The Use of the Numbered Heads Together Type Cooperative Learning Model Can Improve Students' Critical Thinking Ability

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	ABSTRACT
	Cooperative learning is a learning strategy that involves the active role of students in group collaboration to achieve common goals. Several difficulties were found that caused low student learning outcomes such as the passive atmosphere shown by students in the learning process, this can be seen from the lack of students responding to the questions posed by the teacher, the lack of responsibility of students in doing homework, and there are still students who were not serious during class. This study aims to determine the increase in students' critical thinking skills through the NHT-type cooperative learning model. This research uses Classroom Action Research (CAR), which is a research activity carried out in the classroom as a learning effort, critical reflection on a lesson plan for teacher performance, teacher-student interaction, and student-class interaction. in this study, there was an increase in the number of students who reached the target from cycle I to cycle II. The results in cycle II have reached the set target, this shows that the application of the Use of NHT Type Cooperative Learning Model can improve students' critical thinking skills. This achievement percentage indicates that students experience an increase in critical thinking skills in constructing simple explanations, building basic skills, and concluding. The conclusion of this study is that learning using the Numbered Head Together (NHT) cooperative learning model can improve students' critical thinking skills by up to 34% which can be seen from 3 aspects namely Building Simple Explanations by 31%, Building Basic Skills by 37%, and Concluding 35% in physics class X2 Senior high school.

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A. INTRODUCTION

Advances in science will affect effective ways of learning, so there needs to be a way of thinking in a directed and clear way. Many problems arise and there is a need for renewal in the educational environment which directs us to always think critically. This is where the role of education provides a concept of an effective way of learning. Learning model is improved and updated to lead to active, creative learning activities, involving students and creating a new learning atmosphere in each process of learning activities carried out. Therefore, teachers need to make improvements in the learning process which will have an impact on a pleasant atmosphere, students are active and creative, students are involved in learning activities, and will create a new atmosphere during the learning process (Mahartini & Wesnawa, 2018). The learning model is a pattern that is used as a guide in planning learning in class, including the preparation of curriculum, organizing material, determining learning objectives, determining the stages in learning activities, learning environment, and class management (Daryanti & Taufina, 2020). Cooperative learning is a learning strategy that involves the active role of students in group collaboration to achieve common goals. Students who learn to use the cooperative learning model will have high motivation because they are encouraged and supported by their peers (Apriandi, 2012).

He uses of the NHT type of Cooperative Learning model allow students to fully develop their knowledge, abilities, and skills in an open and democratic learning atmosphere. Students are no longer learning objects, but also act as peer tutors for the theme. Seeing the potential and advantages of this model, the researchers took the initiative to use the Numbered Heads Together (NHT) model to improve the ability to solve math word problems in fractional material (Nugraha et al., 2019). Another cooperative learning model that can be applied is the Number Heads Together (NHT) type. The application of the NHT-type cooperative learning model is a learning model that involves more students studying the material in a lesson and checking students' understanding of the content of the lesson, this learning will further enhance cooperation between students (Aprilia et al., 2018). NHT is a type of structural approach to cooperative teaching that provides opportunities for students to share ideas and consider the most appropriate answer, the use of the NHT type in the application of cooperative learning so that students can learn through playing, competing, and working in teams (Elida, 2018). The structural approach consists of two types, namely the Think Pair Share type and the NHT type. Seeing students' mastery of mathematical material, especially circumference and area of flat shapes, in this study the learning model chosen was the Numbered Heads Together (NHT) cooperative learning model, because in this model students occupy a very dominant position in the learning process, and the occurrence of cooperation in groups with the main characteristic of numbering so that all students try to understand each material being taught and are responsible for the number of their respective members. By selecting this model, it is hoped that the learning that occurs can be more meaningful and give a strong impression to students (Ajid, 2020).

Critical thinking skills are important for students in classroom learning. Students who think critically can develop new ideas and concepts within students by first analysing existing problems so they can decide on the action by giving the right reasons. Students who have critical thinking skills are always curious about the problems that arise during learning and are not easily satisfied with the answers given by the teacher. For this reason, learning by applying critical thinking skills in class is the most appropriate way to fix problems that are in students. But what happened in the field is still not as expected.

