

Analysis of Cognitive Mathematics Learning Outcomes Using the Number Head Together (NHT) Model at SMP Negeri 1 Gunungsitoli Idanoi Academic Year 2021/2022

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Abstract

The background of this research is based on the results of a preliminary study conducted by researchers at SMP Negeri 1 Gunungsitoli Idanoi. Problems were found, namely student learning outcomes in mathematics were still sufficient and students were less active in the learning process. The purpose of this research is to: Describe the results of learning Mathematics in the cognitive field using the Number Head Together model. This type of research is a quantitative research. The instrument used in this study was a test of student learning outcomes in the form of an essay test. The research data obtained was processed by describing the test results of the learning outcomes obtained from each student's answer sheet. The research results obtained: Based on the results of data analysis from the research that has been done, it can be concluded that: the results of learning mathematics in the cognitive field using the Number Head Together (NHT) learning model are very good categories of 46.8%, good categories of 40.7% , the adequate category is 9.4% and less is 3.1%. Overall, the results of learning Mathematics in the cognitive field of students reached the very good category, with an overall achievement of 87.5% being in the very good category.

Keywords: Number Head Together, Cognitive, Learning Outcomes



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INTRODUCTION

Education is closely related to human life, because education is a human effort to expand knowledge and form values, attitudes and behavior. This is in line with Law no. 20 of 2003 concerning the National Education System states that: Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, noble character, personality, intelligence, and skills needed by himself, society, nation and state.

Education basically plays an important role in the intellectual life. Success in a nation is closely related to the success of the education sector. Therefore, the government is trying its best to improve the quality of education, one of the government's efforts to improve the quality of education in Indonesia is to renew and develop the curriculum. The current curriculum in Indonesia is the 2013 curriculum. The 2013 curriculum aims to prepare students to have the ability to live as individuals and citizens who are faithful, creative, innovative and effective and able to live in society, nation, state and world civilization. This is in accordance with As'ari (2017: 1) that: Curriculum 2013 is one of the elements contributing to realizing the process of developing student quality. The 2013 curriculum was developed based on competencies needed to direct students to become: (1) quality human beings who are capable and proactive in responding to the challenges of an ever-changing era; (2) people are educated and devoted to God Almighty, have good morals, are healthy, knowledgeable, capable, creative, independent, and (3) citizens who are democratic and responsible.

In the 2013 curriculum, one of the subjects studied by students at school is mathematics. Mathematics subjects are given in every education starting from elementary education to university. According to Mujis in Solekhah (2015: 249) that mathematics is the main "vehicle" for developing the ability to think logically, analytically, systematically, critically, creatively and the ability to work together. In As'ari (2017: 10) The goal of mathematics is for students to be able:

1. Understanding mathematical concepts, is competence in explaining interrelationships, between concepts and applying concepts or logarithms, in a flexible, accurate, efficient, and precise way in solving problems.
2. Using patterns as assumptions in solving problems, and being able to make generalizations based on existing phenomena or data.
3. Using reasoning based on nature, performing mathematical manipulation both in simplification and outside mathematics (real life, science, and technology which includes the ability to understand problems, build mathematical models, complete models and interpret solutions obtained, including in order to solve problems in life everyday (real world)
4. Communicating ideas, reasoning and being able to compile mathematical proofs using complete sentences, table symbols, diagrams or other media to clarify situations or problems.
5. Have an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, concern and interest in studying mathematics, as well as being tenacious and confident in solving problems.
6. Have attitudes and behaviors that are in accordance with values in mathematics and its learning, such as obeying principles, being consistent, upholding agreement, tolerant, respecting the opinions of others, polite, democratic, tenacious, tough, creative, respecting universality (environmental context) , cooperation, fair, honest, conscientious, meticulous, be flexible and open, have a willingness to share feelings with others.
7. Carry out motor activities using mathematical knowledge.
8. Using simple visual aids and technological products to carry out mathematical activities.

To achieve these learning objectives, the role of the teacher in learning mathematics does not only take place to transfer knowledge from teacher to student but the learning carried out must be appropriate so that the expected results are obtained. Based on the results of observations and interviews with teachers conducted by researchers at SMP Negeri 1 Gunungsitoli Idanoi as the school planned for the research location, it was found that there were still many students whose learning outcomes were low due to several things, namely: students' initial ability to learn mathematics was lacking because students could not understand the material teaching, some students are lazy to do assignments because students consider mathematics a difficult subject, students have difficulty solving problems that are different from the examples because they cannot implement formulas in solving problems, teaching and learning activities are more centered on the teacher so students become passive. Students in general students rarely raise questions or opinions when learning takes place because they lack confidence and are afraid of being wrong in expressing opinions. This can also be seen when the teacher gives a test of learning outcomes, students have difficulty doing it and this affects the low student learning outcomes.

