APPLICATION OF NUMBERED HEAD TOGETHER (NHT) TYPE COOPERATIVE LEARNING MODEL TO IMPROVE LEARNING OUTCOMES AND LEARNING ACTIVITIES IN ONE-VARIABLE LINEAR EQUATION AND INEQUALITY MATERIAL FOR GRADE VII STUDENTS

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Abstract: This research is a classroom action research (CAR) conducted in two cycles. This study aims to improve learning outcomes and learning activities of students by implementing the Number Head Together (NHT) type cooperative learning model on the material of linear equations and inequalities of one variable. This research was conducted at SMP Negeri 7 Sentani with the research subjects being 25 class VII B. Data collection techniques were carried out through teacher observation, student observation, and individual tests.. The results show that: 1) The application of the NHT type cooperative learning model can improve learning outcomes in the material on linear equations and inequalities of one variable in class VII B of SMP Negeri 7 Sentani. This is proven by the classical average data of the results of the student learning outcome test which increased by 71% in cycle 1 and 83% in cycle 2. The average value of students also increased by 69 in cycle 1 and 75 in cycle 2. The effectiveness of using this learning model increased with an n-gain of 0.59 in cycle 1 and 0.50 in cycle 2. 2) Student learning activities in learning linear equations and inequalities of one variable increased. In cycle 1, student learning activities increased from 70% in the first to 75% in the second meeting. Classical learning activities in general reached 71%. In addition, in cycle 2, student learning activities also increased from 83% in the first to 88% in the second meeting. Classical learning activities in general reached 88%.

Keywords: Learning Activities; Learning Outcome; Cooperative NHT.

1. INTRODUCTION

Education has a strategic role in encouraging the development and progress of the nation through improving the quality of human resources. Law Number 20 of 2003 concerning the National Education System emphasizes that education aims to develop the potential of students as a whole, including affective, cognitive, and psychomotor aspects. The development of this potential requires a learning process that is designed effectively, precisely, and efficiently so that students are able to learn optimally through educational interactions in the school environment (Aqib, 2009).

Learning is essentially a complex process that results in relatively permanent changes in students' abilities, attitudes, and behaviors as a result of learning experiences

(Hayati, 2017). This process involves the role of educators in utilizing various learning resources and creating conditions that allow students to actively construct knowledge (Ratumanan, 2020). In the context of formal education, one of the subjects that has an important role in shaping students' thinking skills is mathematics.

Mathematics is a systematic and deductive discipline that examines patterns of relationships, thought patterns, and logic-based symbolic language, which serves to help humans understand and solve social, economic, and natural problems (Hamdi, 2017). Through mathematics learning, students are trained to develop logical, critical, and creative thinking skills (Rosba, 2015). One of the essential materials taught at the junior high school level in grade VII is one-variable linear equations and inequalities.

The material of one-variable linear equations and inequalities has a fundamental role because it is a prerequisite for understanding advanced mathematical concepts, such as two- and three-variable linear equations and linear programs. In this material, students are expected to be able to identify the forms of linear equations and inequalities of one variable, determine the set of solutions, and solve various contextual problems related to the concept. However, based on the learning results in the previous year, there were still a number of students who experienced difficulties in solving problems related to this material, which was reflected in the achievement of learning outcomes that did not meet the Minimum Completeness Criteria.

The low learning outcomes of students are influenced by various factors, one of which is the learning activities of students during the learning process (Parni, 2017). This condition shows the need to implement a learning model that is able to increase active student involvement and build meaningful interactions in learning. One relevant alternative is the application of a cooperative learning model.

Cooperative learning is a learning model that emphasizes the cooperation of students in small groups in a structured manner to achieve shared learning goals (Simamora, 2024). This model provides opportunities for learners to interact with each other, exchange ideas, and take responsibility for the understanding of the material. One type of cooperative learning that emphasizes the active participation and responsibility of individuals in the group is the Numbered Heads Together (NHT) model, which is characterized by assigning numbers to each member of the group (Janah, 2021; Machfud, 2018; Palupi, 2023).

The application of the NHT-type cooperative learning model is expected to be able to improve learning activities and student learning outcomes. Therefore, this study was conducted with the title "Application of the Numbered Heads Together Type Cooperative Learning Model to Improve Learning Outcomes and Learning Activities on Linear Equations and Inequality Materials One Variable for Grade VII Students of SMP Negeri 7 Sentani."

