



Application of the Numbered Head Together Type Cooperative Learning Model to Improve Student Learning Outcomes in Mathematics Subjects

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ABSTRACT

Purpose of the study: The aim of this research is to determine the increase in student learning outcomes in mathematics subjects, the subject of relationships between units, after implementing the Numbered Head Together (NHT) cooperative learning model for students.

Methodology: This research uses Classroom Action Research. The research subjects in this study were third grade elementary school students. The research instruments are test questions, interview guide sheets, and observation guide sheets.

Main Findings: The research results obtained in the first cycle were 8 students or 34.78% of students who completed their studies and 15 students or 65.21% who had not completed their studies with an average score of 49.13. In cycle II the number of students who completed increased to 16 students or 66.7% and those who had not completed decreased to 8 students or 33.3% with an average score of 62.5. In the implementation of cycle III, the number of students who completed it reached 22 students or 91.67% and only 2 students or 8.3% did not complete it with an average score of 85.20.

Novelty/Originality of this study: The novelty of this research is the latest in this research is the selection of learning models, especially the Numbered Head Together (NHT) cooperative learning model. Through this NHT type cooperative learning model, students can freely express their opinions and learn to respect other people's opinions while still referring to the material and learning objectives so that they can improve student learning outcomes.

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1. INTRODUCTION

Mathematics is an exact science which has long been the mother of all science in this world [1], [2]. The development of human culture and civilization cannot be separated from elements of mathematics. Without mathematics, of course human civilization would never have achieved the progress it has today. Mathematics as the science of arithmetic is basically a science that has broad functions in everyday life [3], [4]. Nowadays, both stupid and academically clever people, without realizing it, always use mathematics in everyday life, even in simple concepts.

Mathematics subjects need to be given to all students starting from elementary school to equip them with the ability to think logically, analytically, systematically, critically and creatively as well as the ability to work together [5], [6]. Learning mathematics is a sufficient requirement to continue your education to the next

level. Because by studying mathematics, we will learn to reason critically, creatively and actively. In reality, mathematics is a frightening prospect for some students [7], [8]. In the scope of mathematics, counting, formulas, numbers are scary things, make your head dizzy, boring, drain your mind and are not liked by students [9], [10].

What makes mathematics seem difficult and a frightening prospect among students is the existence of other factors than mathematics itself, such as the environment, learning methods, teachers, and so on [11]. It cannot be denied that so far the use of methods that are less varied and tend to be monotonous using the conventional lecture method is still a classic problem in the process of teaching and learning activities in schools. Based on the problems above, it is appropriate for teachers to make a breakthrough in terms of selecting appropriate models and methods in learning to improve student learning outcomes in mathematics lessons. mathematics as social constructivism with its emphasis on knowing how, namely students are seen as beings who are active in constructing knowledge by interacting with their environment.

One learning model that is based on social constructivism theory and can accommodate the interest of involving students in actively interacting with their environment in overcoming the problem of low mathematics learning outcomes is the cooperative learning model [12], [13]. Cooperative learning is a group learning activity organized by the principle that learning must be based on the social exchange of information among groups of learners in which each learner is responsible for his own learning and is encouraged to improve the learning of other members [14], [15].

Through cooperative learning it will help facilitate students' understanding. Interaction between group members allows for improvements in students' understanding through discussion, asking each other questions, and explaining to each other. Submission of ideas by students can sharpen, deepen, solidify or perfect those ideas because they obtain responses from other students or the teacher. Cooperative learning is not the same as simply studying in groups. There are basic elements of cooperative learning that differentiate it from group division which is done haphazardly [16]. These elements include positive interdependence, individual responsibility, promotive interactions, communication between members and group processing.

Numbered Head Together (NHT) or numbered thinking together is a variant of the cooperative learning model [17], [18]. Numbered Head Together (NHT) is designed to involve more students in reviewing the material covered in a lesson and checking their understanding of the content of the lesson [19], [20]. The characteristic is that the teacher appoints one number (student) randomly to present the results of the thinking activity with the group. Random calling of students will guarantee total involvement of all students, because with random calling all students become ready.

The Numbered Head Together (NHT) model can also increase responsibility and cooperation among group members, because each group member, apart from being responsible for their learning, is also responsible for the learning of their group members [21]. This responsibility can be realized by providing assistance in the form of explanations from more capable students to less capable students.

This research is in line with research conducted by Muliandari, where the results of the research concluded that The Influence of the NHT (Numbered Head Together) Type Cooperative Learning Model on Mathematics Learning Outcomes [22]. The similarities in this research can be seen in the type of learning model, namely that they both use the NHT type learning model and the learning outcomes. The difference is, the research used fifth grade students, meanwhile researchers used third grade students.

The urgency of this research is to apply the NHT model to encourage collaboration and communication between students. Success in Mathematics depends not only on understanding concepts, but also the ability to convey and share knowledge. This model can help improve students' social and communication skills. Based on the background above, the aim of this research is to determine the increase in student learning outcomes in mathematics subjects.

