Problem-based numbered head together learning approach for a successful teaching strategy

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui potensi model pembelajaran Numbered Head Together (NHT) dalam meningkatkan keterikatan belajar siswa sekolah dasar di Indonesia. Meskipun penelitian di bidang ini luas, saat ini sedikit yang diketahui tentang kecukupan dan strategi yang lebih baik untuk menerapkan model NHT di tingkat sekolah dasar. Dalam penelitian ini, pendekatan Penelitian Tindakan Kelas (PTK) dipilih, karena telah digunakan secara luas dalam pengajaran sekolah dasar dan sudah populer dalam literatur. Hasil penelitian mengusulkan pendekatan model pembelajaran baru yang terbukti berhasil mengembangkan model NHT untuk sekolah dasar di Indonesia, yaitu dengan mengintegrasikan model pembelajaran Problem Solving (PS) ke dalam model NHT. Walaupun penelitian ini dirancang terbatas untuk konteks Indonesia, namun besar kemungkinan bahwa penerapan model pembelajaran ini dapat diperluas dan diusulkan untuk kegiatan pengajaran di tingkat sekolah dasar secara umum. Penelitian ini dapat dijadikan langkah awal menuju pengetahuan yang lebih mendalam tentang penerapan praktis model pembelajaran NHT dan PS dalam konteks belajar di sekolah dasar. Selain itu, hasil penelitian telah memberikan bukti awal tentang efektivitas model pembelajaran gabungan ini dalam meningkatkan keterlibatan siswa dalam belajar.

Kata Kunci: Model Pembelajaran; *Numbered Head Together*; *Problem Solving*; Sekolah Dasar.

ABSTRACT

The study aims to investigate the potential of the Numbered Head Together (NHT) model for improving the learning engagement of elementary students in Indonesia. Although the work in this area is extensive, little is currently known about the adequacy and better strategy for implementing the model at the elementary school level. Classroom Action Research (CAR) was applied to this study, as it has been extensively used in elementary school teaching and is well established in the literature. The study results provide an extended approach as a proven successful process for applying the NHT model to elementary schools in Indonesia by incorporating the Problem Solving (PS) learning model into the NHT model. While this study was originally designed for the Indonesian context, we also see a possible application of the proposed expanded NHT model as transboundary for teaching activities in general at the elementary school level. This research serves as the first step toward a deeper insight into the practical application of the NHT and PS learning model in primary school contexts. The evaluation of the results provides initial evidence of the effectiveness of the combined model in improving student engagement in learning.

Keywords: *Learning Model; Numbered Head Together; Problem Solving; Elementary Teaching.*

INTRODUCTION

The success in the implementation of a curriculum not only be interpreted as applying it alone but rather on the process of creating a good learning environment for every student. In the context of learning strategies, learning models are factors that may affect the effectiveness of the learning process of students individually. Thus, for teachers, the use of a learning model becomes important to note to improve student activity and student learning outcomes. Meanwhile, based on the perspective of students, with the implementation of learning models, they are more enthusiastic about participating in the learning process (Burns et al., 2014).

In Indonesia, one learning model that is considered to increase student interaction in the classroom is the NHT learning model, namely learning models based on small group assignment (3-4 people), where each pupil is getting numbering and discuss the best agreed-upon answer to the questions provided by the teacher. This is indicated by the results of several studies that have been done before, which state that the NHT learning model has been considered to increase the activity of students in recent years, both in primary school, junior high school, senior high school, the vocational school (Iskatiana, 2017; Isna et al., 2018; Listiadi et al., 2019; Nursyamsi & Corebima, 2016). The NHT learning model is a variant of the discussion group's method by providing opportunities for students to share ideas and consider the most appropriate response. In other words, the NHT learning model could make every student ready and able to carry out discussions in earnest. Students who are good to teach students are less intelligent (Serdyukov, 2017).

