



THE INFLUENCE OF NHT-TYPE COOPERATIVE LEARNING MODEL ON MATHEMATICS LEARNING OUTCOMES REVIEWED FROM THE STUDENTS' INTERESTS

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Abstract

This article aims at finding out (1) the differences in the mathematics learning outcomes of the students who follow NHT type cooperative learning with the students who follow direct learning, (2) the difference in the mathematics learning outcomes between the students who follow NHT type cooperative learning and the students who follow direct learning reviewed from high learning interests, (3) differences in students' mathematics learning outcomes between the students who follow NHT type cooperative learning and the students who follow direct learning reviewed from low learning interests, (4) the influence of interaction between the learning model used and the students' learning interests. This the type of pseudo-experimental research. The instruments used are test of learning outcomes, questionnaires of students' learning interests, and observation of the Lesson Plan implementation. The analytical techniques used are descriptive analysis techniques and inferential statistical analysis with ANOVA tests, and Tukey advanced tests. Based on the results of the ANOVA test and Tukey advanced test obtained that (1) there are the differences in the mathematics learning outcomes of the students who follow NHT type cooperative learning with the students who follow direct learning, (2) there is a significant difference in the mathematics learning outcomes between the students who follow NHT type cooperative learning and the students who follow direct learning reviewed from high learning interests, (3) there is a significant differences in students' mathematics learning outcomes between the students who follow NHT type cooperative learning and the students who follow direct learning reviewed from low learning interests, (4) there is no the influence of interaction between the learning model used and the students' learning interests

Keywords: NHT Learning; Hands-on Learning; Learning Outcomes; Learning Interests.

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INTRODUCTION

Education plays an important role in a nation's future. Suparman and Husen (2015) argued that education is one of the main pillars in facing the future



so that education is always oriented towards coaching students to take a role in the future. Cahyaningsih (2018), added that ideal education is an education that can improve the learning and development of students that include multi-domains, such as cognitive, affective, and psychomotor aspects. Therefore, education should be organized as best as possible through the planned learning process so that all the efforts done by the teachers and students in a learning process are to achieve the goals that have been set which aims to develop the potential of students that play an important role in the future.

Several things that are often applied by a teacher in the learning process are; models, approaches, methods, techniques, or tactics in learning. Oktivianto dan Hudaidah (2018) argued that the learning model is a model or form of learning planned by educators to be applied in the classroom so that it will result in the students' changes. Ngalimun (2014) added that the learning model is a pattern used as a guideline in planning learning in the classroom and tutorials. The learning model has a strategic role in the learning process (Harmono, 2017). so that an educator must be able to use various models in learning which of course are associated with the characteristics of students and subject matter.

The ability to manage the teaching and learning process must be possessed by the teacher, which can create a good learning atmosphere for students so that this will be the starting point for their success in the learning process. In learning activities, the students need something that allows them to communicate well among their teachers, friends, and environment. Each student has different needs for guidance, assistance, and teacher attention.

This also has the same rules for math teachers who need to pay attention to the factors that affect teaching and learning to achieve math teaching. Slamet in Kurniawan, Wiharna, dan Permana (2017) stated that the factors that affect teaching and learning are divided into two categories; internal and external factors. Internal factors are factors that come from within the individual who is studying, while external factors are factors that come from outside the individual such as his/her parents, teachers, as well as the learning environment around the individual. Razali dan Raop (2018) made it clear that they revealed some studies that have been



conducted in Malaysia proved that the teacher factor greatly influences the performance of students, as well as influences the formation of the students' character. Therefore, teachers also participate in the success of learning including the students' attitude and treatment of teachers towards their students. A pleasant teacher attitude will result in fun learning.