2. RESEARCH METHOD

2.1. Research Design

This research uses Classroom Action Research. Classroom action research is research conducted by teachers in the classroom or at the school where they teach, with an emphasis on perfecting or improving practices and processes in learning. In line with research [23]. The reason researchers use this type of classroom action research is because through this research researchers can collaborate and participate in designing, implementing and reflecting on learning in order to improve and improve the quality of learning in the classroom through the Numbered Head Together (NHT) learning model.

2.2. Population and Sample

The research subjects in this study were 25 grade III elementary school students, consisting of 8 male students and 17 female students.

2.3. Research Instrument

The research instruments are test questions, interview guide sheets, and observation guide sheets. Test questions are used to measure students' understanding and mastery of Mathematics learning material. An interview guide sheet was used to collect qualitative information from participants, such as teachers or students, regarding their experiences with the Numbered Head Together (NHT) Cooperative Learning Model. The observation guide sheet is used by researchers to observe behavior, interactions and learning dynamics that occur in the classroom during the implementation of the NHT Type Cooperative Learning Model.

2.4. Data Analysis Technique

Meanwhile, data analysis was carried out by researchers together with collaborators, namely class III mathematics teachers, by giving formative tests in the form of written tests at the end of each learning process (post test). After the data is collected, the data is analyzed. Then the data is analyzed per cycle to determine the improvement in learning outcomes that have been achieved. In this case, to prove the hypothesis, the research results will be analyzed using statistics to calculate classical completeness.

3. RESULTS AND DISCUSSION

3.1. Cycle I

As many as 23 students attended with the main topic of the relationship between units of time. The learning process refers to the learning plan that has been prepared. As a benchmark for completeness, the Class III Minimum Completeness Criteria (KKM) score in mathematics is 65.

Based on the results obtained on student learning outcomes, it can be seen that there has been an increase between the pre-test and post-test. In this first cycle, the students' pre-test results showed that no students had completed their studies with a class average of 22.17. After carrying out learning by applying the NHT model, the post test results showed an increase in learning outcomes of 8 students or 34.78% of students who completed their studies with an average of 49.13. However, there are still 15 students who have not completed or 65.21%. This can be seen in the image below:

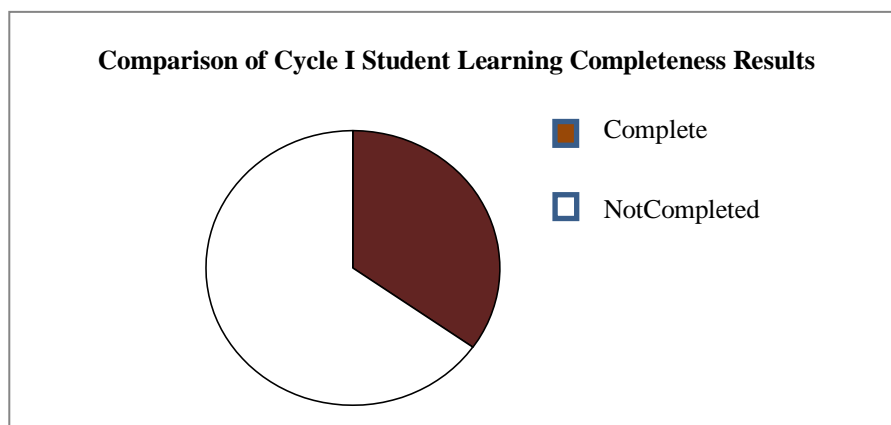


Figure 1. Comparison of Cycle I Student Learning Completeness Results

Learning outcomes in cycle I did not show satisfactory results. Therefore, improvements need to be made in the next cycle.

3.2. Cycle II

A total of 24 students attended with the main topic of the relationship between units of length. Based on the evaluation of student learning in cycle II after implementing the NHT type cooperative learning model, the results obtained. Based on data from table 4.4, it can be seen that 16 students or 66.7% of all students have completed it, while 8 students or 33 students have not completed it. .3% with a class average score of 62.5. A comparison of student learning outcomes can be seen in the picture below:

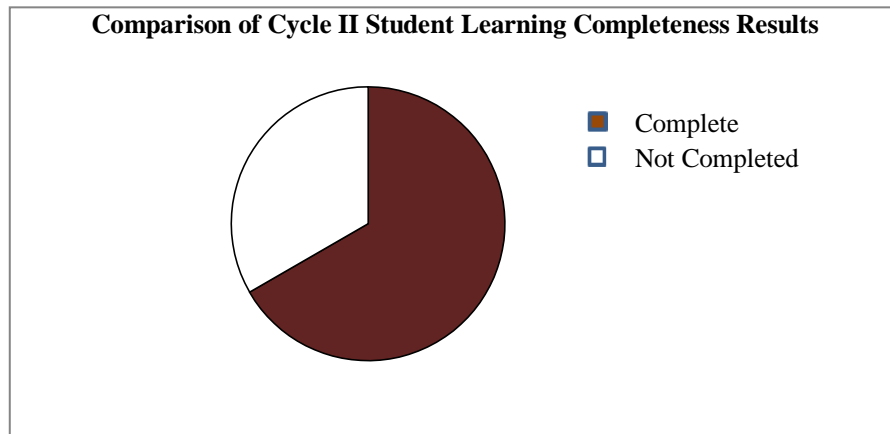


Figure 2. Comparison of cycle II student learning completion results

The learning outcomes in cycle II have shown satisfactory results, but the results obtained have not reached the expected classical completeness, namely $\geq 85\%$ of students who have completed their studies. Therefore, improvements need to be made in the next cycle.

