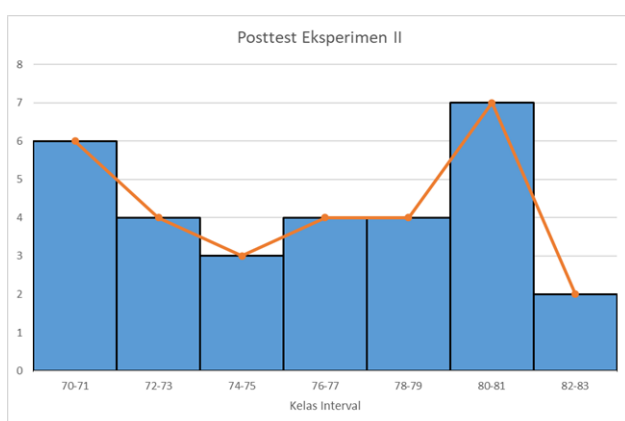
The results of data analysis (Post-Test) conducted on fourth grade students at SDN Batu Ampar 02 Pagi East Jakarta, involving class IV A as the experimental class I which was treated with the Numbered Heads Together (NHT) model and class IV B as the experimental class II, given the Think Pair Share (TPS) model treatment as follows:



Gambar 1.

Distribusi frekuensi hasil nilai kemampuan pemecahan masalah IPA siswa pada kelas Eksperimen I

Based on the results of the Experiment I class research as many as 28 students using the Numbered Heads Together (NHT) learning model, the results data (Post-Test) obtained the lowest score of 70 and the highest score of 82. Frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment I class using the Numbered Heads Together (NHT) model on the sound properties material, the score ranges from 70 to 82 with a total of 28 students as respondents.



Gambar 2.

Distribusi frekuensi hasil nilai kemampuan pemecahan masalah IPA siswa pada kelas Eksperimen II

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Based on the tables and figures for the frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment II class using the Think Pair Share (TPS) model on the material properties of sound, the score ranges from 70 to 82 with a total of 30 students as respondents. The data on the value of the results of problem solving abilities in the Experiment II class by applying the Think Pair Share (TPS) model obtained the result data (Post-Test) which obtained the lowest score of 70 and the highest score of 82.

Tabel 1. Hasil Uji Statistik Deskriptif *Post Test* Kemampuan Pemecahan Masalah

Statistik Deskriptif	Kelas Eksperimen I	Kelas Eksperimen II
N	28	30
Nilai Tertinggi	82	82
Nilai Terendah	70	70
Mean	78,7	76,16

Table 1 shows that the experimental class I with 28 students (N) has an average of 78.7, the lowest score is 70 and the highest score is 82 with. Meanwhile, in the experimental class II with 30 students (N) the average score was 76.16, the lowest score was 70 and the highest score was 82. From table 1, it can be seen that there is a difference in the Posttest average, which is 2.54. Before analyzing the data, the researcher first conducted a normality test and a homogeneity test on the post test. Normality test is presented in Table 2.

Tabel 2. Hasil Uji Normalitas

Perlakuan	N	L_{hitung}	L_{tabel}
<i>Numbered Heads Together</i> (NHT)	28	0,119	0,167
<i>Think Pair Share</i> (TPS)	30	0,146	0,161

Based on Table 2, the calculation of the normality test for the Experiment I class (Post-Test) with the Numbered Heads Together (NHT) learning model, it was obtained that $0.119 < 0.167$ at the real level = 0.05 with $n = 28$. It can be concluded that the Post-Test Experiment I data normally distributed. While the calculation of the normality test for the Experiment II class (Post-Test) with the Think Pair Share (TPS) learning model, it was obtained that $0.146 < 0.161$ at the real level = 0.05 with $n = 30$. It can be concluded that the Post-Test Experiment II data is normally distributed. The homogeneity test for the experimental class I and the experimental class II can be seen in Table 3.

Tabel 3. Hasil Uji Homogenitas

Perlakuan	F_{hitung}	F_{tabel}
<i>Numbered Heads Together</i> (NHT)	1,06621	1,87513
<i>Think Pair Share</i> (TPS)		

Based on Table 3, the homogeneity test or the similarity test of two population variances from two groups was carried out using Fisher's exact test. From the test results obtained and = at a significant level of 0.05. Because it does not exceed the variance of the two groups is homogeneous.

Tabel 4. Hasil Uji T

Kelompok	α	t_{hitung}	t_{tabel}	Keputusan	Kesimpulan
Eksperimen	0,05	4,21	2,00	H_a diterima	Terdapat perbedaan kemampuan pemecahan masalah IPA siswa

From the results of the calculation of the price = 4.21 and = 2.00 at the significant level = 0.05. This shows that $>$ then H_0 is rejected, meaning that there is a significant difference in students' science problem solving abilities between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models in class IV SDN Batu Ampar 02 Pagi, East Jakarta. The difference in the problem solving abilities of fourth grade students between students who follow the Numbered Heads Together (NHT) model learning process and students who follow the Think Pair Share (TPS) model learning process is because there are differences in the stages of learning activities and delivery of material. The Numbered Heads Together (NHT) model in its implementation has distinctive characteristics with the numbering of heads in groups of students where each group consisting of 4-5 students who are given a head number can emphasize learning activities by playing an active role through group discussions and developing problem

solving skills. Learning using the Numbered Heads Together (NHT) model creates joint activities that stimulate the curiosity of students with other group members, namely by providing problems or problems related to everyday life, and students finding out how these problems can be solved. While the learning process of the Think Pair Share (TPS) model in its implementation in groups of students is carried out in pairs, students together help each other in group study. This model presents inspiration such as thinking time or waiting time as a strong aspect in increasing students' skills in responding to problems. By providing problems or problems related to everyday life, opportunities for students to carry out learning activities are to work alone and collaborate with their group mates in finding out how these problems can be solved. So that in this process, students need more time to think, respond and together help each other in their groups. According to (Nugroho & Wardani, 2019) it was revealed from the results of the study that the class that was treated with the application of the Numbered Heads Together (NHT) model proved that there was a better effect on students' problem-solving abilities. Learning from the Numbered Heads Together (NHT) model makes all students more active in learning. The use of the Numbered Heads Together (NHT) model can encourage student activities. Seen in group discussions through the activity of exchanging opinions and giving suggestions in solving problems, where each student will help each other so that all group members are ready to be more enthusiastic in learning. This is also reinforced by (Pakpahan & History, 2016) the Numbered Heads Together (NHT) model can encourage students to be more active in developing ideas when conducting group discussions, namely by helping one another with students who do not master the subject matter. By helping each other and sharing knowledge, students can have open insights when exchanging their respective opinions.

Discussion

Based on the results of the research that has been explained that in research on students' science problem solving abilities there are differences between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models in class IV SDN Batu Ampar 02 Pagi, East Jakarta. The results of the calculation of the hypothesis test show that $t = 4.21$ and $t_{table} = 2.00$ at the significant level $\alpha = 0.05$. This shows that it is greater than ($4.21 > 2.00$) then H_0 is rejected. It means that there are differences in students' science problem solving abilities between the application of the Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models for class IV sound at SDN Batu Ampar 02 Pagi, East Jakarta. According to (Pakpahan & History, 2016) states that learning outcomes using the Heads Together (NHT) type of cooperative learning model are better than the Think Pair Share (TPS) type. Through the Numbered Heads Together (NHT) model in learning can encourage students to be more active in learning because Numbered Heads Together has a characteristic that is numbering where the teacher appoints one student according to the numbering to represent the group. This method aims to involve all students in teaching and learning activities. The group must ensure that each member of the group is able to master the material given by the teacher, this can make students exchange ideas or opinions to find the most appropriate answer collaboratively and train students' responsibility to try to master the material from the teacher. when conducting group discussions, students can share the knowledge they get and can exchange opinions with each other. According to (Nugroho & Wardani, 2019) stating that the learning model in the experimental class 1 using Numbered Head Together (NHT) is superior to the use of Think Pair Share (TPS) in the experimental class 2. In the use of the Numbered Head Together (NHT) model students are better and effective compared to the Think Pair Share (TPS) cooperative learning model. In the Numbered Head Together (NHT) model, students tend to be more active and more focused, which makes students' insights more open to lessons. The Numbered Head Together (NHT) model also provides students with active learning so that they are encouraged to think, work together and prepare themselves in mastering the material. According to (Asniwati et al., 2019) stated that student learning activities through the Think Numbered Heads Together (NHT) model improve student learning outcomes. Through the Numbered Head Together (NHT) model, the improvement in learning outcomes takes place because students work together with groups so that they can share data and the teacher also emphasizes students to be more careful in working on the questions that have been given. Information on student learning outcomes is obtained from assessment tests that are tried at the end of each meeting with the aim of sharing an overview of students' skills in understanding learning. The implication of the results of this study is that the Numbered Head Together (NHT) model has a better effect, superior to the use of Think Pair Share (TPS) on students' problem-solving abilities which can affect the learning, and can make students improve their interactions with fellow friends in exchanging opinions. and provide input or criticism.

4. CONCLUSION

Research that has been conducted at SDN Batu Ampar 02 Pagi East Jakarta, it can be concluded that there are differences in students' science problem solving abilities between the application of the

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Commented [RV6]: Refine the content in the discussion related to the meaning or interpretation of the data results, comparing with the findings of previous studies, followed by making generalizations, as well as implications of research results, research limitations and general recommendations. Please, in sharpening/strengthening this, you also use references from international journals, one of which is the Scopus indexed journal. Each statement is supported by a minimum of two references (Budi, 2020; Wahyu, 2020)

Commented [RV7]: CONCLUSION / CONCLUSION:
1. Consists of 1 conceptual paragraph that answers the research problem
2. Do not repeat the results and discussion

Numbered Heads Together (NHT) and Think Pair Share (TPS) learning models assisted by Zoom Meeting on sound material. More effective learning with the Numbered Heads Together (NHT) model that is applied has more effect on students' problem solving abilities in the teaching and learning process compared to learning the Think Pair Share (TPS) model.

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1. 30-40 references, 90% of reputable journal articles with the SINTA and SCOPUS indexes (minimum 10 Scopus articles), the last 3 years a maximum of 5 years (for journals) and for references from books published in the last 5 years a maximum of 10 years
2. Writing references using the "APA" format of the American Psychological Association.
3. use the Mendeley app to compile a bibliography
4. references in the form of articles complete with URLs and DOI (make sure they are active/accessible)

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[IJEE] Editor Decision

Sri Lestari Handayani <srilestarih@uhamka.ac.id>

Tue, Jun 14, 2022 at 11:09 AM

To: Ejournal Undiksha <ejournal@undiksha.ac.id>

Salam...mohon maaf Bapak/Ibu pengelola IJEE, saya sudah mengirimkan revisi artikel saya ke IJEE baru hari ini. Ijin juga memberitahukan perubahan termasuk judul ada perubahan sedikit.