Most students believe that Mathematics is a difficult subject. Siregar (2017) justified that the students consider mathematics as a difficult lesson and give a negative impression and learning experience for students. Ummaeroh, Gusmania, dan Hasibuan (2019) revealed that most students still have difficulty in understanding mathematical concepts. Most students are unable to redefine what they have learned in their language. The negative impression will affect students' interest in mathematics so that it will have an impact on their learning outcomes. This is reinforced by the statement of Slameto in Ardila dan Hartanto (2017) who believed that interest has a great influence on learning, because if the learning materials are not under the interests of students then the students cannot learn as well as possible. Furthermore, Ardila dan Hartanto (2017) assumed that one of the factors that influence the results of students' mathematics learning is their interest in the subject. Although the description of mathematics lessons is difficult, if the teacher is able to arouse student interest in learning, the learning will be easy to pass, of course by varying the learning model that seeks to activate students who have an interest in learning mathematics.

Learning interest is defined as the willingness and intention to participate in cognitive activities that play an important role in learning, which determines which part we choose to learn and the extent to which our understanding of the information is provided (Klassen & Klassen, 2014). Marimba in Kpolovie, Joe, dan Okoto (2014) stated that the interest in learning is a psychological tendency to acquire something because students feel interesting things, and their learning is usually characterized by pleasure. Meanwhile, Ricardo dan Meilani (2017) argued that learning interest plays an important role in achieving maximum learning outcomes. Each individual's interest is different, but in mathematics, interest can be



raised with a strong desire that is supported by an interesting learning environment and learning process.

Learning outcomes are educational objectives that are realized in the learning process so that the students can understand and apply what has been learned (Ricardo & Meilani, 2017). Solikhah dan Budiharso (2019) defines learning outcomes as the way of measuring what a person gains from a learning process, whether it is structured or unstructured. Furthermore, Adam in Mahajan dan Singh (2017) assumed that learning outcomes are written statements of what the successful students are. Meanwhile, Erikson dan Erikson (2018) found that the results of learning can show students what they have to achieve to graduate. Improvement of learning outcomes should pay attention to the integration of learning strategies and the realization of learning through various teaching methods (Ahmad, Seman, Awang, & Sulaiman, 2015). Therefore, student learning outcomes must be pursued for success, learning outcomes are the overall results of the learning process in the classroom that are measurable and can be used as evaluation material.

Based on the interview's results with one of the teachers who is in charge of mathematics studies at Madrasah Aliyah Muhammadiyah Bantaeng. She stated that MA Muhammadiyah Bantaeng is one of the formal educational institutions to improve the education quality of its students, continuing to hold various efforts and various innovations, especially related to learning models. Class X ISS specifically in the field of mathematics studies teachers who still use the direct learning model, although some teachers have implemented a problem-based learning model, the efforts of these teachers have not been successful. Students' learning outcomes, especially grade X ISS MA Muhammadiyah Bantaeng, are still getting grades below MCC with a range of 65-70, while the Minimum Completion Criteria (MCC) of mathematics subjects is 75. That is because the learning model applied in the mathematical learning process is a direct learning model that is more teacher-centered and makes students always expect the information that will be conveyed by the teacher. On the other hand, it also triggers students to be less active and bored



in the learning process so that their interest in learning is lower and affects the student's learning outcomes.

Therefore, a research needs to be conducted that examines the importance of using learning models in the teaching and learning process, and controls other factors that can affect students' learning outcomes. One of the learning models that can improve students' learning outcomes is the NHT (Number Head Together) type cooperative learning model. The research results conducted by Arpiah (2020) revealed that the application of the NHT type cooperative learning model can increase the interest and results of students' mathematics learning of class XII IPA 1 MAN Balikpapan in the 2018/2019 school year on statistical materials. Filda dan Rulianto (2020) in their research also revealed that applying a cooperative learning model type NHT (Number Head Together) can increase the students' interest and learning outcomes by showing the existence of cognitive, affective, psychomotor, and enthusiastic students to express opinions or respond in group discussions. And Dadri, Dantes, dan Gunamantha (2019) that there is an increase in learning outcomes and critical thinking of students with the implementation of cooperative learning models of Number Heads Together type. The difference in the research that will be carried out is different from the results of these studies, namely the research conducted by comparing the categorization of students' interests.