For the application of the NHT learning model at the primary school level in Indonesia, several studies have been conducted. Results of research conducted by Fauziah & Montessori (2018), Triwindi et al. (2021), Prakoso & Radia (2019), and Setiawan & Ismaniati (2019) showed that the application of the NHT learning model could give a positive impact on increasing student activities in the classroom. The NHT learning model still has some drawbacks, such as not being suitable to be applied to several students that a lot because it takes a long time, and not all members of the group were called by the teachers because of the possibility of limited time. In other words, the development of the NHT learning model still needs to be done, and this is the focus of this study.

In this study, our main research question is how to develop the learning process of NHT to enhance the activity and student learning outcomes? The purpose of this study was to propose a learning strategy that combines the NHT learning model with the PS learning model. Integration of NHT and PS learning model is done because it is based on the results of previous studies, PS learning model is also proven to increase the effectiveness of student learning strategies in the classroom, in the case of stimulating learners in thinking that starts from the search data to formulate conclusions (Masitoh & Bachri, 2018).

In the NHT model development process, we used the method of classroom action research (CAR) to provide a particular intervention or treatment to enhance or improve the quality of learning, especially in terms of the learning process of students in the class (Amri, 2013). Jannah (2015) states that the success of a teacher in learning is when they understand professional and academic problems, which problems can be studied, improved, and resolved through CAR so that innovative and systematic learning will be created. The role of CAR is also seen in analyzing how the quality of learning affect student motivation and participation in the classroom (Simbolon, 2017) and offers the flexibility to test a particular teaching method that is directly integrated into classroom teaching and learning activities (Bilqis Maulany, 2013; Cohen et al., 2013; Khasinah, 2013). Therefore, teachers can use this method to deliver a course and at the same time determine and directly validate the effectiveness of using a particular teaching method in their classroom (Cohen et al., 2013), hence it is consistent with the objectives of this study. Moreover, this method is already used at various levels of education and is also widely used in elementary school (Bilqis Maulany, 2013; Cohen et al., 2013).

The case studies in this research were conducted in the fourth grade of SDN 2 Sumanggi Hulu Sungai Tengah district South Kalimantan province (Indonesia). The class made the object of CAR because the student learning outcomes remain low (less than 70). Based on the results of previous evaluations, students' poor performance is due to a lack of learning development, lack of student interest in learning materials, and learning activities are still less attractive to students because the learning process only uses the lecture method so that students become passive in learning.

LITERATURE REVIEW

The learning model is a conceptual framework that describes a systematic procedure for organizing learning experiences to achieve specific learning goals. The use of a learning model greatly determines the quality of learning outcomes. There are many learning models, but no learning model is better than one other (Zhou & Brown, 2015). A teacher is expected to be able to choose a learning model by the material being taught. For the elementary school level, the cooperative learning model is one of the most popular learning models (Hennessey & Dionigi, 2013). A cooperative learning model is a form of learning in which students learn and work in small groups collaboratively whose members consist of four to six people with a heterogeneous group structure (Hennessey & Dionigi, 2013).

One type of cooperative learning method is the Numbered Head Together (NHT) model. This learning model is implemented by providing numbering so that each student in the team has a different number, according to the number of students in the group. By giving these numbers, the teacher can ask questions to students. The questions given can be taken from certain subject matter that is being studied (Nursyamsi & Corebima, 2016). NHT is a variant of group discussion which aims to provide opportunities for students to share ideas and consider the most appropriate answers, as well as to improve student cooperation (Burns et al., 2014). Several studies have shown the benefits of implementing the NHT model in the learning process at the elementary school level. However, other experiences have shown that in general, the NHT learning model still has shortcomings: 1) The application of the NHT learning model is not suitable for many students because it takes a long time, and 2) not all group members are called by the teacher because

of the possibility of limited time (Listiadi et al., 2019). By looking at the shortcomings of the NHT learning model, new developments are needed to achieve optimal learning objectives.