The objectives of this study are: (1) Improving student learning outcomes through the application of the Numbered Heads Together type cooperative learning model on one-variable linear equations and inequalities in grade VII of SMP Negeri 7 Sentani. (2) Improving students' learning activities through the application of the Numbered Heads Together type cooperative learning model on one-variable linear equations and inequalities in grade VII of SMP Negeri 7 Sentani.

2. RESEARCH METHODS

This research is a Classroom Action Research (CAR) which aims to improve the process and improve learning outcomes through the application of a cooperative learning model of the Numbered Heads Together (NHT) type. Classroom Action Research was chosen because it is reflective and contextual, and oriented towards solving learning problems faced by teachers in the classroom.

The research design used refers to the Kemmis and McTaggart models, which are implemented in several cycles. Each cycle consists of four main stages, namely (1) planning, (2) implementation of actions, (3) observation, and (4) reflection. The results of reflection in each cycle are used as the basis for improvement in the next cycle (Musliman, 2018).

Research data was collected through: (1) Observation of teacher activities, (2) Observation of student activities, and (3) Learning outcome tests. Observation of teacher and student activities is carried out during the learning process using structured observation sheets. Observation activities were carried out by two observers (fellow research teachers) to ensure the objectivity of the data. Meanwhile, learning outcome tests are given at the end of each cycle to measure the achievement of students' competencies after the implementation of the NHT learning model.

The data analysis in this study uses qualitative and quantitative descriptive approaches. The analysis is carried out through several stages, namely data reduction, data presentation, and drawing conclusions. The observation data was analyzed qualitatively, while the learning outcome test data was analyzed quantitatively. The final score of students is obtained from the number of scores achieved on the learning outcome test. Students are declared complete individually if they obtain a minimum score of 70 in accordance with the Minimum Completeness Criteria. The average value of a class is calculated using the formula:

$$\bar{X} = \frac{\sum X}{N}$$

The percentage of classical learning completeness is calculated by the formula:

$$Classical\ Learning\ Completenes$$
$$= \frac{the\ number\ of\ students\ who\ achieved\ criteria}{total\ number\ of\ students} \times 100\%$$

The class is declared classically complete if at least 75% of students achieve learning completion. Next Steps Gain Normality Test By using formulas (Shofa, 2022; Anggraini, 2019)

$$\text{N-Gain} = \frac{post\ test\ score - pre\ test\ score}{maximum\ score - pre\ test\ score}$$

Steps in the process of analyzing data on student learning activities:

Based on the observation data, the value of each student's learning activities in each indicator was processed to determine the total value of the learning activities of each indicator and each student. After obtaining the total value of learning activities for each indicator and each student, the next step is to find the percentage of learning activities for each indicator and each student. The percentage of learning activities of each student can be calculated using the following formula.

Percentage of Total Student Activity Score Per Indicator $= \frac{total\ score\ obtained}{total\ maximum\ score} \times$ 100%. Percentage of Total Learning Activity Scores of Students Per Individual $= \frac{total\ score\ obtained}{total\ maximum\ score} \times 100\%$.

Meanwhile, the percentage of students' learning activities is classically through the following formula.

$$\text{Classical Percentage} = \frac{number\ of\ active\ students}{number\ of\ students} \times 100\%$$

3. RESULTS AND DISCUSSION

This research was carried out in two cycles with each cycle consisting of two learning process meetings and one meeting to implement learning outcome tests at the end of each cycle. The results of the student learning evaluation test show the ability of students to understand and absorb the subject matter that has been followed. The completeness of learning outcomes is determined by the minimum completeness criteria. The following is data on student learning outcomes in the form of a percentage of completeness. Calculations were carried out to determine the average value, classical percentage, and gain normality test to determine the effectiveness of using the NHT-type cooperative learning model. The following data on student learning outcomes are stated in Table 1 below.