Ijin mengirimkan juga turnitin yang harus saya cek dulu sebelum saya unggah revisian ke IJEE. Terimakasih

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The Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students (An Experiment Study)

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ABSTRAK

Penelitian ini dilakukan untuk mengkaji dan menentukan perbedaan kemampuan pemecahan masalah IPA siswa antara penerapan pembelajaran NHT dan TPS materi bunyi kelas IV Sekolah Negeri di Jakarta Timur. Penelitian ini dilakukan dalam bentuk penelitian eksperimen dengan menggunakan Quasy Eksperimental Design. Desain yang digunakan yaitu Non Equivalen Control Group Posttest Design. Penelitian dilaksanakan di Sekolah Dasar Negeri Batu Ampar 02 Pagi di Jakarta Timur. Populasi dalam penelitian ini adalah sebanyak 58 siswa di kelas IV. Pengambilan sampel dilakukan dengan teknik sampel jenuh pada kelas IV A dengan jumlah 28 siswa sebagai kelas eksperimen I (NHT) dan Kelas IV B dengan jumlah siswa 30 yang diberi perlakuan TPS. Analisis data post-test kedua kelas menggunakan uji-t diperoleh $t_{hitung} = 4,21$ serta $t_{tabel} = 2,00$ pada taraf signifikan $\alpha = 0,05$. Hasil tersebut menunjukkan bahwa $t_{hitung} > t_{tabel}$ maka H_0 ditolak berarti terdapat ketidaksamaan atau perbedaan antara kemampuan pemecahan masalah siswa kelas IV pada kelas eksperimen I (NHT) dan kelas eksperimen II (TPS) di Sekolah Dasar Negeri Batu Ampar 02 Pagi khususnya pada materi bunyi.

ABSTRACT

This study was conducted to examine and determine the differences in students' science problem-solving abilities between the application of NHT and TPS learning materials for class IV public schools in East Jakarta. This research was conducted in the form of experimental research using Quasy Experimental Design. The design used is Non Equivalent Control Group Posttest Design. The research was conducted at the Batu Ampar 02 Pagi State Elementary School in East Jakarta. The

population in this study were 58 students in class IV. Sampling was carried out using a saturated sample technique in class IV A with a total of 28 students as experimental class I (NHT) and Class IV B with a total of 30 students being treated with TPS. Analysis of post-test data for both classes using t-test obtained $t_{count} = 4.21$ and $t_{table} = 2.00$ at the significant level = 0.05. These results indicate that $t_{count} > t_{table}$, then H_0 is rejected, meaning that there is an inequality or difference between the problem solving abilities of fourth grade students in experimental class I (NHT) and experimental class II (TPS) at Batu Ampar 02 Pagi State Elementary School, especially on sound material.

1. INTRODUCTION

Natural Sciences is taught to student since in elementary schools and is taken and is required at every level of education. Science subjects are one of the subjects in elementary schools that emphasize the curiosity of students scientifically. Natural Science is a systematic way of explore nature, so that it is not only the ability to master various accumulated knowledge which can be in the form of facts, concepts, or principles but a process of discovering (Shebastian et al., 2020). Therefore, the Natural Science subjects given are not only about memorizing and understanding theory, but how we act, do, and solve a problem. This definition states that science is a form of effort in various experiences that can develop process skills, understanding concepts, application of concepts, scientific attitudes, and is based on natural science learning activities on issues developed in society (Mulyaningsih et al., 2021). The process of learning science in elementary schools so far is still carried out conventionally which results in the lack of problem solving abilities in students. The practic of the learning process is only directed at the ability to memorize and understand theory so that students find it difficult to relate it to situations in everyday life. Science learning in elementary schools is also still less emphasis on the curiosity attitude of students scientifically, but it is always about memorizing and understanding theory, so that students are lacking in how to act, do, and solve a problem. Natural Science is a theoretical knowledge that is obtained or compiled by finding out and doing,

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it will assist students to achieve a rooted understanding which is a process (human effort to understand the universe), procedure (appropriate observations and correct procedures) and produce a product or conclusion (Soemari et al., 2020). The implementation of the science learning process is directed at the ability to develop scientific skills and attitudes in students so that they are able to relate them to situations in everyday life. Science learning in elementary schools also emphasizes the curiosity of students scientifically, but it is always about memorizing and understanding theory, so that students can understand how to act, do, and solve a problem. The science learning process in elementary schools does not only memorize concepts for students, but they must to comprehend, observe, analyze and solve problems which will be useful for everyday life through science subjects (Oktaviani & Tari, 2018).

Problem solving ability is the activity of higher order thinking skills to solve a problem in accepting new problems. Problem solving ability is power of a person to use the inspiration of his deep thinking so as to encourage scientific thinking which is expected in the learning process (Chin & Osborne, 2008; DeHaan, 2009; Mukhopadhyay, 2013; Mayratih et al., 2019). Problem solving leads to the efforts needed by students for the problems experienced and how students act to determine a way out in solving a problem. According to (Yandhari et al., 2019) problem solving indicators include clarifying concept terms which means classifying information in solving problems to get an overview of the things contained in the problem. Second, formulating problems and analyzing problems which means compiling several steps according to information and data from a problem. Third, building ideas systematically means carrying out problem solving based on steps that have been thoroughly designed. Fourth, seeking new information through other sources, which means that after the completion stage is reached, it is necessary to add new ideas to strengthen the concept. Thus this study observes the problem solving ability of students in learning science content. Therefore, an experiment has been carried out using one of the methods for researching science content learning in elementary schools. The methods used are NHT and TPS methods. NHT is a cooperative learning model by discussing in groups where each student is given a number and has the same opportunity to answer questions by calling the number randomly proposed by the teacher (Siti Muawanah & Nizaruddin, 2019). In the NHT model, students are directed to be able to participate actively by using numbered heads in their groups. Research with learning techniques and learning steps in NHT, the first step is numbering. Students are divided into groups of 4-5 people, everyone in each group takes a number. Second, asking questions (questioning) The teacher gives assignments and each group does it. Third, think together (heads together), the group discusses the correct answer and make sure that their member be able to carry on or to understand it. Fourth, giving answers (answering) randomly, the teachers makes student who have number called out to report their discussion result. And fifth, the conclusion (Iskandar & Leonard, 2018) In process learning by applying the BHT model, students study in groups where each member is liable for the group's work. Through these activities, the application of NHT which during the process of learning involves students in implementing a learning process (Yuniarti et al., 2021). The NHT model is expected to activate students, motivate students, and invite students to think creatively in solving problems. According to (Haniyah, et al. 2014) the NHT model is one of cooperative learning type that design to affect the interaction patterns of student and it can be as an alternative to traditional classroom structures.

While the TPS model requires students to think and find the answers in pairs (Rahayu et al., 2021). The TPS emphasizes that every student are first given the opportunity to think individually, then students make a discussion with their partners and then present the results of their thoughts. According to (Rizqi et al., 2021) the TPS model is thinking in pairs in interacting with other students to appreciate any differences that exist and be responsible for learning activities. TPS is applied to students to let them to think, to give respond and to assist one and other in group learning. It presents inspiration such as thinking time as a solid aspect in improving students' skills in responding toward problems. Learning techniques and learning steps in the TPS model consist of Session one, think (thinking), Session two, pair (pairs), and the third session, share (sharing). Problem solving ability is an activity of thinking and reasoning in solving problems through problems that have previously been encountered to encourage students to be able to solve these problems. Indicators of problem solving include (1) Clarifying concept terms. That is, classifying information in solving problems to get a picture of something that is contained in the problem. (2) Formulate the problem and analyze the problem. That is, compiling several steps according to information and data from a problem. (3) Build ideas systematically. That is, carrying out problem solving based on steps that have been designed thoroughly. (4) Seeking new information through other sources. That is, after the completion stage is reached, it is necessary to add new ideas to strengthen the concept (Yandhari et al., 2019).

The learning process of NHT and TPS during pandemic has made the implementation of learning activities by online. In order to reduce and suppress the spread of the virus, the learning that was originally carried out in schools was diverted by changing all educational activities into learning at home via online or online. Learning through online or online using digital technology, namely zoom meetings. According to

(Rizaldi & Fatimah, 2020) Zoom meetings are one of the online platforms or applications that are often used to carry out online or remote activities such as meetings, dialogues and virtual or not face-to-face learning and distance education. Zoom meeting is an application that basically fits the demands of the industrial revolution 4.0 by emphasizing on system digitization or technology-based. Teachers are required to understand information and communication technology in order to make it easier for teachers to provide direction to students in learning (Zaenuri & Prastowo, 2021). The teacher position in online learning process must be more optimal, so that students become learning activists because teachers must be able to make the basis of a constructivist approach in which students are learning subjects. The zoom meeting application is an application that has developed in helping the online learning process. Zoom meetings are one of the applications or platforms that are very supportive in the needs of communication, interaction and remote education processes that can still be done virtually or not face-to-face. According to (Eko Yulianto et al., 2020) learning is through zoom meetings, where educators and students can meet face-to-face and interact properly so as to make it easier and at the same time help teachers to interact with their students in all learning process. Learning through zoom meetings is considered more efficient, because if teachers cannot attend, zoom meetings are an option for teachers and students to continue to carry out the distance learning process (Haqien & Rahman, 2020). Learning is not just remembering, but broader than that, namely experiencing. This study aims to examine and determine the differences in students' science problem solving abilities between the application of the NHT and TPS learning models in the fourth grade sound material at SDN Batu Ampar 02 Pagi, East Jakarta.

2. METHOD

The population in this study were fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi, East Jakarta. There are 58 students, divided into 32 student as member of first experiment class and 26 student as member of second experiment class students. The sample of this study using the Quasy Experimental Design method was carried out with the saturated sample technique in class IV A by being treated with Numbered Heads Together (NHT) and Class IV B by being treated with Think Pair Share (TPS). The data collection technique used a subjective test in the form of a posttest. In the experimental class I was given Numbered Heads Together (NHT) treatment, while the experimental class II was given Think Pair Share (TPS) treatment. After the two classes were given different treatments, they were then given a final test to determine students' understanding after being given treatment. The results of the final test of both class was analyzed and then compared to test the differences using statistical tests on students' problem solving abilities.

3. RESULT AND DISCUSSION

Result

The results of data analysis (Post-Test) conducted on fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, involving class IV A as the experimental class I which was treated with the NHT model and class IV B as the experimental class II given the TPS model treatment can be observed in Table 1.

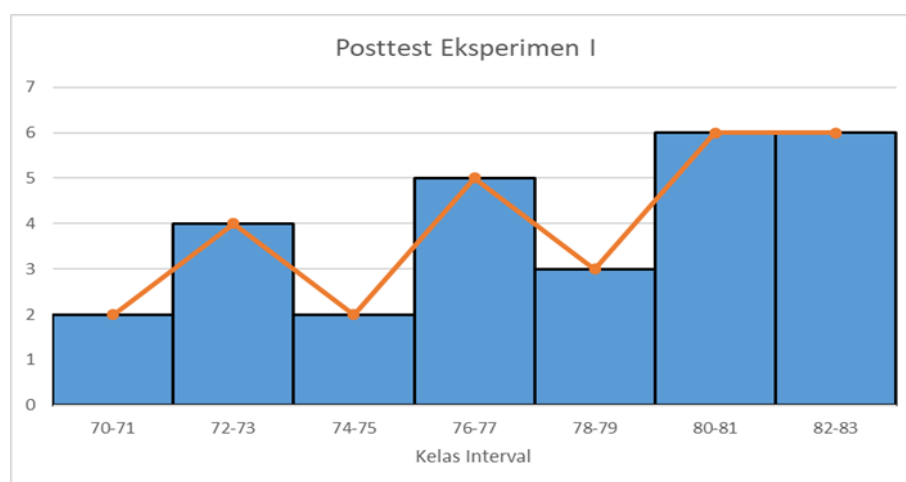


Figure 1. Frequency distribution of students' science problem solving ability scores in Experiment I class

Based on the results of the Experiment I class research as many as 28 students using the NHT model, the results data (Post-Test) obtained the lowest dan highest score in ar row are 70 and 82. Frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment I class using the NHT model on the sound properties material, the score ranges from 70 to 82 with a total of 28 students as respondents.