In this study, we applied an integrated model of Numbered Head Together (NHT) and Problem Solving (PS). The selection of the PS model is based on the results of previous research which shows that the PS learning model can stimulate students to think, starting from looking for data to formulating conclusions and being actively involved in the learning process taking place. The research results of Maesari et al., (2019), Mardianis (2018), and Kadek et al. (2018) have also shown that the PS learning model can improve students' thinking skills and problem-solving abilities at the elementary school level. Therefore, the combination of the NHT model and the PS model can be used as a learning strategy that prioritizes student understanding and activity which of course will make students more interested, motivated, and excited about participating in learning activities.

In sum, the NHT model focus on intense interaction between students in answering questions and no student dominates in the group because there are limiting numbers. Whereas in the PS model, students can train and accustom students to face and solve problems skillfully and can develop students' thinking skills creatively. By combining the NHT learning model and the Problem-Solving learning model, it is hoped that students can become more actively involved in the learning process and can more easily understand the material which in turn can improve student learning outcomes.

METHODOLOGY
Research Sample
This study used the approach of Classroom Action Research (CAR). CAR is an observation of the activities that are deliberately raised and occur in a classroom. In other words, the teacher gives a deliberate intervention, and then the teacher can directly observe the results. This study involved 20 students in the fourth grade (13 male, 7 females, aged between 10-12 years).

Research Design
In this study, we applied the CAR implementation procedures that have been developed by Khasinah (2013) as a guide to overcoming the problems and designing the learning strategies proposed. The stages in this study are as follows:
1. Plan

    Based on observations, the researchers devised strategies that were considered to improve the activity and student learning outcomes, namely through the application of the NHT learning model combined with the PS learning model.
2. Implementation

    This stage is the implementation or application of the draft contents. In this research, teaching and learning activities in each cycle are carried out following the scenario step of the NHT learning model combined with the PS learning model that is planned in the lesson plan.
3. Observation

    Serves to document the actions taken, such as observing the student activities in learning by using an observation sheet that has been created by

researchers. Skills students here were assessed individually and continued with the evaluation of learning outcomes that have been implemented. All results are recorded for consideration in implementing reflection. The observation focused on students' activity (through the observation sheet learning activities using the student activity sheet) and student learning outcomes (through the provision of tests) for 4 meetings

4. Reflection

Analysis activities, interpretation, and explanation of the information obtained from observations of the action research. It is also used by teachers to evaluate themselves, and the extent to their ability in teaching and managing the class so that it can be used as a reference for the improvement of the learning process in the execution of the next cycle.

The evaluation method used the observation of students' activity (through the observation sheet learning activities using student activity sheet) and student learning outcomes (through the provision of tests) for 4 meetings. Criteria of student activity are said to be successful if the observation of the students in learning activities get an average score of ≥ 82% with the acquisition of highly active criteria. The formula used to find the score of student activity in the learning criteria is as follows (1).

Student Activity Score = (Total Acquisition/Maximum Number of Scores) × 100%   (1)

While the criteria of learning outcomes are said to be successful if students get the average score of individual mastery ≥70 and ≥81% in classical achievement. The formula used to find the score of individual completeness and classical completeness is as follows (2) and (3).

Individual completeness = (Number of Correct Answers/Maximum Number of Scores) x 100%   (2)

Classical completeness = (Number of Students Who Have Completed/Total Number of Students) x 100%   (3)

RESULTS AND DISCUSSION

This study was conducted in two cycles using the combination of the NHT learning model and the PS learning model (Figure 1), where one cycle consists of two meetings. Then the teacher made learning tools to support the implementation of the model for both cycles (Figure 2).
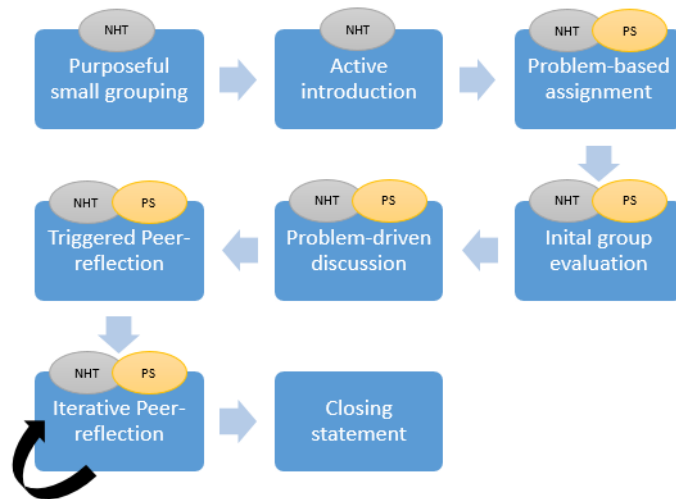
Figure 1. Proposed study process by combining NHT and PS