Based on information from the mathematics subject teacher, it is known that the average test score for students' mathematics learning outcomes is still in the sufficient category, obtained information that the number of students in class A who completed was 20 and did not complete 12, so that the average score was 71 with the sufficient category. Likewise with

class VII-B, VII-C, VII-D and VII-E are in the sufficient category. So, it can be concluded that the average value of grade 7 students in the cognitive domain is in the sufficient criteria. This can be seen from the results of the average UTS score for grade 7 students who are in the sufficient criteria. In accordance with information from the mathematics teacher that students get scores with sufficient criteria because they are influenced by several factors such as interest in learning, learning motivation, and some students think mathematics is difficult. students' learning interest in the class is still in the sufficient category. This is caused by the learning process which is carried out centered on the teacher where the teacher explains the material and provides practice questions. Students' learning motivation is also still in the sufficient category, this can be shown by the student's response in solving problems which is very minimal. Mostly when faced with questions or problems, students tend to be silent and do not try to find solutions to problems. In addition to low motivation and interest in learning, students also experience learning difficulties, this can be seen in the learning process when students are slow to accept or catch lessons so it takes a long time.

The solution taken by researchers is to conduct research. Through research, it is hoped that schools can be motivated in implementing learning that allows students to play an active role and be directly involved in solving math problems both independently and in groups so as to improve student learning outcomes by choosing the right model to improve student learning outcomes. One effort to improve student learning outcomes is by using a learning model that makes students focus and actively ask questions during the learning process individually or in groups, students express their ideas/opinions, solve problems and can apply what students learn. One learning model that can be used as a proposed solution is the Number Head Together (NHT) cooperative learning model.

The researcher chose the Number Head Together (NHT) model, because this NHT model guides students to be active individually or in groups and guides students to express ideas/opinions. This is also in accordance with the opinion according to Lie in Rahmawati, et al (2020: 156), stating that: The NHT learning model is a learning model that provides opportunities for students to share ideas with each other and consider the most appropriate answers, while also encouraging students to increase their cooperative spirit, this learning model can be used in all subjects and for all age levels of students. Furthermore, according to Udani in Suwandari (2020: 247), states that: the characteristic or characteristic of the learning environment of this NHT type cooperative learning model is that it only wants one student to represent the group without informing the group in advance who will represent it, this characteristic ensures full involvement from all students so that they can increase individual responsibility in group activities and can increase mutual understanding between students. The NHT type cooperative learning model is based on constructivism learning theory which provides opportunities for students to build their own knowledge so that their knowledge is not procedural. Furthermore, according to Trianto in Muliandiri (2019: 134) states, "For students with low learning outcomes, Numbered Head Together (NHT) is able to increase self-confidence in students, improve student attendance in the teaching and learning process, reduce behavior that disturbs other students, reduce interpersonal conflicts, gain a deeper understanding, increase the spirit of cooperation in groups, provide opportunities for students to share ideas and discuss the most appropriate answers, and obtain better learning outcomes". As for the formulation of the problem, namely "What are the results of learning Mathematics in the Cognitive field using the Number Head Together (NHT) learning model at SMP Negeri 1 Gunungsitoli Idanoi Academic Year 2021/2022?". The purpose of this study is as follows "Describe the results of learning mathematics in the cognitive field using the Number Head Together (NHT) model at SMP Negeri 1 Gunungsitoli Idanoi"

RESEARCH METHODS

In this study, researchers used pre-experimental research. The design used is a pre-experimental design in the form of a one shot case study as suggested by Sugiyono. (2017:110).