Muliandari (2019) in her research showed that the average value of mathematics learning outcomes studied using the NHT type cooperative learning model is higher compared to students who are studied without using the NHT type cooperative learning model. So that the NHT type cooperative learning model affects the math learning outcomes of grade V elementary students in Cluster IV Sekasada. Furthermore, the research results conducted by Sugiyadnya, Wiarta, and Putra (2019) showed that there is a significant influence on the competence of group mathematical knowledge taught by the number head together (NHT) type cooperative learning model and the group that is taught with conventional learning. The difference in the research that will be carried out is different from the results of these studies, namely the research carried out paying attention to the variable of



interest in learning as a moderating variable and learning outcomes is the dependent variable.

Based on the above exposures, the researchers are interested in researching the Influence of the NHT Type Cooperative Learning Model on Mathematics Learning Outcomes reviewed from The Students' Interests of Class X ISS MA Muhammadiyah Bantaeng. This research was conducted to provide input and solutions to improve the students' learning outcomes of class X ISS MA Muhammadiyah Bantaeng. This research was carried out on the absolute value material.

METHOD

This is quantitative research with the research design used is Quasy experiment, namely the research development of true experiments. The design of the study used by the researchers is a factorial design of 2x2, a factorial design of two or more free variables and at least one variable that is manipulated. In this design where the manipulated variables are NHT Type Cooperative Learning Model is experimental variable, the direct learning model is called control variable, and student learning interest is moderator variable and learning outcome is a bound variable. The population in this study is the students of class X ISS MA Muhammadiyah Bantaeng which consists of 2 classes with a total of 20 students in each class.

The instruments in this study are tests, questionnaires, and observation tools. The test used is essay-test, consisting of six valid and reliable questions. Validation process begins with expert validation. To determine the validity of the item, the product correlation formula is used moment and reliability test using the formula alpha. The test is conducted to obtain the data on the students' learning outcomes. The questionnaire referred to in this study is a study interest questionnaire, the type of questionnaire used is a closed questionnaire, in this study used an item or statement of interest questionnaire consists of 20 valid and reliable items. The questionnaire is conducted to obtain the levels of students' learning



interests. Then the observations made are specifically on the implementation of the Lesson Plan, and as for learning tools such as the implementation plans.

The researchers applied the learning interest scale to collect data from respondents about students' learning interests. The scale of learning interest is based on the theory put forward by Guildford where the interest in learning has four indicators such as feelings of pleasure, interest in learning, attention while learning, and involvement in learning (Jihad & Haris, 2012).

The data analysis techniques used are descriptive and inferential statistical analysis. Descriptive statistical analysis is used to analyze data by describing or describing the results of mathematics learning obtained by students after following the subject matter approaches with NHT Type Cooperative Learning Model. Then, inferential statistical analysis is used to analyze sample data, and the results are then generalized for the population where the sample is taken.

RESULT AND DISCUSSION

Based on the interest questionnaire, the median value in the control class is 63.5 and in the experimental class is 64.5. In classifying the students' learning interests based on median grades, it is high when the students' learning interests are similar to the median and are relatively low if the students' learning interests are smaller than the median. The following are the values of pretest and posttest control classes and experiments with high learning interests in the table below.

Table 1. Description of Pretest and Posttest on Control and Experimental Classes of High Learning Interest Students

	High Interest	Minimum	Maximum	Mean Score	Standard Deviation
Pretest Control	10	54	71	62.00	4.830
Posttest Control	10	73	83	77.90	2.293
Pretest Experiment	10	53	70	65.60	6.190
Posttest Experiment	10	83	100	89.90	6.190