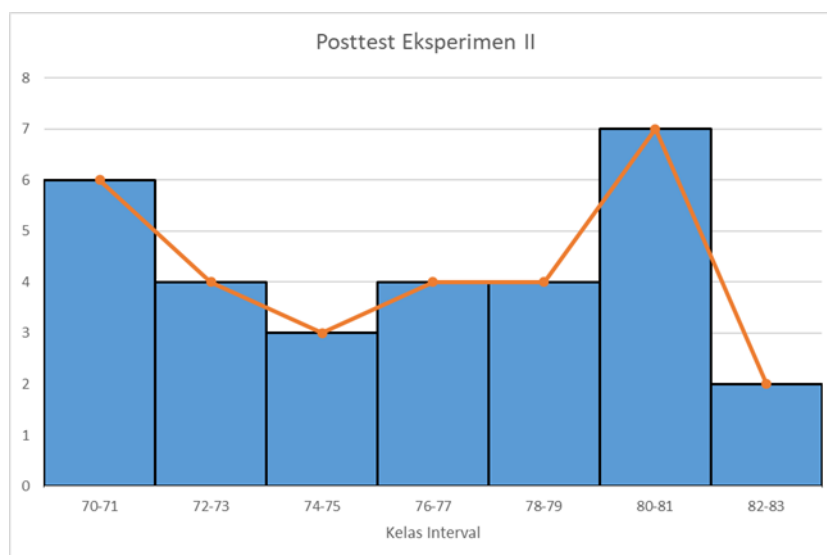


Figure 2. Frequency distribution of students' science problem solving ability scores in Experiment II class

Based on Figure 1 and Figure 2 for the frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment II class using the TPS model on the material properties of sound, the score ranges from 70 to 82 with a total of 30 students as respondents. The data on the value of the results of problem solving abilities in the Experiment II class by applying the TPS model obtained the result data (Post-Test) which obtained the lowest and highest score in a row were 70 and 82.

Table 1. Post-Descriptive Statistical Test Results Problem Solving Ability

Descriptive Statistic	Experiment Class I	Experiment Class II
N	28	30
Highest Score	82	82
Lowest Score	70	70
Mean	78.7	76.16

Table 1 shows that the experimental class I with 28 students (N) has an average of 78.7. Meanwhile, in the experimental class II with 30 students (N) the average score was 76.16. From Table 1, it can be seen that there is a difference in the Posttest average, which is 2.54. Before analyzing the data, the researcher first conducted a normality and homogeneity test on the data of post test. Normality test is presented in Table 2.

Table 2. Normality Test Results

Treatment	N	L_{hitung}	L_{tabel}
Numbered Heads Together (NHT)	28	0,119	0,167
Think Pair Share (TPS)	30	0,146	0,161

Based on Table 2, the normality test calculation for the Experiment I class (Post-Test) with the NHT model, it was obtained that $0.119 < 0.167$ at the real level = 0.05 with $n = 28$. It shows that the data of Post-Test Experiment I is normal. While the calculation of the normality test for the Experiment II class (Post-Test) with the TPS model, it was obtained that $0.146 < 0.161$ at the real level = 0.05 with $n = 30$. It shows that the data of Post-Test Experiment II is normal. The homogeneity test for both class can be seen in Table 3.

Table 3. Homogeneity Test Result

Treatment	F_{count}	F_{table}
NHT	1,06621	1,87513
TPS		

Based on Table 3, the homogeneity test of two population variances from two groups was carried out using Fisher's exact test. From the test results obtained and = at a significant level of 0.05. Because it does not exceed the variance of the two groups is homogeneous.

Tabel 4. T-test Result

Group	α	t_{count}	t_{table}	Decision	Conclusion
Experiment	0,05	4,21	2,00	H_a diterima	Terdapat perbedaan kemampuan pemecahan masalah IPA siswa

From the results of the calculation of the price = 4.21 and = 2.00 at the significant level = 0.05. This shows that H_0 is rejected. It means that students' science problem solving abilities between two class is a significant different. The difference the problem solving abilities of fourth grade students between students who follow the NHT and the others who follow the TPS model is because there are differences in the stages of learning activities and delivery of material. The NHT model in its implementation has distinctive characteristics with the numbering of heads in groups of students where each group consisting of 4-5 students who are given a head number can emphasize learning activities by playing an active role through group discussions and developing problem solving skills. The NHT model creates joint activities that stimulate the curiosity of students with other group members, namely by providing problems or problems related to everyday life, and students finding out how problems could be solved. While the TPS model in its implementation in groups of students is carried out in pairs, students together help each other in group study. This model presents inspiration such as thinking time as a solid aspect in improving students' skills in responding to problems. By providing problems or problems related to everyday life, opportunities for students to carry out learning activities are to work alone and collaborate with their group mates in finding out how these problems can be solved. So that in this process, students need more time to think, respond and together help each other in their groups. According to (Nugroho & Wardani, 2019; Rahmawati, et al. 2021) it was revealed from the results of the study that the class that was treated with the implementation of NHT model proved that there was a better effect on students' problem-solving abilities. Learning from the NHT model makes all students more active in learning. The use of the NHT model can encourage student activities. Seen in group discussions through the activity of exchanging opinions and giving suggestions in solving problems, where each student will help each other so that all group members are ready to be more enthusiastic in learning. This is also reinforced by (Pakpahan & History, 2016; Juniarta, 2017; Baskoro, 2020) the NHT model will encourage students to be more active in developing ideas when conducting group discussions, namely by helping one another with students who do not master the subject matter. By helping each other and sharing knowledge, students can have open insights when exchanging their respective opinions.

Discussion

Based on result, it has been explained that in research on students' science problem solving abilities there are differences between the application of the NHT and TPS learning models. The hypothesis test shows that $t_{count} = 4.21$ and $t_{table} = 2.00$ at the significant level = 0.05. This shows that it is greater than ($4.21 > 2.00$) then H_0 is rejected. That is to say that the students' science problem solving abilities of both class (NHT and TPS) is not same. According to (Pakpahan & History, 2016) states that learning outcomes using

the NHT model is better than the TPS model. Through the NHT model in learning will encourage students to be more active because NHT has a characteristic that is numbering where the teacher appoints one student according to the numbering to represent the group (Maman & Rajab, 2016). This method aims to involve all students through out the learning activities. The group must ensure that each member of the group is able to master the material given by the teacher, this can make students exchange ideas or opinions to find the most appropriate answer collaboratively and train students' responsibility to try to master the material from the teacher. when conducting group discussions, students can share the knowledge they get and can exchange opinions with each other. According to (Nugroho & Wardani, 2019) stating that the learning model in the experimental class I using NHT is superior to the use of TPS in the experimental class 2. In the use of the NHT model students are better and effective compared to the TPS model. In the NHT model, students tend to be more explore and more focused, which makes students' insights more open to lessons. The NHT model also provides students with active learning so that they are encouraged to think, work together and prepare themselves in mastering the material (Simamora & Zunaiedy, 2021). According to (Asniwati et al., 2019; Hanifah, et al. 2019; Naibaho, 2019; Kurnia, et al. 2021) stated that student learning activities through the NHT model improve learning outcomes of students. Through the NHT model, the improvement in learning outcomes takes place because students work together with groups so that they can share data and the teacher also emphasizes students to be more careful in working on the questions that have been given. Information on student learning outcomes is obtained from assessment tests that are tried at the end of each meeting with the aim of sharing an overview of students' skills in understanding learning. The implication of this study results is that the NHT model has a better effect, superior to the use of TPS on students' problem-solving abilities which can affect the learning, and can make students improve their interactions with fellow friends in exchanging opinions and provide input or criticism.

4. CONCLUSION

Research that has been conducted at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, it can be concluded that students' science problem solving abilities between the application of the NHT and TPS learning models assisted by Zoom Meeting on sound material are not same or different. More effective learning with the NHT model that is applied has more effect on students' problem solving abilities in the teaching and learning process compared to TPS model. Other research can focus on more in-depth research related to the application of the two learning models. It can also be done other studies that focus on other materials.

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4. Bukti Konfirmasi Review Kedua dan Hasil Reviewnya (10 Juli 2022)

[IJEE] Editor Decision

Ejournal Undiksha <ejournal@undiksha.ac.id>
To: Sri Lestari Handayani <srilestarih@uhamka.ac.id>

Sun, Jul 10, 2022 at 8:43 PM

Sri Lestari Handayani:

We have reached a decision regarding your submission to International Journal of Elementary Education, "Comparison of the Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students".

Our decision is to: revision required

International Journal of
Elementary Education <http://ejournal.undiksha.ac.id/index.php/IJSD>

2 attachments



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The Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students (An Experiment Study)

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ABSTRAK

Penelitian ini dilakukan untuk mengkaji dan menentukan perbedaan kemampuan pemecahan masalah IPA siswa antara penerapan pembelajaran NHT dan TPS materi bunyi kelas IV Sekolah Negeri di Jakarta Timur. Penelitian ini dilakukan dalam bentuk penelitian eksperimen dengan menggunakan Quasy Eksperimental Design. Desain yang digunakan yaitu Non Equivalen Control Group Posttest Design. Penelitian dilaksanakan di Sekolah Dasar Negeri Batu Ampar 02 Pagi di Jakarta Timur. Populasi dalam penelitian ini adalah sebanyak 58 siswa di kelas IV. Pengambilan sampel dilakukan dengan teknik sampel jenuh pada kelas IV A dengan jumlah 28 siswa sebagai kelas eksperimen I (NHT) dan Kelas IV B dengan jumlah siswa 30 yang diberi perlakuan TPS. Analisis data post-test kedua kelas menggunakan uji-t diperoleh $t_{hitung} = 4,21$ serta $t_{tabel} = 2,00$ pada taraf signifikan $\alpha = 0,05$. Hasil tersebut menunjukkan bahwa $t_{hitung} > t_{tabel}$ maka H_0 ditolak berarti terdapat ketidaksamaan atau perbedaan antara kemampuan pemecahan masalah siswa kelas IV pada kelas eksperimen I (NHT) dan kelas eksperimen II (TPS) di Sekolah Dasar Negeri Batu Ampar 02 Pagi khususnya pada materi bunyi.