Table 1. Data Recapitulation Average & Percentage Completeness
Classical Student Learning Outcomes

No	Data	Cycle 1 test	Cycle 2 test
1	The number of students completed	17	20
2	The number of students is incomplete	7	4
3	Average Score	69	75
4	Classical learning completeness	71%	83%

Table 1 shows an increase in student learning outcomes from Cycle I Tests to Cycle II Tests, which can be seen from the increase in the number of complete students from 17 to 20 people and an increase in average scores from 69 to 75. The percentage of classical learning completeness has also increased significantly, from 71% in Cycle I to 83% in Cycle II, in line with the decrease in the number of students who are not complete. This increase indicates that the learning actions or strategies applied in Cycle II are more effective in improving students' understanding and learning achievement. N-gain of student learning outcomes, is asked in Table 2 below.

Table 2. Average and N-Gain Percentage Recapitulation

No	N-gain *test results*	Cycle 1 test	Cycle 2 test
1	Average *N-Gain*	0,59	0,50
2	Percentage	59,32%	50,0%

Table 2 shows that the average N-Gain in the 1st cycle test of 0.59 (59.32%) was in the medium category and higher than the 2nd cycle test which had an average N-Gain of 0.50 (50.0%). This indicates that the improvement in learning outcomes in cycle 1 is more optimal, while in cycle 2 the improvement still occurs but with a lower level of effectiveness. The number of students who completed is as shown in Figure 1 below.
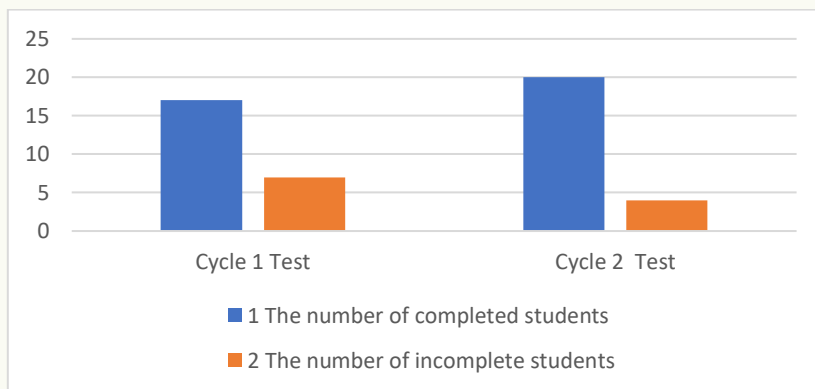

Figure 1. The Number of Completed and Incomplete Students

Based on Figure 1, the number of students who achieved learning completeness increased from the first cycle test to the second cycle test, while the number of students who did not complete decreased significantly. This shows that the learning actions applied in cycle II are more effective in improving student learning outcomes compared to cycle I.

The classical completeness of grade VII students of SMP Negeri 7 Sentani is expressed as shown in Figure 2 below.
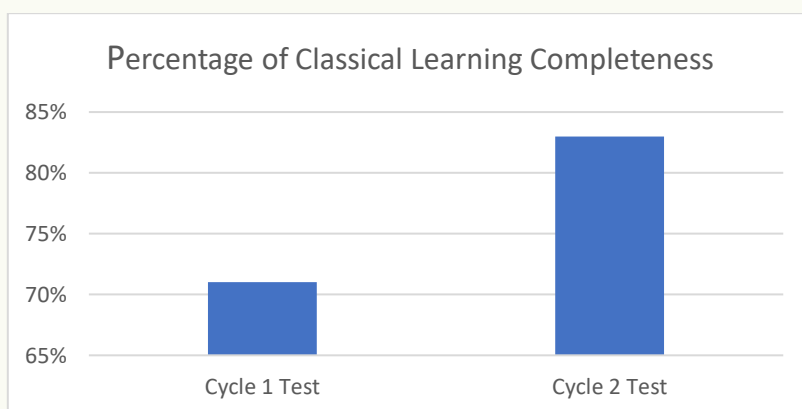