Based on the results of observations, it appears that students who achieve a standard value of 14% while students who score <70 is 86% or as many as 24 students who have not achieved mastery in learning. The learning objectives to be expected in the learning process are to achieve maximum learning outcomes, with the level of student learning outcomes that can achieve KKM scores of more than 70%. So, the acquisition of these learning outcomes has not met the expected goals because students who have not achieved more than students who have achieved.

Based on the observations made, it was found several difficulties caused low student learning outcomes such as the passive atmosphere shown by students in the learning process, this can be seen from the lack of students responding to questions asked by the teacher, the lack of student responsibility in doing homework, and there are still students who play around during learning. Besides that, the ability to think critically has been seen in the practice questions given by the teacher, but the grades given by the teacher still measure learning outcomes in the cognitive domain only. When the teacher gave practice questions, there were still many students who had difficulty completing the practice questions. Such as: in the aspect of giving simple explanations, there are still many students who are not precise in writing down what is known and asked, for example in writing symbols and units. In the aspect of building basic skills, students' answers are not following proper procedures, for example when solving questions, students only write down the formula or theory used to find out the answers asked. And in the aspect of conclusion, there are still many students who do not describe answers in giving conclusions according to the questions and answers made by the teacher. This shows that students' critical thinking skills are still low. In connection with these problems, it is necessary to make efforts to improve the learning process so that students are more involved in learning. The involvement of students in the learning process will make it easier for them to find and understand the material they are studying. The more students are involved in the learning process, it is hoped that their critical thinking skills will be honed so the higher the possibility of learning outcomes they achieve. The difficulties experienced by students in understanding the material can be caused by several factors, one of which is the learning model used by the teacher. One model that is innovative and can involve students actively in the learning process is by applying the Numbered Head Together (NHT) cooperative learning model.

The NHT type of cooperative learning model is basically a group discussion variant; its characteristic is that the teacher only appoints a student who represents the group, without telling in advance who will represent the group (Nur, 2011). The syntax for this lesson consists of six phases: (1) conveying goals and motivating students; (2) presenting information; (3) organizing students into study groups, in this phase the numbering of heads is carried out for students; (4) guiding work and study groups, in this phase there are questions submitted by students and thinking together; (5) evaluation, students answer the problems given; and (6) give awards. The advantage of the NHT type of cooperative learning model is that no student dominates the group because of the limiting number. In the 2013 curriculum students are required to be active, creative and innovative in solving every problem they face at school (Kurniasih, et al., 2014). Through the cooperative learning model of the NHT type, students are invited to actively think in discussions, gather information, analyze and discover the concepts being studied so that they can train students' critical thinking skills. In Fascione's opinion, the critical thinking skills of students who are trained are only the first three indicators which include interpretation, analysis and inference. These three critical thinking skills are trained in phases in the NHT type cooperative learning model. In phase 1 the indicators were trained in interpretation, in phase 4 the indicators were trained in interpretation and analysis, while in

phase 5 the indicators were trained namely inference. The Numbered Head Together (NHT) cooperative learning model is suitable for thematic learning because it can involve all students actively, not just one or two people. The Numbered Head Together (NHT) learning model is basically a variant of group discussions (Huda, 2013).

B. METHODS

This research is Classroom Action Research. This study seeks to examine, critically reflect on, and collaboratively a lesson plan on teacher performance, teacher-student interaction, and student interaction in class. Based on the action research design, research is carried out in cycles, so the improvement process is carried out continuously or through repeated actions (cycles) so that from the first, second, and so on cycles, better results can be obtained to achieve the research objectives. However, if after being reviewed in cycle I the researcher has not obtained maximum data, then another cycle will be added to obtain maximum data. The population of this study was students of class X2 Senior high school with a total of 28 students consisting of 13 students and 15 female students.