Figure 1 shows a detailed explanation of the implementation of the NHT-PS learning model. First, students are divided into heterogeneous groups. Each student in the group is getting several heads. Second, the teacher explains the purpose of learning and group goals. Third, the teacher gives duty to the form of common problems, and each group does. Fourth, students evaluate their group assignments. Fifth, each group discusses the existing materials cooperatively and contains findings. Sixth, after completion of the discussion, the teacher calls a student number, and the number is called out of the group to report or explain their group's work. Seventh, an iterative process as the student responds with someone else, then the teacher pointed to another number. The last, the teacher provides a brief explanation at the same conclusion.
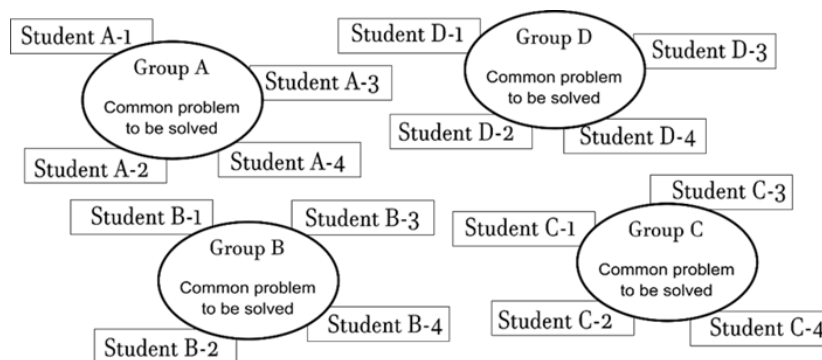

Figure 2. The elements of the group form

In the implementation of the first cycle, indicators of success have not been achieved, both in terms of student activities and learning outcomes. Not all students are actively involved in learning and there are still students whose learning outcomes have not reached the target. So, in the next meeting, the teacher must motivate and pay more attention to students working in groups. In explaining the material, the teacher also needs to emphasize important points in language that is easier for students to understand.

Based on the results of the reflection in the first cycle, and in the second cycle, improvements were made to the strategies and learning methods. During the

learning process, the teacher goes around each group to ensure that all group members participate in working on group assignments. To find out the level of students' understanding, the teacher explores students' knowledge by randomly dialling head numbers, so students will pay more attention to learning because of the fear of being called and embarrassed if they cannot give the correct answer.

With improvements in learning strategies and methods, but still paying attention to the steps of the combination of the NHT learning model and Problem Solving, in this second cycle there was a significant increase in both activities and student learning outcomes. Increased activity and student learning outcomes are shown in Figure 3 and Figure 4.
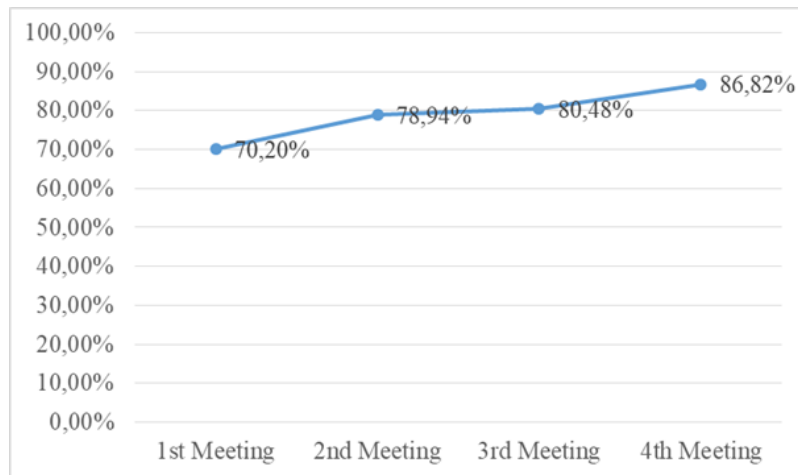
Figure 3. The tendency of student activities