3.3 Cycle III

Cycle III was attended by 24 students with the main material being the relationship between weight units. The results of the evaluation (post test) after implementing the NHT type cooperative learning model. Based on the research results, data was obtained that there were 22 students or 91.67% who had completed their studies, and 2 students or 8.3% had not completed their studies with an average class score of 85.20. like the picture below:

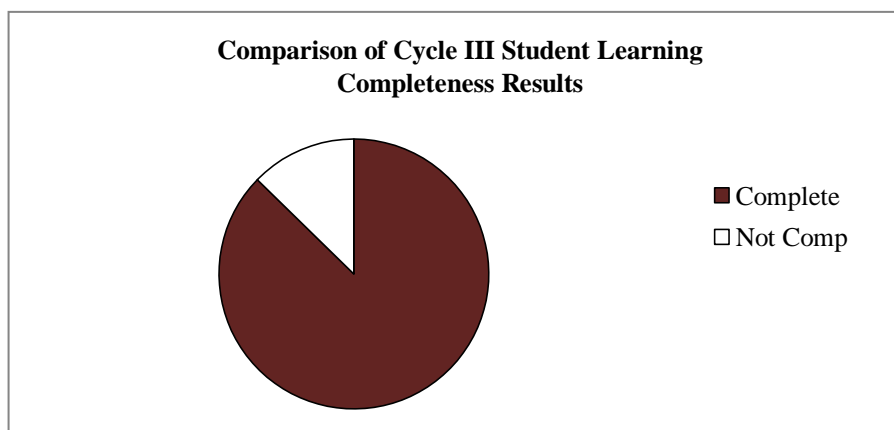


Figure 3. Comparison of cycle III student learning completion results

Based on the results and figure 3, classical completeness has reached $\geq 85\%$. Students who have completed learning in cycle III have reached 91.67%. Based on observations, supporting factors have increased, while inhibiting factors have decreased in the implementation of cycle III.

The increase in learning outcomes from cycle I to cycle III was due to learning using the Numbered Head Together (NHT) cooperative learning model which could increase/clarify students' understanding of the material being studied and stimulate student participation in group discussions. By paying attention to the discussion of the research results above, the researcher concludes that the hypothesis proposed can be accepted as true, in other words, the application of the Numbered Head Together (NHT) type cooperative learning model in elementary schools can improve student learning outcomes in mathematics subjects, the subject of relationships between units.

The findings of this research are in accordance with the findings of Kistian, which show that the results of research using the NHT type cooperative learning model have a positive influence in improving student learning outcomes compared to learning that does not use the NHT type cooperative learning model [24]. This is caused by the use of the NHT type cooperative model which makes students active during the learning process. Learning activities using the NHT type cooperative model encourage students to be able to express opinions in public and be able to socialize with their friends. Students become more enthusiastic in participating in the

learning process. Apart from that, teachers also feel more responsible for learning, increasing their creativity, and making learning more meaningful for students.

The implication of this research is that teachers can begin to consider using appropriate learning models to achieve better learning outcomes. The limitation of this research is that the influence of learning models can vary depending on the context and learning environment. Research results cannot necessarily be directly applied to other learning contexts. The effectiveness of the learning model can be influenced by the teacher's skills and the extent to which students have mastered the previous material.

4. CONCLUSION

Based on the results of classroom action research which has been carried out through several series of actions starting from cycle I, cycle II, and cycle III as well as based on all discussions and results of data analysis carried out, it can be concluded that the Numbered Head Together (NHT) type cooperative learning model can improve results. Class III students study mathematics, the main topic of relationships between units. This indicator can be seen from the students' post test scores which have increased in each cycle. In cycle I there were 8 students or 34.78% of students who completed their studies and 15 students or 65.21% who had not completed their studies with an average score of 49.13. In cycle II the number of students who completed it increased to 16 students or 66.7% and those who did not complete it decreased to 8 students or 33.3% with an average score of 62.5. In the implementation of cycle III, the number of students who completed it reached 22 students or 91.67% and only 2 students or 8.3% did not complete it with an average score of 85.20. The results of the research can provide recommendations by implementing the NHT type cooperative learning model in this research, teachers should be more motivated to use innovative learning models in carrying out the learning process in the classroom so that they can improve the quality of the process and student Mathematics learning outcomes.

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