The research instrument used in this research is a). the observation sheet is used to observe the implementation of the student learning process using the NHT-type cooperative learning model. The aspects observed in the implementation of the learning process in this study are the implementation of learning carried out during research using the NHT-type cooperative learning model which includes; forming groups and numbering, discussing problems, thinking together, and answering. Filling in the observation sheet is done by assessing the form of a checklist (V) yes or no in the indicator column for the implementation of the NHT type of cooperative learning in accordance with the indicators of the implementation of the NHT type of cooperative learning being carried out. b). Test questions will be given at the end of the cycle to determine the increase in students' critical thinking skills after participating in learning. The test questions given are 5 items that are made with reference to the basic competency indicators that have been set.

The data collection technique in this study is to provide tests and observation sheets, the test that is the test will be given at the end of the cycle. Test questions are used to find out whether there is an increase in students' critical thinking skills after applying the NHT type of cooperative learning model. The observation sheet, namely data collection using observation techniques is carried out by observing directly the student learning process with the NHT-type cooperative learning model. Data analysis techniques in this study are (1) Data analysis critical thinking skills. The research data is in the form of qualitative data from the ability to think critically in each cycle. In accordance with the nature of this research, namely classroom action research (CAR), the data analysis used in this study is a descriptive analysis that seeks to provide an overview or review of the data obtained. Before determining the research title, first determine the criteria (benchmarks) that will be used as a benchmark for further assessment, if using 3 categories of assessment, namely good, sufficient, and not in accordance with the grouping of scores, then the range score is divided into three equally; and (2) Data analysis of the implementation of the NHT cooperative learning models (Mills, 2003).

C.   RESULT AND DISCUSSION

Based on the results of the research that has been described, an overview of learning using the NHT-type cooperative learning model is obtained in improving students' critical thinking skills on the subject matter of temperature and heat in order to encourage the realization of critical thinking skills in students. The details of observations of the research that has been done are as follows:

1.   Implementation of Learning by Using the NHT Type Cooperative Learning Model

Based on the increase in the implementation of learning using the NHT type cooperative learning model from cycle I and cycle II as shown in Table 1.

Table 1. Observation Data on the Implementation of Learning Through the NHT Type Cooperative Learning Model from Cycle I and Cycle II

Cycle	Total indicators	Average Number of Indicators achieved	Achievement	Enhancement
I	15	11	74%	21%
II	15	14	95%	

Based on Table 1, it can be explained that in cycle I, the observation results of the implementation of learning through the NHT-type cooperative learning model reached 74%. The data shows that in the first cycle the success indicators have not been achieved. This condition shows that when learning using the NHT-type cooperative learning model there are still many students who are engrossed in chatting with one benchmark and playing alone when the teacher explains the material. Meanwhile, when the teacher gave the problems in the LKS to be discussed by each group, there were still group members who did not actively discuss and did not want to work together to help the group in carrying out the assignments given by the teacher. For example, in group 1, out of 6 students, there were only 2 students who actively discussed while there were 3 students who still often chatted and discussed outside the subject matter, and there was 1 student who was absent due to alpha. So that when the teacher calls students randomly to report the results of their discussion in front of the class, the noisy student will not be able to do the work, even though he can do it but he will not understand what he is doing because he only transfers the answers from his friends. The results are supported by research (Mana et al., 2013). Namely through written test data collection techniques and observation. Student learning outcomes can be seen from students' absorption, completeness, and post-test as follows: a) Students' absorption in cycle I obtained an average score of 66.29, which increased in cycle II to 81.95; b) Student completeness in cycle I with incomplete results increased in cycle II with complete results; c) The post-test obtained by students in cycle I obtained a value of 68.45, increasing in cycle II with an average value of 85.87.

It is supported by research (Murtalib et al., 2021), namely by collecting data through observation, tests, and interview methods. The results showed that the average value obtained in the first cycle was 57.50 (40%), the second cycle was 69.10 (60%), and the third cycle was 82.60 (95%). In addition, the results of the study also showed an increase in teacher activity, student activity, student affective, and student psychomotor. Through the NHT type, teacher activity in delivering material increased from cycle I by 73% to cycle II to 85%, then in cycle III to 95%. For previous student activities in cycle was only 74% to 86% in cycle II and increased in cycle III by 92%. Then the affective level of students from 78% in cycle I to 81% in cycle II and increased to 91% in cycle III. Furthermore, the student's psychomotor score was 71% in cycle I