Based on Figure 3, an increase in the activity of the students from the first meeting until the fourth meeting (cycle 1: 1st - 2nd meeting, and cycle 2: 3rd – 4th meeting). This means that the implementation of NHT and PS learning model success increases student activity and achieves a success indicator of student activity (M ≥ 82%). Activity and student engagement in learning activities are implemented are as expected.
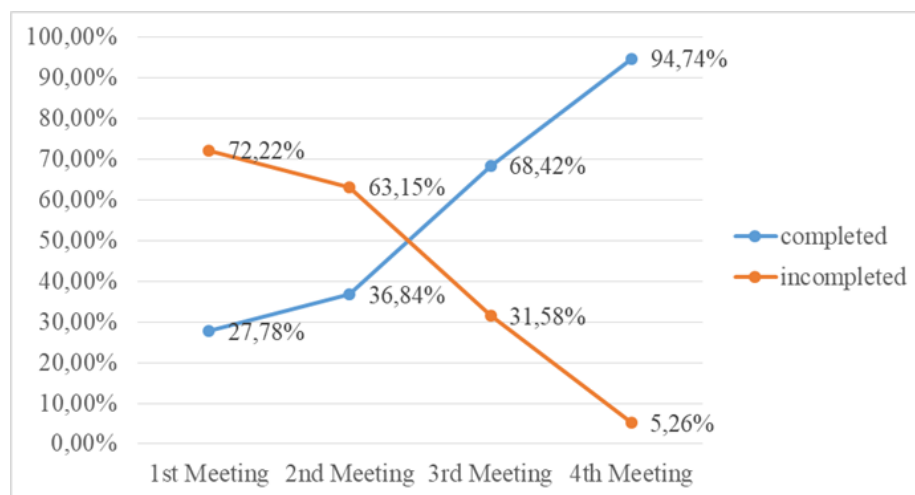
Figure 4. The trend of student learning outcomes

Based on Figure 4, an increase in the student learning outcomes from the initial meeting until the last meeting ($M \geq 70$). The reason behind the changes in the learning outcomes is because students quickly understand the material and students are active and involved in learning activities. The most basic thing that is required in the learning process is student activities. In this case, the visible progress of student learning outcomes of students' activity in learning.

Overall, the findings of the evaluation showed positive results. Thus, it can be said that the implementation of the NHT-PS learning model can be well-received by students to support the effectiveness of learning activities in the classroom.

Based on data obtained through observation of student activity in learning activities and evaluation tests to measure student learning outcomes of learning undertaken using a combination of the NHT model and PS model, some points of discussion arise. The first is related to the characteristics of primary school students in Indonesia. In general characteristics of primary school students in Indonesia are excited to play, always on the move, at work, or playing in groups, and always want to carry out and feel themselves (direct practice). In this study, we used and successfully demonstrated how the combination process NHT and PS learning model could be used as the proposed new learning models for primary schools in Indonesia. NHT was implemented by giving numbering, so that every student in the group has a different number, according to the number of students in the group. By giving the number, the teacher can ask questions to the students. Questions provided can be retrieved from a particular subject matter that is being learned. And in making the question be varied from the specific to the general nature with varying levels of difficulty as well. Thus, this model can bring intense interaction between students in answering the questions. In the NHT, no student will dominate the group because there is a limiting number. This is to the concept of the NHT model that requires the responsibilities of each member in the group for the group tasks. Thus, there is no separation between one student with other students in a group to give and take between one the other. On the other hand, the combination with the PS model can add to the stimulus of students in thinking. So that students can take the meaning of the learning activities. This is because, to solve a problem, students need knowledge and abilities that are related to a problem (Serdyukov, 2017). Therefore, the model of PS applied in this study supports previous studies for a role in improving the skills of students which includes the ability to search for information, analyze the situation and identify problems to produce an alternative so that it can take decisive action to achieve the goals (Damopolii et al., 2018).