ABSTRACT

This study was conducted to examine and determine the differences in students' science problem-solving abilities between the application of NHT and TPS learning materials for class IV public schools in East Jakarta. This research was conducted in the form of experimental research using Quasy Experimental Design. The design used is Non Equivalent Control Group Posttest Design. The research was conducted at the Batu Ampar 02 Pagi State Elementary School in East Jakarta. The

population in this study were 58 students in class IV. Sampling was carried out using a saturated sample technique in class IV A with a total of 28 students as experimental class I (NHT) and Class IV B with a total of 30 students being treated with TPS. Analysis of post-test data for both classes using t-test obtained $t_{count} = 4.21$ and $t_{table} = 2.00$ at the significant level = 0.05. These results indicate that $t_{count} > t_{table}$, then H_0 is rejected, meaning that there is an inequality or difference between the problem solving abilities of fourth grade students in experimental class I (NHT) and experimental class II (TPS) at Batu Ampar 02 Pagi State Elementary School, especially on sound material.

1. INTRODUCTION

Natural Sciences is taught to student since in elementary schools and is taken and is required at every level of education. Science subjects are one of the subjects in elementary schools that emphasize the curiosity of students scientifically. Natural Science is a systematic way of explore nature, so that it is not only the ability to master various accumulated knowledge which can be in the form of facts, concepts, or principles but a process of discovering (Shebastian et al., 2020). Therefore, the Natural Science subjects given are not only about memorizing and understanding theory, but how we act, do, and solve a problem. This definition states that science is a form of effort in various experiences that can develop process skills, understanding concepts, application of concepts, scientific attitudes, and is based on natural science learning activities on issues developed in society (Mulyaningsih et al., 2021). The process of learning science in elementary schools so far is still carried out conventionally which results in the lack of problem solving abilities in students. The practice of the learning process is only directed at the ability to memorize and understand theory so that students find it difficult to relate it to situations in everyday life. Science learning in elementary schools is also still less emphasis on the curiosity attitude of students scientifically, but it is always about memorizing and understanding theory, so that students are lacking in how to act, do, and solve a problem. Natural Science is a theoretical knowledge that is obtained or compiled by finding out and doing,

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1. Start by writing a 2-sentence research problem
2. State one main objective of the research, use KKO (operational verb) with higher cognitive level,
3. Type of research, and research design (1 sentence is sufficient)
4. Research subjects,
5. Data collection methods and research instruments.
6. Analysis of the data used,
7. Results are in line with the main goal
8. Conclusions, are general in nature and answer research problems.
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it will assist students to achieve a rooted understanding which is a process (human effort to understand the universe), procedure (appropriate observations and correct procedures) and produce a product or conclusion (Soemari et al., 2020). The implementation of the science learning process is directed at the ability to develop scientific skills and attitudes in students so that they are able to relate them to situations in everyday life. Science learning in elementary schools also emphasizes the curiosity of students scientifically, but it is always about memorizing and understanding theory, so that students can understand how to act, do, and solve a problem. The science learning process in elementary schools does not only memorize concepts for students, but they must to comprehend, observe, analyze and solve problems which will be useful for everyday life through science subjects (Oktaviani & Tari, 2018).

Problem solving ability is the activity of higher order thinking skills to solve a problem in accepting new problems. Problem solving ability is power of a person to use the inspiration of his deep thinking so as to encourage scientific thinking which is expected in the learning process (Chin & Osborne, 2008; DeHaan, 2009; Mukhopadhyay, 2013; Mayrath et al., 2019). Problem solving leads to the efforts needed by students for the problems experienced and how students act to determine a way out in solving a problem. According to (Yandhari et al., 2019) problem solving indicators include clarifying concept terms which means classifying information in solving problems to get an overview of the things contained in the problem. Second, formulating problems and analyzing problems which means compiling several steps according to information and data from a problem. Third, building ideas systematically means carrying out problem solving based on steps that have been thoroughly designed. Fourth, seeking new information through other sources, which means that after the completion stage is reached, it is necessary to add new ideas to strengthen the concept. Thus this study observes the problem solving ability of students in learning science content. Therefore, an experiment has been carried out using one of the methods for researching science content learning in elementary schools. The methods used are NHT and TPS methods. NHT is a cooperative learning model by discussing in groups where each student is given a number and has the same opportunity to answer questions by calling the number randomly proposed by the teacher (Siti Muawanah & Nizaruddin, 2019). In the NHT model, students are directed to be able to participate actively by using numbered heads in their groups. Research with learning techniques and learning steps in NHT, the first step is numbering. Students are divided into groups of 4-5 people, everyone in each group takes a number. Second, asking questions (questioning) The teacher gives assignments and each group does it. Third, think together (heads together), the group discusses the correct answer and make sure that their member be able to carry on or to understand it. Fourth, giving answers (answering) randomly, the teachers makes student who have number called out to report their discussion result. And fifth, the conclusion (Iskandar & Leonard, 2018) In process learning by applying the BHT model, students study in groups where each member is liable for the group's work. Through these activities, the application of NHT which during the process of learning involves students in implementing a learning process (Yuniarti et al., 2021). The NHT model is expected to activate students, motivate students, and invite students to think creatively in solving problems. According to (Haniyah, et al. 2014) the NHT model is one of cooperative learning type that design to affect the interaction patterns of student and it can be as an alternative to traditional classroom structures.

While the TPS model requires students to think and find the answers in pairs (Rahayu et al., 2021). The TPS emphasizes that every student are first given the opportunity to think individually, then students make a discussion with their partners and then present the results of their thoughts. According to (Rizqi et al., 2021) the TPS model is thinking in pairs in interacting with other students to appreciate any differences that exist and be responsible for learning activities. TPS is applied to students to let them to think, to give respond and to assist one and other in group learning. It presents inspiration such as thinking time as a solid aspect in improving students' skills in responding toward problems. Learning techniques and learning steps in the TPS model consist of Session one, think (thinking), Session two, pair (pairs), and the third session, share (sharing). Problem solving ability is an activity of thinking and reasoning in solving problems through problems that have previously been encountered to encourage students to be able to solve these problems. Indicators of problem solving include (1) Clarifying concept terms. That is, classifying information in solving problems to get a picture of something that is contained in the problem. (2) Formulate the problem and analyze the problem. That is, compiling several steps according to information and data from a problem. (3) Build ideas systematically. That is, carrying out problem solving based on steps that have been designed thoroughly. (4) Seeking new information through other sources. That is, after the completion stage is reached, it is necessary to add new ideas to strengthen the concept (Yandhari et al., 2019).

The learning process of NHT and TPS during pandemic has made the implementation of learning activities by online. In order to reduce and suppress the spread of the virus, the learning that was originally carried out in schools was diverted by changing all educational activities into learning at home via online or online. Learning through online or online using digital technology, namely zoom meetings. [According to](#)

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(Rizaldi & Fatimah, 2020) Zoom meetings are one of the online platforms or applications that are often used to carry out online or remote activities such as meetings, dialogues and virtual or not face-to-face learning and distance education. Zoom meeting is an application that basically fits the demands of the industrial revolution 4.0 by emphasizing on system digitization or technology-based. Teachers are required to understand information and communication technology in order to make it easier for teachers to provide direction to students in learning (Zaenuri & Prastowo, 2021). The teacher position in online learning process must be more optimal, so that students become learning activists because teachers must be able to make the basis of a constructivist approach in which students are learning subjects. The zoom meeting application is an application that has developed in helping the online learning process. Zoom meetings are one of the applications or platforms that are very supportive in the needs of communication, interaction and remote education processes that can still be done virtually or not face-to-face. According to (Eko Yulianto et al., 2020) learning is through zoom meetings, where educators and students can meet face-to-face and interact properly so as to make it easier and at the same time help teachers to interact with their students in all learning process. Learning through zoom meetings is considered more efficient, because if teachers cannot attend, zoom meetings are an option for teachers and students to continue to carry out the distance learning process (Haqien & Rahman, 2020). Learning is not just remembering, but broader than that, namely experiencing. This study aims to examine and determine the differences in students' science problem solving abilities between the application of the NHT and TPS learning models in the fourth grade sound material at SDN Batu Ampar 02 Pagi, East Jakarta.

2. METHOD

The population in this study were fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi, East Jakarta. There are 58 students, divided into 32 student as member of first experiment class and 26 student as member of second experiment class students. The sample of this study using the Quasy Experimental Design method was carried out with the saturated sample technique in class IV A by being treated with Numbered Heads Together (NHT) and Class IV B by being treated with Think Pair Share (TPS). The data collection technique used a subjective test in the form of a posttest. In the experimental class I was given Numbered Heads Together (NHT) treatment, while the experimental class II was given Think Pair Share (TPS) treatment. After the two classes were given different treatments, they were then given a final test to determine students' understanding after being given treatment. The results of the final test of both class was analyzed and then compared to test the differences using statistical tests on students' problem solving abilities.

3. RESULT AND DISCUSSION

Result

The results of data analysis (Post-Test) conducted on fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, involving class IV A as the experimental class I which was treated with the NHT model and class IV B as the experimental class II given the TPS model treatment can be observed in Table 1.

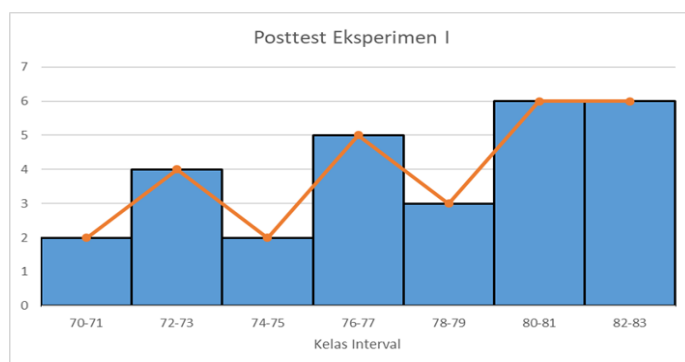


Figure 1. Frequency distribution of students' science problem solving ability scores in Experiment I class

Sri Lestari Handayani/Comparison of the Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students

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1. The type and design of the research (1 paragraph) can be completed with a design chart (with clear sources)
2. Research subjects, who are involved in research
3. Data collection methods and instruments (the method used is complete with instrument grids and instrument validity tests)
4. The method of analysis, the analysis carried out.

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2. For quantitative research (especially experimental and correlational), the presentation of results includes the results of descriptive analysis; the results of the analysis prerequisite test/classical assumption test (if any); and the results of hypothesis testing.
3. Submission of results can use pictures, tables, or graphics that are clear and unambiguous.
4. Avoid conveying the same information in different forms (eg: already presented in the table but presented again in the form of sentences).

Based on the results of the Experiment I class research as many as 28 students using the NHT model, the results data (Post-Test) obtained the lowest dan highest score in ar row are 70 and 82. Frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment I class using the NHT model on the sound properties material, the score ranges from 70 to 82 with a total of 28 students as respondents.

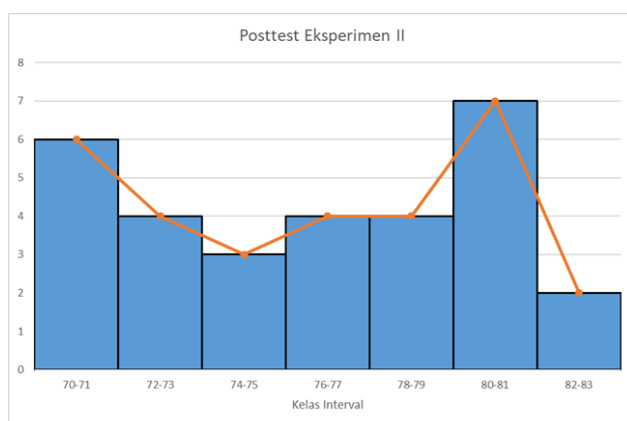


Figure 2. Frequency distribution of students' science problem solving ability scores in Experiment II class

Based on Figure 1 and Figure 2 for the frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment II class using the TPS model on the material properties of sound, the score ranges from 70 to 82 with a total of 30 students as respondents. The data on the value of the results of problem solving abilities in the Experiment II class by applying the TPS model obtained the result data (Post-Test) which obtained the lowest and highest score in a row were 70 and 82.