to 88% in cycle II and increased to 92% in cycle III. Based on the results of the study (Atiyah et al. 2019) shows that the Numbered Head Together (NHT) Learning Model with crosswords media is effective in increasing thematic learning outcomes of fourth-grade students at Elementary school. With increased learning outcomes compared to learning that does not use the Numbered Head Together (NHT) Learning Model with crossword media. The results of the students' pre-test scores before being given learning using the Numbered Head Together Learning Model (NHT) with crossword media obtained an average score of 49.94, 4 students had reached the KKM, and 14 students had not yet reached the KKM. While the results of the post-test results of students after being given treatment got an average value of 80.61, 15 students had achieved KKM, and 3 students had not reached KKM.

2. Students' Critical Thinking Ability

Critical thinking skills in this study were seen from three aspects, namely giving simple explanations, building basic skills, and concluding. To see students' critical thinking skills in this study using instruments in the form of essay questions totalling 5 questions. The stages in solving the problem are grouped into three stages sequentially, each of which represents or is an illustration of an aspect of critical thinking that will be observed and analysed. So, by looking at the results of student answers from the final test questions given, it will able to illustrate students' critical thinking skills. Students' critical thinking skills in physics learning using the NHT-type cooperative learning model are known to use the results of the final test in each cycle. Based on the results of the data analysis of cycle I and cycle II tests, showed that there was an increase in the average percentage of each aspect of students' critical thinking skills which was achieved after using the NHT-type cooperative learning model from cycle I to cycle II can be seen in Table 2.

Table 2. Average Percentage of Each Aspect of Critical Thinking Ability from Cycle I and Cycle

Aspects of critical thinking ability	Cycle I		Cycle II		enhancement (%)
	The average percentage of achievement	Qualification	Percentage of average achievement	Qualification	
Building Simple explanations	45%	More and less	76%	good	31%
Basic skills building	61%	fair	98%	Very good	37%
Conclusion	41%	More and less	76%	fair	35%
Percentage of average critical thinking ability					34%

Based on Table 2 the average percentage of each aspect of students' critical thinking abilities from cycle I and cycle II has increased. In the learning process that has been carried out in two cycles, the teacher gives a problem in the form of worksheets. The problems given require students to solve these problems by using critical thinking skills. Students' critical thinking skills can be seen from the results of discussions that have been carried out by students in completing the LKS given by the teacher. The preparation of this LKS is designed to require students to think critically. Students will be guided with problems that lead to an answer that requires critical thinking. The process of thinking together is a stage in the NHT-type cooperative learning model which aims to unite opinions or provide input and convince each member of the team to find out the answer of the team. In this stage, the ability to think critically has been seen in each group

that answers the problems in the LKS by discussing these problems with their respective group members.

This answering process is also a stage in the NHT-type cooperative learning model to train and develop students' critical thinking skills. Because at this stage students can express answers from the results of their discussions. So, when working on critical thinking ability test questions, students can work on them according to the indicators of critical thinking ability that have been set. Furthermore, by looking at the results of student answers from the final test questions given, it will be able to illustrate students' critical thinking abilities. Supported by research (Sunarsih, 2019). Through the results of this research shows that the Number Head Together (NHT) type cooperative model has a positive impact on improving student learning outcomes. This can be seen from the increasingly solid understanding of students towards the material presented by the teacher as evidenced by the increase in learning outcomes in cycle I and cycle II. Nursyamsi, (2016) states that from the comparison of the corrected average it is known that the NHT learning strategy has a greater influence, which is equal to 21.56%, compared to the influence caused by conventional learning. Mutia Agisni Mulyana et al. (2016) stating that the Numbered Heads Together (NHT) type cooperative model can improve student learning outcomes on material natural and socio-cultural appearance.

D. CONCLUSION AND SUGGESTIONS

Based on classroom action research that has been carried out using the NHT Type Cooperative Learning Model, the results of the data analysis from the research that has been carried out and the discussion that has been carried out, it can be concluded that learning using the cooperative learning model the Numbered Head Together (NHT) type can improve students' critical thinking skills by up to 34% which can be seen from 3 aspects, namely Building Simple Explanations by 31%, Building Basic Skills by 37%, and Concluding 35% in physics class X2 Senior High School.

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