Table 1 shows that the students with a high level of interest in learning, on the pretest granting of control classes obtained the minimum score of 54, the maximum value is 71, the mean score is 62.00 and the standard deviation is 4.830. Then, the result of the posttest in the control class with high learning interest obtained the minimum score is 73, the maximum value is 83, the mean score is 77.90 and the standard deviation is 2.923. Furthermore, the pretest of the experimental class obtained the minimum value of 53, the maximum value of 70, the mean score of 65.60, and the standard deviation is 5.337. While the posttest in the experimental class with high learning interests obtained the minimum score of 83, the maximum value is 100, the mean score is 89.90, and the standard deviation is 6.190. Thus, it is inferred that the score of pretest giving with high learning interest in experimental classes is better than in the control class with the mean score of the learning outcome ($65.60 > 62.00$). in addition, the posttest score with high learning interest in the experimental class is better than the control class with the mean score of the learning outcome ($89.90 > 77.90$).

Based on the interest's questionnaire, the pretest and posttest given in the control and experimental classes, which is taught using direct learning model in the control class and cooperative learning type NHT in class X students experiment ISS1 and X ISS2 MA Muhammadiyah Bantaeng on absolute value material. The followings are the values of pretest and posttest control and experimental classes with high learning interests in the table below.

Table 2. Description of Pretest and Posttest of Control and Experimental Classes on Low Learning Interest Students

	High Interest	Minimum	Maximum	Mean Score	Standard Deviation
Pretest Control	10	58	70	64.80	4.315
Posttest Control	10	60	87	73.50	8.165
Pretest Experiment	10	57	73	64.50	4.994
Posttest Experiment	10	75	95	82.60	5.892

Based on table 2, it is obtained that the students with low levels of learning interest, on the pretest granting of control classes obtained the minimum score of 58, the maximum score of 70, the mean score of 64.80, and the standard deviation



of 4.135. Then, the result of the posttest in the control class with low learning interest obtained the minimum value is 60, the maximum value is 87, the mean score is 73.50, and the standard deviation is 8.155. Furthermore, in the experimental class with pretesting obtained the minimum value is 57, the maximum value is 73, the mean score is 64.50, and the standard deviation is 4.994. Whereas, the posttest in the experimental classes with low learning interest obtained the minimum score of 75, the maximum value is 95, the mean score is 82.60, and the standard deviation is 5.892. Thus, it is indicated that the value of pretest giving with low learning interest in the control class is better than in the experimental class with the mean score of learning outcomes of $64.80 < 64.50$. The posttest value with the high learning interest in the experimental class is better than the control class with the mean score of learning outcomes of $83.90 > 73.50$.

To examine the hypothesis in this article, the researchers used a two-way variance analysis technique (Anova) with 2x2 factorial design interactions using Statistical Program for Social Sciences (SPSS) version 21 software. The following table is the results of the F (Anova) test of students' learning outcomes and interests.

Table 3. Test F (Anova) of Students' Learning Outcomes and Interests

Variance Source	F Calculated	<i>F</i> <i>Table</i>	<i>Sig.</i>
Between columns	30.066	4.11	0.001
Between rows	9.244	4.11	0.004
Interaction	0.568	4.11	0.456

a) Between Columns, it shows the overall differences from the learning outcomes of students who learn with NHT-type cooperative learning and direct learning applied regardless of the sample group reviewed from the students' learning interests. Based on table 3 obtained the value of F-count = $30.066 < F \text{ table} = F_{0.05}(1/36) = 4.11$ and sig = $0.001 < 0.05$ which concluded that there are differences in the mathematics learning outcomes of the students who are taught with NHT-type cooperative learning models with the students who are taught using the direct learning model.



- b) Between Rows, it shows the overall differences from the learning outcomes of the students who have a high learning interest and low learning interest regardless of the sample group taught by NHT-type cooperative learning model with direct learning. Based on table 3 obtained, the value of F-count is 9.244. The value is greater than F-table value at the degree of freedom $df = 1$, which is 4.11 ($F\text{-count} = 9.244 > F\text{table} = 4.11$), and the significant value of $0.004 < 0.05$. Based on these results, it can be seen that overall there are significant differences in mathematics learning outcomes between the students who have a high interest in learning and the students who have low learning interests.
- c) Interactions, it is seen on table 3 the interactions using learning models reviewed from students' learning interests in influencing students' learning outcomes. Based on table 4.9 obtained the value of F count = $0.568 < F\text{-table} = F_{0.05}(1/36) = 4.11$ and sig = $0.456 > 0.05$ which gives the conclusion that there is no interaction between the learning model and the students' learning interests in the students' mathematics learning outcomes.