Table 1. Post-Descriptive Statistical Test Results Problem Solving Ability

Descriptive Statistic	Experiment Class I	Experiment Class II
N	28	30
Highest Score	82	82
Lowest Score	70	70
Mean	78.7	76.16

Table 1 shows that the experimental class I with 28 students (N) has an average of 78.7. Meanwhile, in the experimental class II with 30 students (N) the average score was 76.16. From Table 1, it can be seen that there is a difference in the Posttest average, which is 2.54. Before analyzing the data, the researcher first conducted a normality and homogeneity test on the data of post test. Normality test is presented in Table 2.

Table 2. Normality Test Results

Treatment	N	L_{hitung}	L_{tabel}
Numbered Heads Together (NHT)	28	0,119	0,167
Think Pair Share (TPS)	30	0,146	0,161

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Based on Table 2, the normality test calculation for the Experiment I class (Post-Test) with the NHT model, it was obtained that $0.119 < 0.167$ at the real level = 0.05 with $n = 28$. It shows that the data of Post-Test Experiment I is normal. While the calculation of the normality test for the Experiment II class (Post-Test) with the TPS model, it was obtained that $0.146 < 0.161$ at the real level = 0.05 with $n = 30$. It shows that the data of Post-Test Experiment II is normal. The homogeneity test for both class can be seen in Table 3.

Table 3. Homogeneity Test Result

Treatment	F_{count}	F_{table}
NHT		
TPS	1,06621	1,87513

Based on Table 3, the homogeneity test of two population variances from two groups was carried out using Fisher's exact test. From the test results obtained and = at a significant level of 0.05. Because it does not exceed the variance of the two groups is homogeneous.

Tabel 4. T-test Result

Group	α	t_{count}	t_{table}	Decision	Conclusion
Experiment	0,05	4,21	2,00	H_a diterima	Terdapat perbedaan kemampuan pemecahan masalah IPA siswa

From the results of the calculation of the price = 4.21 and = 2.00 at the significant level = 0.05. This shows that H_0 is rejected. It means that students' science problem solving abilities between two class is a significant different. The difference the problem solving abilities of fourth grade students between students who follow the NHT and the others who follow the TPS model is because there are differences in the stages of learning activities and delivery of material. The NHT model in its implementation has distinctive characteristics with the numbering of heads in groups of students where each group consisting of 4-5 students who are given a head number can emphasize learning activities by playing an active role through group discussions and developing problem solving skills. The NHT model creates joint activities that stimulate the curiosity of students with other group members, namely by providing problems or problems related to everyday life, and students finding out how problems could be solved. While the TPS model in its implementation in groups of students is carried out in pairs, students together help each other in group study. This model presents inspiration such as thinking time as a solid aspect in improving students' skills in responding to problems. By providing problems or problems related to everyday life, opportunities for students to carry out learning activities are to work alone and collaborate with their group mates in finding out how these problems can be solved. So that in this process, students need more time to think, respond and together help each other in their groups. According to (Nugroho & Wardani, 2019; Rahmawati, et al. 2021) it was revealed from the results of the study that the class that was treated with the implementation of NHT model proved that there was a better effect on students' problem-solving abilities. Learning from the NHT model makes all students more active in learning. The use of the NHT model can encourage student activities. Seen in group discussions through the activity of exchanging opinions and giving suggestions in solving problems, where each student will help each other so that all group members are ready to be more enthusiastic in learning. This is also reinforced by (Pakpahan & History, 2016; Juniarta, 2017; Baskoro, 2020) the NHT model will encourage students to be more active in developing ideas when conducting group discussions, namely by helping one another with students who do not master the subject matter. By helping each other and sharing knowledge, students can have open insights when exchanging their respective opinions.

Discussion

Based on result, it has been explained that in research on students' science problem solving abilities there are differences between the application of the NHT and TPS learning models. The hypothesis test shows that $t_{count} = 4.21$ and $t_{table} = 2.00$ at the significant level = 0.05. This shows that it is greater than ($4.21 > 2.00$) then H_0 is rejected. That is to say that the students' science problem solving abilities of both class (NHT and TPS) is not same. According to (Pakpahan & History, 2016) states that learning outcomes using

Sri Lestari Handayani/Comparison of the Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students

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 3. The implications/contribution of these findings to the development of the scientific field under study.
 4. Limitations/limitations of the research conducted, then provide recommendations based on the limitations

the NHT model is better than the TPS model. Through the NHT model in learning will encourage students to be more active because NHT has a characteristic that is numbering where the teacher appoints one student according to the numbering to represent the group (Maman & Rajab, 2016). This method aims to involve all students through out the learning activities. The group must ensure that each member of the group is able to master the material given by the teacher, this can make students exchange ideas or opinions to find the most appropriate answer collaboratively and train students' responsibility to try to master the material from the teacher. when conducting group discussions, students can share the knowledge they get and can exchange opinions with each other. According to (Nugroho & Wardani, 2019) stating that the learning model in the experimental class I using NHT is superior to the use of TPS in the experimental class 2. In the use of the NHT model students are better and effective compared to the TPS model. In the NHT model, students tend to be more explore and more focused, which makes students' insights more open to lessons. The NHT model also provides students with active learning so that they are encouraged to think, work together and prepare themselves in mastering the material (Simamora & Zunaiedy, 2021). According to (Asniwati et al., 2019; Hanifah, et al. 2019; Naibaho, 2019; Kurnia, et al. 2021) stated that student learning activities through the NHT model improve learning outcomes of students. Through the NHT model, the improvement in learning outcomes takes place because students work together with groups so that they can share data and the teacher also emphasizes students to be more careful in working on the questions that have been given. Information on student learning outcomes is obtained from assessment tests that are tried at the end of each meeting with the aim of sharing an overview of students' skills in understanding learning. The implication of this study results is that the NHT model has a better effect, superior to the use of TPS on students' problem-solving abilities which can affect the learning, and can make students improve their interactions with fellow friends in exchanging opinions and provide input or criticism.

4. CONCLUSION

Research that has been conducted at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, it can be concluded that students' science problem solving abilities between the application of the NHT and TPS learning models assisted by Zoom Meeting on sound material are not same or different. More effective learning with the NHT model that is applied has more effect on students' problem solving abilities in the teaching and learning process compared to TPS model. Other research can focus on more in-depth research related to the application of the two learning models. It can also be done other studies that focus on other materials.

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The Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students (An Experiment Study)

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ABSTRAK

Penelitian ini dilakukan untuk mengkaji dan menentukan perbedaan kemampuan pemecahan masalah IPA siswa antara penerapan pembelajaran NHT dan TPS materi bunyi kelas IV Sekolah Negeri di Jakarta Timur. Penelitian ini dilakukan dalam bentuk penelitian eksperimen dengan menggunakan Quasy Eksperimental Design. Desain yang digunakan yaitu Non Equivalen Control Group Posttest Design. Timur. Populasi dalam penelitian ini adalah sebanyak 58 siswa di kelas IV. Pengambilan sampel dilakukan dengan teknik sampel jenuh pada kelas IV A dengan jumlah 28 siswa sebagai kelas eksperimen I (NHT) dan Kelas IV B dengan jumlah siswa 30 yang diberi perlakuan TPS. Pengumpulan data yang digunakan berupa tes dalam bentuk post-test. Analisis data post-test kedua kelas menggunakan uji-t diperoleh $t_{hitung} = 4,21$ serta $t_{tabel} = 2,00$ pada taraf signifikan $\alpha = 0,05$. Hasil tersebut menunjukkan bahwa $t_{hitung} > t_{tabel}$ maka H_0 ditolak berarti terdapat ketidaksamaan atau perbedaan antara kemampuan pemecahan masalah siswa kelas IV pada kelas eksperimen I (NHT) dan kelas eksperimen II (TPS) khususnya pada materi bunyi. Model NHT yang diterapkan lebih berpengaruh terhadap kemampuan pemecahan masalah siswa dalam proses belajar mengajar dibandingkan dengan model TPS.

ABSTRACT

This study was conducted to examine and determine the differences in students' science problem-solving abilities between the application of NHT and TPS learning materials for class IV public schools in East Jakarta. This research was conducted in the form of experimental research using Quasy Experimental Design. The design

used is Non Equivalent Control Group Posttest Design. The population in this study were 58 students in class IV. Sampling was carried out using a saturated sample technique in class IV A with a total of 28 students as experimental class I (NHT) and Class IV B with a total of 30 students being treated with TPS. The data collection technique used a test in the form of a posttest. Analysis of post-test data for both classes using t-test obtained $t_{count} = 4.21$ and $t_{table} = 2.00$ at the significant level = 0.05. These results indicate that $t_{count} > t_{table}$, then H_0 is rejected, meaning that there is an inequality or difference between the problem solving abilities of fourth grade students in experimental class I (NHT) and experimental class II (TPS), especially on sound material. NHT model that is applied has more effect on students' problem solving abilities in the teaching and learning process compared to TPS model.

1. INTRODUCTION

Natural Sciences is taught to student since in elementary schools and is taken and is required at every level of education. Science subjects are one of the subjects in elementary schools that emphasize the curiosity of students scientifically. Natural Science is a systematic way of explore nature, so that it is not only the ability to master various accumulated knowledge which can be in the form of facts, concepts, or principles but a process of discovering (Shebastian et al., 2020). Therefore, the Natural Science subjects given are not only about memorizing and understanding theory, but how we act, do, and solve a problem. This definition states that science is a form of effort in various experiences that can develop process skills, understanding concepts, application of concepts, scientific attitudes, and is based on natural science learning activities on issues developed in society (Mulyaningsih et al., 2021). The process of learning science in elementary schools so far is still carried out conventionally which results in the lack of problem solving abilities in students. The practic of the learning process is only directed at the ability to memorize and understand theory so that students find it difficult to relate it to situations in everyday life. Science learning in elementary schools is also still less emphasis on the curiosity attitude of students scientifically, but it is

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always about memorizing and understanding theory, so that students are lacking in how to act, do, and solve a problem. Natural Science is a theoretical knowledge that is obtained or compiled by finding out and doing, it will assist students to achieve a rooted understanding which is a process (human effort to understand the universe), procedure (appropriate observations and correct procedures) and produce a product or conclusion (Soemari et al., 2020). The implementation of the science learning process is directed at the ability to develop scientific skills and attitudes in students so that they are able to relate them to situations in everyday life. Science learning in elementary schools also emphasizes the curiosity of students scientifically, but it is always about memorizing and understanding theory, so that students can understand how to act, do, and solve a problem. The science learning process in elementary schools does not only memorize concepts for students, but they must to comprehend, observe, analyze and solve problems which will be useful for everyday life through science subjects (Oktaviani & Tari, 2018).