The second related teaching activities in the classroom. The use of learning strategies will determine the quality of teaching and learning outcomes. There are many strategies and learning models, and of the many strategies and models that can be said that there is no better learning model of learning than other learning. In this study, the proposed learning strategy emphasizes understanding and active students, which would certainly make students more interested, motivated, and enthusiastic about participating in learning activities. By applying the NHT and PS, students in learning activities have increased in every meeting, which can reach the percentage achievement of 86.82% with very active criteria. Increased this activity is because students quickly understand the material, and students are engaged in learning activities. Activity and student engagement in learning activities are implemented are as expected. Following constructivism theory, the application of the NHT learning model combined with the PS learning model can be used as a

learning technique that emphasizes understanding and student activity which of course will make students more interested, motivated, and excited in participating in learning activities, because students are actively involved in the learning process. In the proposed learning model, the NHT learning model functions as cooperative learning, and the PS learning model acts as problem-based learning. Based on the results of the combination of the NHT and PS learning model, the syntaxes that indicate efforts to increase student activity:

1. Problem-based assignments: creating cooperation between one student and another.
2. Initial evaluation: students are required to find out about assignments given
3. Problem-based discussion: allowing students to share ideas and consider the most appropriate answers.
4. Triggered peer-reflection: students are responsible for each number they have

Besides, the learning model proposed in this study can improve student learning outcomes. Based on the evaluation, implementation of the integration of the NHT and PS model in learning can improve student learning outcomes, these results confirm other studies related to the implementation of the two methods separately (Damopolii et al., 2018; Listiadi et al., 2019). In this learning progress, students see the result of completeness individually. From the results of the acquisition score of the evaluation, it can be said that learning to use the NHT combined with PS has managed to improve student learning outcomes. This is because students quickly understand the material, students are active and involved in learning activities. Learning outcomes refers to student achievement, while it is an indicator of learning achievement and degrees change their students' behaviour. In this learning progress, students see the result of completeness individually. The learning result obtained in the form of cooperative learning is not only academic scores, but also moral scores and manners of a sense of personal responsibility, mutual respect, need for each other, giving each other, and respect for the existence of others around us (Seel, 2017). The results obtained by the students learning certainly prove that the cooperative learning model type NHT combined with PS can improve student learning outcomes in learning.

CONCLUSION

Based on the literature review, the current research in primary school education leads to increased effectiveness of learning models. The main key to creating an effective learning model is the activity and student learning outcomes. Therefore, this study attempts to develop a learning model for the implementation of learning strategies in primary schools, especially for primary school students in Indonesia. The development process focused on an intense interaction between students in answering questions, and the habituation of students in facing and solving problems skillfully. In this case by combining two models of learning, namely the NHT model and PS model.

From a theoretical perspective, this study contributes to the related needs of the class action approach in primary schools. This study demonstrated the successful application of new learning models. Meanwhile, from the perspective of practice, the results of this study can be used by primary schools to design and improve the teaching and learning process in the classroom. The results of this study indicate that the combination of the NHT and PS model can support an increase in

the effectiveness of teaching and learn in primary schools, especially primary schools in Indonesia. Besides, this study also showed that students could interact with other students and develop the ability to think creatively. Therefore, the results of this study can be used as a starting point for further research.

This study has a limitation in using descriptive statistical data that have not explained the factors that influence the success of the learning model proposed. For future studies, we will analyze the factors that influence the success of teaching and learning in primary schools. The result can also give us the basic approach to support further analysis processes related to the impact of the use of learning strategies in the classroom, both in the increased activity of students and teachers. And then we would try to integrate the proposed learning model into the curriculum of institutions for a various variety of different subjects.

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