Figure 2. Percentage of Classical Learning Completeness

Figure 2 shows an increase in the percentage of classical learning completeness from the First Cycle Test of about 70% to the Second Cycle Test of around 83%. This increase indicates that the learning actions applied in Cycle II are more effective in

improving the completeness of students' learning. Average N-gain and Percentage *N-Gain,* is shown in the following Figure 3.
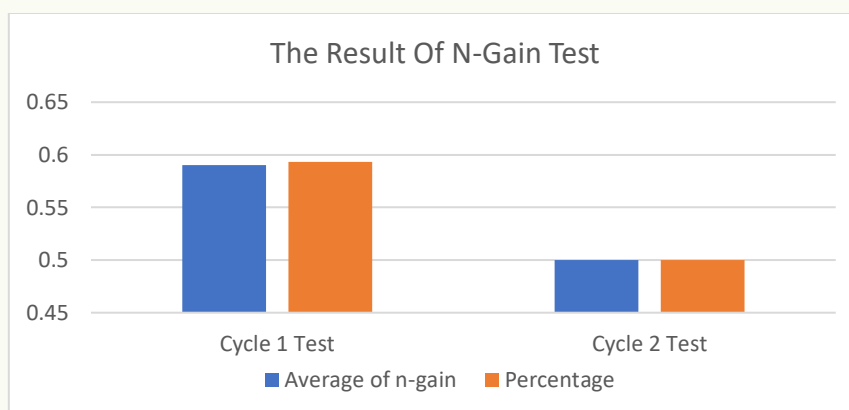

Figure 3. Average and Percentage of N-Gain

Figure 3, shows that the results of the gain normality test in the cycle 1 and cycle 2 tests have a relatively balanced average value of n-gain and percentage. This indicates that the gain data in both cycles meet the normality assumptions and are therefore suitable for use for advanced statistical analysis.

The results of the observation of students learning activities show how active students are in participating in the learning process. Students activities are shown by several activity indicators, namely asking questions, answering questions, doing group worksheet, discussions, exchanging answers, recording the results of discussions, and giving opinions or responses. The following is the data from the observation of student activities each indicator and the classical percentage per cycle, which is stated in Figure 4 below.
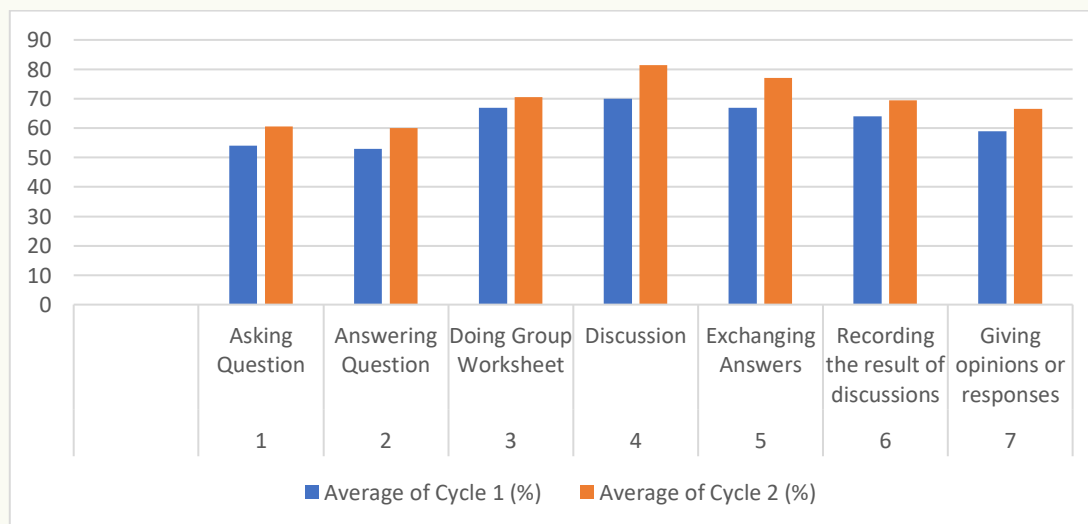

Figure 4. Recapitulation of Student Learning Activity Data Each Indicator

Figure 4, shows that all indicators of student learning activities have increased from Cycle I to Cycle II, with the most prominent increase in the indicators of discussing and exchanging answers. This indicates that the implementation of learning actions in cycle II is more effective in increasing the active involvement of students in the learning process.

While The recapitulation of the data on the percentage of student learning activities is stated as shown in Table 3 below.

Table 3. Data recapitulation of the percentage of student learning activities

No	Data	Cycle 1		Cycle 2	
		Meeting 1	Meeting 2	Meeting 1	Meeting 2
1	The number of Active Students	16	18	20	21
2	The number of inactive students	8	6	4	3
3	Classical activeness	70%	75%	83%	88%

Based on Table 3, there was an increase in student learning activities from cycle I to cycle II. In the first cycle of meeting 1, the number of active students was 16 people and 8 people who were not active, with classical learning completeness of 70%. Furthermore, at the next meeting, the number of active students increased to 18 people, while the number of inactive students decreased to 6 people, with classical completeness reaching 75%.