Problem solving ability is the activity of higher order thinking skills to solve a problem in accepting new problems. Problem solving ability is power of a person to use the inspiration of his deep thinking so as to encourage scientific thinking which is expected in the learning process (Chin & Osborne, 2008; DeHaan, 2009; Mukhopadhyay, 2013; Mayrath et al., 2019). Problem solving leads to the efforts needed by students for the problems experienced and how students act to determine a way out in solving a problem. According to (Yandhari et al., 2019) problem solving indicators include clarifying concept terms which means classifying information in solving problems to get an overview of the things contained in the problem. Second, formulating problems and analyzing problems which means compiling several steps according to information and data from a problem. Third, building ideas systematically means carrying out problem solving based on steps that have been thoroughly designed. Fourth, seeking new information through other sources, which means that after the completion stage is reached, it is necessary to add new ideas to strengthen the concept. Thus this study observes the problem solving ability of students in learning science content. Therefore, an experiment has been carried out using one of the methods for researching science content learning in elementary schools. The methods used are NHT and TPS methods. NHT is a cooperative learning model by discussing in groups where each student is given a number and has the same opportunity to answer questions by calling the number randomly proposed by the teacher (Siti Muawanah & Nizaruddin, 2019). In the NHT model, students are directed to be able to participate actively by using numbered heads in their groups. Research with learning techniques and learning steps in NHT, the first step is numbering. Students are divided into groups of 4-5 people, everyone in each group takes a number. Second, asking questions (questioning) The teacher gives assignments and each group does it. Third, think together (heads together), the group discusses the correct answer and make sure that their member be able to carry on or to understand it. Fourth, giving answers (answering) randomly, the teachers makes student who have number called out to report their discussion result. And fifth, the conclusion (Iskandar & Leonard, 2018) In process learning by applying the BHT model, students study in groups where each member is liable for the group's work. Through these activities, the application of NHT which during the process of learning involves students in implementing a learning process (Yuniarti et al., 2021). The NHT model is expected to activate students, motivate students, and invite students to think creatively in solving problems. According to (Haniyah, et al. 2014) the NHT model is one of cooperative learning type that design to affect the interaction patterns of student and it can be as an alternative to traditional classroom structures.

While the TPS model requires students to think and find the answers in pairs (Rahayu et al., 2021). The TPS emphasizes that every student are first given the opportunity to think individually, then students make a discussion with their partners and then present the results of their thoughts. According to (Rizqi et al., 2021) the TPS model is thinking in pairs in interacting with other students to appreciate any differences that exist and be responsible for learning activities. TPS is applied to students to let them to think, to give respond and to assist one and other in group learning. It presents inspiration such as thinking time as a solid aspect in improving students' skills in responding toward problems. Learning techniques and learning steps in the TPS model consist of Session one, think (thinking), Session two, pair (pairs), and the third session, share (sharing). Problem solving ability is an activity of thinking and reasoning in solving problems through problems that have previously been encountered to encourage students to be able to solve these problems. Indicators of problem solving include (1) Clarifying concept terms. That is, classifying information in solving problems to get a picture of something that is contained in the problem. (2) Formulate the problem and analyze the problem. That is, compiling several steps according to information and data from a problem. (3) Build ideas systematically. That is, carrying out problem solving based on steps that have been designed thoroughly. (4) Seeking new information through other sources. That is, after the completion stage is reached, it is necessary to add new ideas to strengthen the concept (Yandhari et al., 2019).

The learning process of NHT and TPS during pandemic has made the implementation of learning activities by online. In order to reduce and suppress the spread of the virus, the learning that was originally

carried out in schools was diverted by changing all educational activities into learning at home via online or online. Learning through online or online using digital technology, namely zoom meetings. Zoom meetings are one of the online platforms or applications that are often used to carry out online or remote activities such as meetings, dialogues and virtual or not face-to-face learning and distance education (Rizaldi & Fatimah, 2020). Zoom meeting is an application that basically fits the demands of the industrial revolution 4.0 by emphasizing on system digitization or technology-based. Teachers are required to understand information and communication technology in order to make it easier for teachers to provide direction to students in learning (Zaenuri & Prastowo, 2021). The teacher position in online learning process must be more optimal, so that students become learning activists because teachers must be able to make the basis of a constructivist approach in which students are learning subjects. The zoom meeting application is an application that has developed in helping the online learning process. Zoom meetings are one of the applications or platforms that are very supportive in the needs of communication, interaction and remote education processes that can still be done virtually or not face-to-face. Learning is through zoom meetings, where educators and students can meet face-to-face and interact properly so as to make it easier and at the same time help teachers to interact with their students in all learning process (Eko Yulianto et al., 2020). Learning through zoom meetings is considered more efficient, because if teachers cannot attend, zoom meetings are an option for teachers and students to continue to carry out the distance learning process (Haqien & Rahman, 2020). Learning is not just remembering, but broader than that, namely experiencing. This study aims to examine and determine the differences in students' science problem solving abilities between the application of the NHT and TPS learning models in the fourth grade sound material at SDN Batu Ampar 02 Pagi, East Jakarta.

2. METHOD

The population in this study were fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi, East Jakarta. There are 58 students, divided into 32 student as member of first experiment class and 26 student as member of second experiment class students. The sample of this study using the Quasy Experimental Design method was carried out with the saturated sample technique in class IV A by being treated with Numbered Heads Together (NHT) and Class IV B by being treated with Think Pair Share (TPS). The data collection technique used a subjective test in the form of a posttest. In the experimental class I was given Numbered Heads Together (NHT) treatment, while the experimental class II was given Think Pair Share (TPS) treatment. After the two classes were given different treatments, they were then given a final test to determine students' understanding after being given treatment. The results of the final test of both class was analyzed and then compared to test the differences using statistical tests on students' problem solving abilities.

3. RESULT AND DISCUSSION

Result

The results of data analysis (Post-Test) conducted on fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, involving class IV A as the experimental class I which was treated with the NHT model and class IV B as the experimental class II given the TPS model treatment can be observed in Table 1.

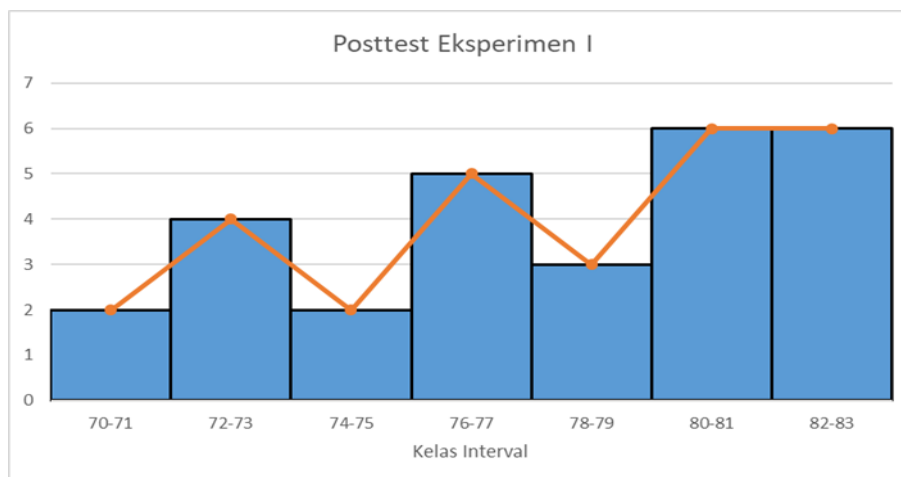
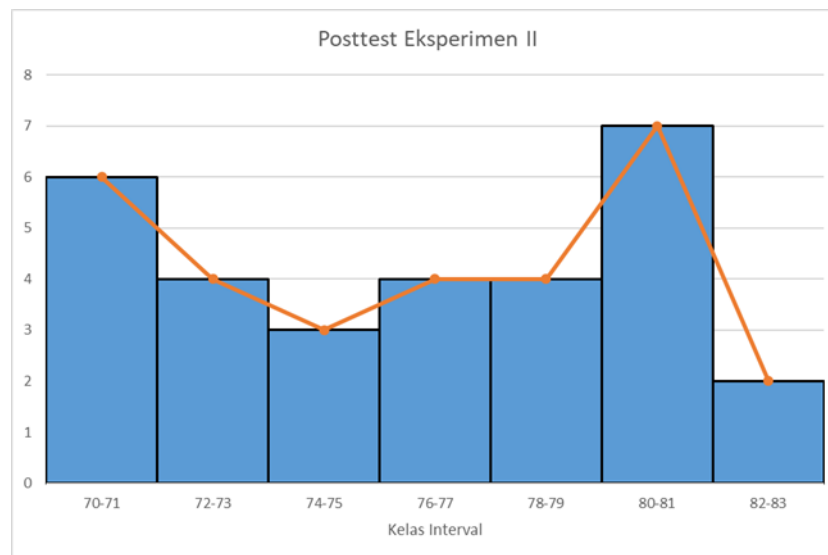


Figure 1. Frequency distribution of students' science problem solving ability scores in Experiment I class

Based on the results of the Experiment I class research as many as 28 students using the NHT model, the results data (Post-Test) obtained the lowest dan highest score in ar row are 70 and 82. Frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment I class using the NHT model on the sound properties material, the score ranges from 70 to 82 with a total of 28 students as respondents.

**Figure 2.** Frequency distribution of students' science problem solving ability scores in Experiment II class

Based on Figure 1 and Figure 2 for the frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment II class using the TPS model on the material properties of sound, the score ranges from 70 to 82 with a total of 30 students as respondents. The data on the value of the results of problem solving abilities in the Experiment II class by applying the TPS model obtained the result data (Post-Test) which obtained the lowest and highest score in a row were 70 and 82.

Table 1. Post-Descriptive Statistical Test Results Problem Solving Ability

Descriptive Statistic	Experiment Class I	Experiment Class II
N	28	30
Highest Score	82	82
Lowest Score	70	70
Mean	78.7	76.16

Table 1 shows that the experimental class I with 28 students (N) has an average of 78.7. Meanwhile, in the experimental class II with 30 students (N) the average score was 76.16. From Table 1, it can be seen that there is a difference in the Posttest average, which is 2.54. Before analyzing the data, the researcher first conducted a normality and homogeneity test on the data of post test. The normality test calculation for the Experiment I class (Post-Test) with the NHT model, it was obtained that $0.119 < 0.167$ at the real level $= 0.05$ with $n = 28$. It shows that the data of Post-Test Experiment I is normal. While the calculation of the normality test for the Experiment II class (Post-Test) with the TPS model, it was obtained that $0.146 < 0.161$ at the real level $= 0.05$ with $n = 30$. It shows that the data of Post-Test Experiment II is normal. The homogeneity test of two population variances from two groups was carried out using Fisher's exact test. From the test results obtained $F_{\text{count}} = 1.06621$ and $F_{\text{table}} = 1.87513$ at a significant level of 0.05. Because it

does not exceed the variance of the two groups is homogeneous. Next, the data was analyzed using t-test. The results is showned in Table 2.