On the description above, it can be concluded that there are significant differences in the students' mathematics learning outcomes who are taught with NHT-type cooperative learning model with the students who are taught with the learning model directly reviewed from low learning interest in class X ISS MA Muhammadiyah Bantaeng. This is in line with the research results conducted by Dadri, Dantes, dan Gunamantha (2019) that there is an increase in learning outcomes and critical thinking of students with the implementation of cooperative learning models of Number Heads Together type. Muliandari (2019) in her research showed the results that the use of NHT type cooperative learning model affects the results of mathematics learning of grade V elementary students in group IV Sukasada Subdistrict, Buleleng District in the 2017/2018 school year. The results of this study have similarities with the results that the researchers found, but there are things that new researchers have raised regarding interest in learning.

Having the overall comparison test is conducted, it is then continued with further tests by comparing groups one by one. The advanced test used in this study



is the Tukey test. The results of further test calculations with the Tukey test can be seen by using Statistical Program for Social Sciences (SPSS) version 21 as follows.

Table 4. Tukey Test Posttest Results and Students' Learning Interests

I-Interaction	J-Interaction	Different Mean (I-J)	Sig.
NHT High Interest	NHT High Interest	12.00	0.001
NHT Low Interest	NHT Low Interest	9.10	0.010

- a) In table 4, it is obtained MD = 12.00 and sig = 0.001 < 0.05, because of sig < α . It can be concluded that there is a significant difference between the students' mathematics learning outcomes who follow NHT-type cooperative learning and students who follow direct learning who have a high interest in learning. So it can be said that there are significant differences in the students' mathematics learning outcomes who are taught with NHT-type cooperative learning model with the students who are taught with the direct learning model reviewed from a high learning interest.
- b) In table 4, it is obtained MD = 9.10 and sig = 0.010 < 0.05, because of sig < α . It can be concluded that there is a significant difference between the students' mathematics learning outcomes who follow NHT learning and the students who follow direct learning of the students who have low learning interests. It can be said that there are significant differences in the students' mathematics learning outcomes who are taught with NHT-type cooperative learning model with the students who are taught with the direct learning model reviewed from low learning interests.

Thus, it can be concluded that there is no interaction between the NHT type cooperative learning model and the interest on the mathematics learning outcomes study of class X ISS MA Muhammadiyah Bantaeng so that the intercolumn cell worship in one row follows the treatment on its main, namely the main effect of the row (interest in learning) and the main effect of the column (learning model). This is in line with the results of the research conducted by Gani (2015) who argued that there is there is no interaction between the NHT type cooperative learning model and the interest on the mathematics learning outcomes. The researcher suspects that



there is an interaction between the learning model and interest in learning, but the results obtained are contradictory, it needs a more specific study for future research.

CONCLUSION

Based on the results of the previous research and discussion, several conclusions were obtained as follows: (1) there are differences in the students' mathematics learning outcomes who are taught with NHT-type cooperative learning model with the students who are taught using the direct learning model in class X ISS MA Muhammadiyah Bantaeng. (2) there is a significant difference between the results of mathematics learning in control and experimental classes with high student learning interests. (3) there is a significant difference between the mathematics learning outcomes in control and experimental classes with low students' learning interests. (4) there is no interaction with the use of NHT type cooperative learning model with the learning interest toward the students' mathematics learning outcomes in class X ISS MA Muhammadiyah Bantaeng.

Suggestions that can be given after doing this research is that mathematics teachers are expected to teach by applying learning models that can increase students' interest in participating in the learning process.

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