A more significant improvement was seen in cycle II. At meeting 1, the number of active students reached 20 people and those who were not active remained 4 people, with classical completeness of 83%. In meeting 2, the number of active students increased again to 21 people and the number of inactive students decreased to 3 people, with classical completeness reaching 88%. These findings show that students' learning activities and completeness have consistently increased in each learning cycle.

The results of the observation of teacher activities show the implementation of the learning process and each activity carried out by the teacher in accordance with the syntax of the learning model used. The following is the data on the percentage of the results of observation of teachers' activities, expressed as shown in Figure 5 below.
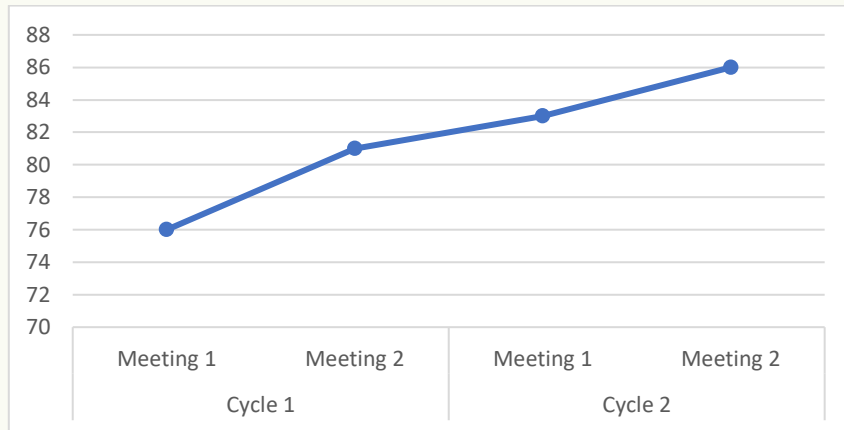
Figure 5. Percentage of Teacher Activity Each Meeting

Figure 5 shows an increase in student learning outcomes from Meeting 1 to Meeting 2 in Cycle 1, which then continues to increase in Cycle 2. This indicates that the learning actions applied in each cycle are more effective in improving student learning outcomes. Based on the observation data, there was an increase in teacher activity at each meeting in cycle I and cycle II. In cycle I, the percentage of teacher activity increased from 76% in the first meeting to 81% in the second meeting, with an average of 79%. Furthermore, in cycle II the percentage of teacher activity increased from 83% in the first meeting to 86% in the second meeting, with an average of 85%. This increase shows an improvement in the quality of learning implementation in each cycle. The findings of this study are in line with the results of Alfisyahriah's (2020) which states that the application of the Numbered Heads Together (NHT) type cooperative learning model is able to increase students' activities and learning outcomes, characterized by an increase in average activity from 2.91 in the first cycle to 3.16 in the second cycle and an increase in learning outcomes from 75% to 92.86%. In addition, Indrawati (2023) also reported an increase in student activity from 69.44% to 81.55% and an increase in learning outcomes from 66.67% to 77.78% after the implementation of the NHT-type cooperative learning model.

4. CONCLUSIONS AND SUGGESTIONS
CONCLUSIONS

Based on the data from the results of the research and discussion, it can be concluded that: the Number Head Together type cooperative learning model can improve learning outcomes in the material of linear equations and inequalities of one variable in

grade VII of SMP Negeri 7 Sentani. This is evidenced by the average classical data of test results of student learning outcomes which increased by 71% in cycle 1 and 83% in cycle 2. In addition, the average score of students also increased, namely by 69 in cycle 1 and by 75 in cycle 2. In addition, the effectiveness of using the Number Head Together type cooperative learning model showed an average n-gain of 0.59 with a percentage of 59.32% in cycle 1 and an average of 0.50 with a percentage of 50.0% in cycle 2.

SUGGESTIONS

The Number Head Together type cooperative learning model can increase students' social activities. These learning activities are manifested in several activities observed during the research, namely asking questions, answering questions, working on group worksheet, discussions, exchanging answers, recording the results of discussions, and giving opinions or responses.

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