Tabel 2. T-test Result

Group	α	t_{count}	t_{table}	Decision	Conclusion
Experiment	0,05	4,21	2,00	H_a accepted	There are differences in students' science problem solving abilities

From the results of the calculation of the price $t_{count} = 4.21$ and $t_{table} = 2.00$ at the significant level = 0.05. This shows that H_0 is rejected. It means that students' science problem solving abilities between two class is a significant different. The difference the problem solving abilities of fourth grade students between students who follow the NHT and the others who follow the TPS model is because there are differences in the stages of learning activities and delivery of material. The NHT model in its implementation has distinctive characteristics with the numbering of heads in groups of students where each group consisting of 4-5 students who are given a head number can emphasize learning activities by playing an active role through group discussions and developing problem solving skills. The NHT model creates joint activities that stimulate the curiosity of students with other group members, namely by providing problems or problems related to everyday life, and students finding out how problems could be solved. While the TPS model in its implementation in groups of students is carried out in pairs, students together help each other in group study. This model presents inspiration such as thinking time as a solid aspect in improving students' skills in responding to problems. By providing problems or problems related to everyday life, opportunities for students to carry out learning activities are to work alone and collaborate with their group mates in finding out how these problems can be solved. So that in this process, students need more time to think, respond and together help each other in their groups. According to (Nugroho & Wardani, 2019; Rahmawati, et al. 2021) it was revealed from the results of the study that the class that was treated with the implementation of NHT model proved that there was a better effect on students' problem-solving abilities. Learning from the NHT model makes all students more active in learning. The use of the NHT model can encourage student activities. Seen in group discussions through the activity of exchanging opinions and giving suggestions in solving problems, where each student will help each other so that all group members are ready to be more enthusiastic in learning. This is also reinforced by (Pakpahan & History, 2016; Juniarta, 2017; Baskoro, 2020) the NHT model will encourage students to be more active in developing ideas when conducting group discussions, namely by helping one another with students who do not master the subject matter. By helping each other and sharing knowledge, students can have open insights when exchanging their respective opinions.

Discussion

Based on result, it has been explained that in research on students' science problem solving abilities there are differences between the application of the NHT and TPS learning models. The hypothesis test shows that $t_{count} = 4.21$ and $t_{table} = 2.00$ at the significant level = 0.05. This shows that it is greater than ($4.21 > 2.00$) then H_0 is rejected. That is to say that the students' science problem solving abilities of both class (NHT and TPS) is not same. One of research states that learning outcomes using the NHT model is better than the TPS model (Pakpahan & History, 2016). Through the NHT model in learning will encourage students to be more active because NHT has a characteristic that is numbering where the teacher appoints one student according to the numbering to represent the group (Maman & Rajab, 2016). This method aims to involve all students through out the learning activities. The group must ensure that each member of the group is able to master the material given by the teacher, this can make students exchange ideas or opinions to find the most appropriate answer collaboratively and train students' responsibility to try to master the material from the teacher. when conducting group discussions, students can share the knowledge they get and can exchange opinions with each other. The learning model in the experimental class I using NHT is superior to the use of TPS in the experimental class 2 (Nugroho & Wardani, 2019). In the use of the NHT model students are better and effective compared to the TPS model. In the NHT model, students tend to be more explore and more focused, which makes students' insights more open to lessons. The NHT model also provides students with active learning so that they are encouraged to think, work together and prepare themselves in mastering the material (Mustami & Safitri, 2018; Lestari & Ariesta, 2019; Simamora & Zunaedy, 2021). Student learning activities through the NHT model improve learning outcomes of students (Asniwati et al., 2019; Hanifah, et al. 2019; Naibaho, 2019; Wati & Suarni, 2020; Kurnia, et al. 2021). Through

the NHT model, the improvement in learning outcomes takes place because students work together with groups so that they can share data and the teacher also emphasizes students to be more careful in working on the questions that have been given. Information on student learning outcomes is obtained from assessment tests that are tried at the end of each meeting with the aim of sharing an overview of students' skills in understanding learning. The implication of this study results is that the NHT model has a better effect, superior to the use of TPS on students' problem-solving abilities which can affect the learning, and can make students improve their interactions with fellow friends in exchanging opinions and provide input or criticism.

4. CONCLUSION

Research that has been conducted at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, it can be concluded that students' science problem solving abilities between the application of the NHT and TPS learning models assisted by Zoom Meeting on sound material are not same or different. More effective learning with the NHT model that is applied has more effect on students' problem solving abilities in the teaching and learning process compared to TPS model. Other research can focus on more in-depth research related to the application of the two learning models. It can also be done other studies that focus on other materials.

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**6. Bukti Konfirmasi Accepted
(28 Oktober 2022)**

[IJEE] Editor Decision

2 messages

Ejournal Undiksha <ejournal@undiksha.ac.id>
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We have reached a decision regarding your submission to International Journal of Elementary Education, "Comparison of the Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students".

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Dear Author

Based on the results of the review, the manuscript was declared accepted.

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**7. Artikel Publish
(13 Desember 2022)**



The Use of NHT and TPS Assisted by Zoom Meetings on the Problem Solving Ability of Elementary School Students

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ABSTRAK

Pembelajaran IPA di sekolah dasar masih dilakukan secara konvensional yang mengakibatkan kurangnya kemampuan pemecahan masalah pada siswa. NHT dan TPS merupakan variasi metode yang dapat menunjang kemampuan pemecahan masalah siswa. Penelitian ini dilakukan untuk menganalisis perbedaan kemampuan pemecahan masalah IPA siswa antara penerapan pembelajaran NHT dan TPS materi bunyi kelas IV Sekolah Negeri. Penelitian ini dilakukan dalam bentuk penelitian eksperimen dengan menggunakan Quasy Eksperimental Design. Desain yang digunakan yaitu Non Equivalent Control Group Posttest Design. Populasi dalam penelitian ini adalah sebanyak 58 siswa di kelas IV. Pengambilan sampel dilakukan dengan teknik sampel jenuh pada kelas IV A dengan jumlah 28 siswa sebagai kelas eksperimen I (NHT) dan Kelas IV B dengan jumlah siswa 30 yang diberi perlakuan TPS. Pengumpulan data yang digunakan berupa tes dalam bentuk post-test. Hasil tersebut menunjukkan bahwa terdapat ketidaksamaan atau perbedaan antara kemampuan pemecahan masalah siswa kelas IV pada kelas eksperimen I (NHT) dan kelas eksperimen II (TPS) khususnya pada materi bunyi. Model NHT yang diterapkan lebih berpengaruh terhadap kemampuan pemecahan masalah siswa dalam proses belajar mengajar dibandingkan dengan model TPS.

ABSTRACT

Learning science in elementary schools still carried out conventionally which results in the lack of problem solving abilities in students. NHT and TPS are a kinds of methods that can support students' problem solving abilities. This study was conducted to analysis the differences in students' science problem-solving abilities between the application of NHT and TPS learning materials for class IV public schools. This research was conducted in the form of experimental research using Quasy Experimental Design. The design used is Non Equivalent Control Group Posttest Design. The population in this study were 58 students in class IV. Sampling was carried out using a saturated sample technique in class IV A with a total of 28 students as experimental class I (NHT) and Class IV B with a total of 30 students being treated with TPS. The data collection technique used a test in the form of a posttest. These results indicate that there are dissimilarities or differences between the problem-solving abilities of fourth-grade students in experimental class I (NHT) and practical class II (TPS), especially in sound material. The NHT model that is applied has more influence on students' problem-solving abilities in the teaching and learning process compared to the TPS model.

1. INTRODUCTION

Natural Sciences is taught to student since in elementary schools and is taken and is required at every level of education. Science subjects are one of the subjects in elementary schools that emphasize the curiosity of students scientifically. Natural Science is a systematic way of explore nature, so that it is not only the ability to master various accumulated knowledge which can be in the form of facts, concepts, or principles but a process of discovering (Cavus & Alhihi, 2014; Kurniawan et al., 2019; Tanti et al., 2021). Therefore, the Natural Science subjects given are not only about memorizing and understanding theory, but how we act, do, and solve a problem. This definition states that science is a form of effort in various experiences that can develop process skills, understanding concepts, application of concepts, scientific attitudes, and is based on natural science learning activities on issues developed in society (Kibirige & Teffo, 2014; Madu, 2020; Mouromadhoni et al., 2019).

The process of learning science in elementary schools so far is still carried out conventionally which results in the lack of problem solving abilities in students (Kartikasari et al., 2018; Leasa et al., 2021; Rochman et al., 2019). The practic of the learning process is only directed at the ability to memorize and understand theory so that students find it difficult to relate it to situations in everyday life. Science

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learning in elementary schools is also still less emphasis on the curiosity attitude of students scientifically, but it is always about memorizing and understanding theory, so that students are lacking in how to act, do, and solve a problem (Etobro & Fabinu, 2017; Giselsson, 2020; Rostika & Junita, 2017). Natural Science is a theoretical knowledge that is obtained or compiled by finding out and doing, it will assist students to achieve a rooted understanding which is a process (human effort to understand the universe), procedure (appropriate observations and correct procedures) and produce a product or conclusion (Nugraha, 2018; Utaminingsih et al., 2018; Widowati et al., 2017). The implementation of the science learning process is directed at the ability to develop scientific skills and attitudes in students so that they are able to relate them to situations in everyday life. The science learning process in elementary schools does not only memorize concepts for students, but they must to comprehend, observe, analyze and solve problems which will be useful for everyday life through science subjects (Asmahasanah et al., 2018; Wahyuni et al., 2020; Yamin & Karmila, 2020).

Problem solving ability is the activity of higher order thinking skills to solve a problem in accepting new problems. Problem solving ability is power of a person to use the inspiration of his deep thinking so as to encourage scientific thinking which is expected in the learning process (Chasanah, 2019; Muzaki & Masjudin, 2019; Rostika & Junita, 2017). Problem solving leads to the efforts needed by students for the problems experienced and how students act to determine a way out in solving a problem. Some methods that support problem solving skill are NHT and TPS methods. NHT is a cooperative learning model by discussing in groups where each student is given a number and has the same opportunity to answer questions by calling the number randomly proposed by the teacher (Anggraini et al., 2021; Tussyana & Luciana, 2019; Wati & Suarni, 2020). In the NHT model, students are directed to be able to participate actively by using numbered heads in their groups. In process learning by applying the NHT model, students study in groups where each member is liable for the group's work (Astuti, 2019; Kurnia & Damayani, 2019; Yenni, 2016). The NHT model is expected to activate students, motivate students, and invite students to think creatively in solving problems (Maman & Rajab, 2016; Simanungkalit, 2021; Sudewiputri & Dharma, 2021). According to Previous study the NHT model is one of cooperative learning type that design to affect the interaction patterns of student and it can be as an alternative to traditional classroom structures (Pramestika et al., 2019).

While the TPS model requires students to think and find the answers in pairs. The TPS emphasizes that every student are first given the opportunity to think individually, then students make a discussion with their partners and then present the results of their thoughts (Anggreni et al., 2017; Meilana et al., 2020; Mufarizuddin., 2018). According to previous study TPS model is thinking in pairs in interacting with other students to appreciate any differences that exist and be responsible for learning activities (Utami et al., 2020). TPS is applied to students to let them to think, to give respond and to assist one and other in group learning. It presents inspiration such as thinking time as a solid aspect in improving students' skills in responding toward problems. Learning techniques and learning steps in the TPS model consist of Session one, think (thinking), Session two, pair (pairs), and the third session, share (sharing) (Kadek Yogi Parta, 2016; Ulya et al., 2013).

The learning process of NHT and TPS during pandemic has made the implementation of learning activities by online. In order to reduce and suppress the spread of the virus, the learning that was originally carried out in schools was diverted by changing all educational activities into learning at home via online or online. Teachers are required to understand information and communication technology in order to make it easier for teachers to provide direction to students in learning (Fitriansyah et al., 2020; Ningsih et al., 2019; Yu et al., 2021). Learning through online or online using digital technology, namely zoom meetings. Zoom meetings are one of the online platforms or applications that are often used to carry out online or remote activities such as meetings, dialogues and virtual or not face-to-face learning and distance education (Assidiqi & Sumarni, 2020; Novayulianti, 2021; Sadikin & Hamidah, 2020). Zoom meeting is an application that basically fits the demands of the industrial revolution 4.0 by emphasizing on system digitization or technology-based (Kelana et al., 2021; Novayulianti, 2021; Susanti & Kristin, 2021). This study observes the problem solving ability of students in learning science content. Therefore, an experiment has been carried out using one of the methods for researching science content learning in elementary schools. This study aims to analysis the differences in students' science problem solving abilities between the application of the NHT and TPS learning models in the fourth grade sound material at SDN Batu Ampar 02 Pagi, East Jakarta.

2. METHOD

The population in this study were fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi, East Jakarta. There are 58 students, divided into 32 student as member of first experiment class and

26 student as member of second experiment class students. The sample of this study using the Quasy Experimental Design method was carried out with the saturated sample technique in class IV A by being treated with Numbered Heads Together (NHT) and Class IV B by being treated with Think Pair Share (TPS). The data collection technique used a subjective test in the form of a posttest. In the experimental class I was given Numbered Heads Together (NHT) treatment, while the experimental class II was given Think Pair Share (TPS) treatment. After the two classes were given different treatments, they were then given a final test to determine students' understanding after being given treatment. The results of the final test of both class was analyzed and then compared to test the differences using statistical tests on students' problem solving abilities.

3. RESULT AND DISCUSSION

Result

The results of data analysis (Post-Test) conducted on fourth grade students at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, involving class IV A as the experimental class I which was treated with the NHT model and class IV B as the experimental class II given the TPS model treatment can be observed in Figure 1.

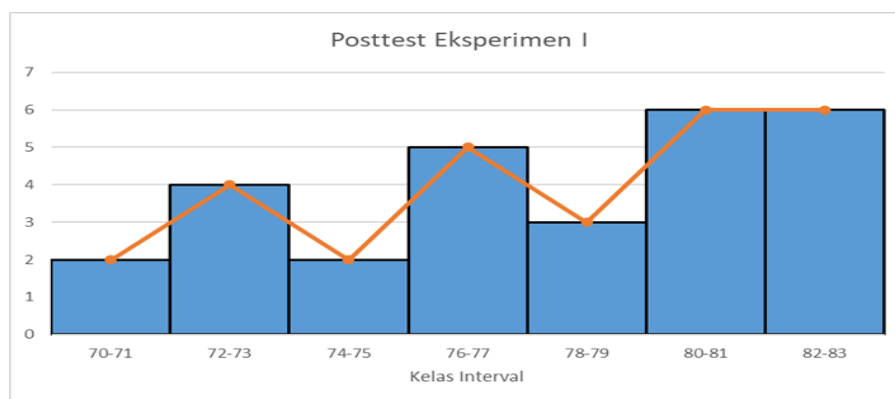


Figure 1. Frequency Distribution of Students' Science Problem Solving Ability Scores in Experiment I Class

Based on Figure 1 show the results of the Experiment I class research as many as 28 students using the NHT model, the results data (Post-Test) obtained the lowest dan highest score in ar row are 70 and 82. Frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment I class using the NHT model on the sound properties material, the score ranges from 70 to 82 with a total of 28 students as respondents. Frequency distribution of students' science problem solving ability scores in Experiment II class is show in Figure 2.

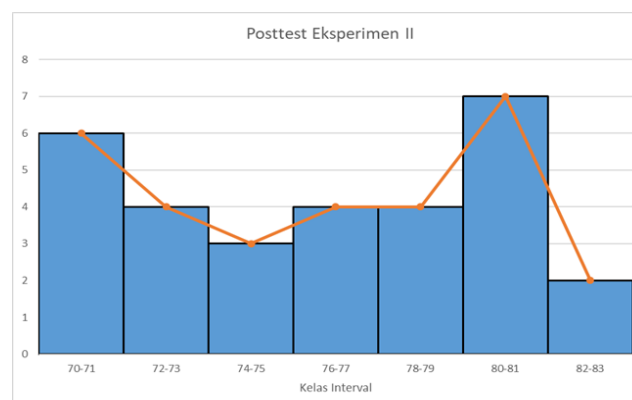


Figure 2. Frequency Distribution of Students' Science Problem Solving Ability Scores in Experiment II Class

Based on Figure 1 and Figure 2 for the frequency distribution of the results of students' science problem solving ability scores for the post-test in the Experiment II class using the TPS model on the

material properties of sound, the score ranges from 70 to 82 with a total of 30 students as respondents. The data on the value of the results of problem solving abilities in the Experiment II class by applying the TPS model obtained the result data (Post-Test) which obtained the lowest and highest score in a row were 70 and 82. Based on data analysis shows that the experimental class I with 28 students (N) has an average of 78.7. Meanwhile, in the experimental class II with 30 students (N) the average score was 76.16. From Table 1, it can be seen that there is a difference in the Posttest average, which is 2.54. Before analyzing the data, the researcher first conducted a normality and homogeneity test on the data of post test. The normality test calculation for the Experiment I class (Post-Test) with the NHT model, it was obtained that $0.119 < 0.167$ at the real level = 0.05 with $n = 28$. It shows that the data of Post-Test Experiment I is normal. While the calculation of the normality test for the Experiment II class (Post-Test) with the TPS model, it was obtained that $0.146 < 0.161$ at the real level = 0.05 with $n = 30$. It shows that the data of Post-Test Experiment II is normal. The homogeneity test of two population variances from two groups was carried out using Fisher's exact test. From the test results obtained $F_{\text{count}} = 1.06621$ and $F_{\text{table}} = 1.87513$ at a significant level of 0.05. Because it does not exceed the variance of the two groups is homogeneous. Next, the data was analyzed using t-test. The results is showned in Table 1.

Tabel 1. T-test Result

Group	α	t_{count}	t_{table}	Decision	Conclusion
Experiment	0.05	4.21	2.00	H_a accepted	There are differences in students' science problem solving abilities

From Table 1, show the results of the calculation of the price $t_{\text{count}} = 4.21$ and $t_{\text{table}} = 2.00$ at the significant level = 0.05. This shows that H_0 is rejected. It means that students' science problem solving abilities between two class is a significant different. The difference the problem solving abilities of fourth grade students between students who follow the NHT and the others who follow the TPS model is because there are differences in the stages of learning activities and delivery of material.

Discussion

Based on result, it has been explained that in research on students' science problem solving abilities there are differences between the application of the NHT and TPS learning models. The hypothesis test shows that $t_{\text{count}} = 4.21$ and $t_{\text{table}} = 2.00$ at the significant level = 0.05. This shows that it is greater than ($4.21 > 2.00$) then H_0 is rejected. That is to say that the students' science problem solving abilities of both class (NHT and TPS) is not same. One of research states that learning outcomes using the NHT model is better than the TPS model (Juliartini & Arini, 2017). Through the NHT model in learning will encourage students to be more active because NHT has a characteristic that is numbering where the teacher appoints one student according to the numbering to represent the group (Pramestika et al., 2019; Simanungkalit, 2021).

This method aims to involve all students through out the learning activities. The group must ensure that each member of the group is able to master the material given by the teacher, this can make students exchange ideas or opinions to find the most appropriate answer collaboratively and train students' responsibility to try to master the material from the teacher. The learning model in the experimental class I using NHT is superior to the use of TPS in the experimental class (Kadek Yogi Parta, 2016; Meilana et al., 2020). In the use of the NHT model students are better and effective compared to the TPS model. In the NHT model, students tend to be more explore and more focused, which makes students' insights more open to lessons. The NHT model also provides students with active learning so that they are encouraged to think, work together and prepare themselves in mastering the material (Tusyana & Luciana, 2019; Wati & Suarni, 2020). The NHT model creates joint activities that stimulate the curiosity of students with other group members, namely by providing problems or problems related to everyday life, and students finding out how problems could be solved (Kurnia & Damayani, 2019; Sudewiputri & Dharma, 2021). While the TPS model in its implementation in groups of students is carried out in pairs, students together help each other in group study. This model presents inspiration such as thinking time as a solid aspect in improving students' skills in responding to problems (Juliartini & Arini, 2017; Simanungkalit, 2021). By providing problems or problems related to everyday life, opportunities for students to carry out learning activities are to work alone and collaborate with their group mates in finding out how these problems can be solved (Colliver, 2018; Imam et al., 2018). So that in this process, students need more time to think, respond and together help each other in their groups. According to previous study it was revealed from the results of the study that the class that was treated with the implementation of NHT model proved that there was a better effect on students' problem-solving abilities (Yenni, 2016).

Learning from the NHT model makes all students more active in learning. The use of the NHT model can encourage student activities. Seen in group discussions through the activity of exchanging opinions and giving suggestions in solving problems, where each student will help each other so that all group members are ready to be more enthusiastic in learning. This is also reinforced by previous study that state the NHT model will encourage students to be more active in developing ideas when conducting group discussions, namely by helping one another with students who do not master the subject matter (Juliartini & Arini, 2017; Pramestika et al., 2019). By helping each other and sharing knowledge, students can have open insights when exchanging their respective opinions. Student learning activities through the NHT model improve learning outcomes of students. Through the NHT model, the improvement in learning outcomes takes place because students work together with groups so that they can share data and the teacher also emphasizes students to be more careful in working on the questions that have been given (Kurnia & Damayani, 2019; Tussyana & Luciana, 2019). Information on student learning outcomes is obtained from assessment tests that are tried at the end of each meeting with the aim of sharing an overview of students' skills in understanding learning. The implication of this study results is that the NHT model has a better effect, superior to the use of TPS on students' problem-solving abilities which can affect the learning, and can make students improve their interactions with fellow friends in exchanging opinions and provide input or criticism. The limitation of this research lies in the limited research scope. This research only involved one school as a research subject. It is hoped that future research will be able to broaden and deepen the scope of research and consider other factors related to the use of tps on the problem solving ability.

4. CONCLUSION

Research that has been conducted at Sekolah Dasar Negeri Batu Ampar 02 Pagi East Jakarta, it can be concluded that students' science problem solving abilities between the application of the NHT and TPS learning models assisted by Zoom Meeting on sound material are not same or different. More effective learning with the NHT model that is applied has more effect on students' problem solving abilities in the teaching and learning process compared to TPS model. Other research can focus on more in-depth research related to the application of the two learning models. It can also be done other studies that focus on other materials.

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