X . O

X = (treatment) given (independent variable)

O = observation (independent variable)

The paradigm can be read as follows: there is a group that is given treatment and then the results are observed. The research steps are as follows: Researchers conduct learning using the Number Head Together learning model. After learning, students are given a learning achievement test to measure the level of student achievement. The learning outcomes obtained are then analyzed based on the KKM mastery level and the presentation of learning achievement achievements. This research is a descriptive research with one variable. the variable used in this research is the independent variable, namely the student learning outcomes obtained from the learning outcomes test using the Number Head Together learning model. The research subjects were class VII at SMP Negeri 1 Gunungsitoli Idanoi for the 2021/2022 academic year. The data in this study are student learning outcomes in the subject matter of Social Arithmetic at SMP Negeri 1 Gunungsitoli Idanoi for the 2021/2022 academic year using the Number Head Together learning model, because the data collected is in the form of numbers, it is classified as quantitative data, and data obtained directly from research is called primary data.

Data about student learning outcomes are obtained by giving tests to research subjects. The test used in this study is a description test of 5 (five) items arranged based on the test grid. Before being used as a research instrument, the test is first tested for feasibility with: test validity, test reliability, test difficulty level, and discriminating power. The final test (post-test) is the final activity carried out on all samples. This final test is also in the form of an essay test which is based on a grid of 5 (five) test questions. This test is given to all research samples after the learning process is carried out. To support this research instrument, researchers use other supporting documents, namely interviews and observations.

RESEARCH RESULTS AND DISCUSSION

This study aims to determine the learning outcomes of students in the cognitive field on Social Arithmetic material for class VII students at SMP Negeri 1 Gunungsitoli Idanoi. Collecting data in this study through tests of student learning outcomes. Tests were conducted to collect data related to student learning outcomes in the cognitive field. Before the test was given to research informants, the test was validated logically to the mathematics lecturer/teacher. After the test is tested for logical validity, it is followed by a validity test. Researchers tested the test at West Gunungsitoli 1 Middle School. Furthermore, research activities were carried out at SMP Negeri 1 Gunungsitoli Idanoi. The trial results data are used to test the validity, reliability, level of difficulty, and discriminatory power.

Logical Validity

The test used in this research is a written test in the form of a description test. Before the test is designated as a research instrument, it must first be logically validated by mathematics lecturers/teachers, including one lecturer in the mathematics education study program, and two mathematics teachers. From the results of validation by the validator, the test (appendix 5) is declared valid or suitable for use as a research instrument.

Research Instrument Trial Results

After logical validity is carried out, then the next step is that the test is tried out at SMP Negeri 1 Gunungsitoli Barat in class VII-A for the 2020/2021 academic year with 5 forms of essay tests. With the results of the trial of the research instrument (appendix 6), the data from the trial results are used to test the validity of the test, the reliability of the test, the level of difficulty of the test, and the differentiating power of the test. The results of the analysis are as follows:

Test Validity Test

Test the validity of the items using correlation. The question is said to be valid if the correlation value $r_{count} > r_{table}$, with a significant level of 5%. Based on the trial data of the problem solving test, the calculation of the validity test of item number 1 obtained 0.785 in full, which can be seen in Appendix 2. Then it was confirmed in r_{table} For $N=15$ at a significant level of 5% ($\alpha=0.05$) it was obtained $r_{table}=0.514$ so that for item number 1 is obtained $r_{xy} > r_{table}$. Thus item number 1 is declared valid. Based on the calculations (appendix 8 table 20), all test items item 1 to item 5 are declared valid so that they can be used as research instruments.

Test Reliability Test

To test the reliability of the test is done by using the alpha formula. By referring to the reliability test calculation (appendix 9), $r_{11} = 1.3675$ and $r_{table} = 0.514$ are obtained. Because $r_{11} > r_{table}$, overall the test is declared reliable. Thus, measurements made using tests as research instruments provide consistent (fixed) results so that they can be trusted and can be used anytime and anywhere.

Test Difficulty Level Test

To find out whether the difficulty level on the test grid corresponds to the actual conditions at school, a difficulty level calculation is carried out based on the results of the instrument trial. Calculation of the difficulty level of item number 1 to item number 4. From the calculation of the difficulty level of item number 1 to item number 4 (appendix 10 table 24), it is concluded that the level of difficulty of each test item corresponds to the level of difficulty on the test grid.

Discriminating Power Test Test

To find out whether each test item can distinguish students who are smart from students who are less intelligent, a discriminatory power calculation is carried out based on the results of the instrument trial. From calculating the discriminating power of item number 1 to item number 4 (appendix 11 table 26) and all test items are acceptable/good.

Analysis of Learning Outcomes Data

The data in this study were obtained using the learning outcomes test instrument (description). The written test was carried out to determine student learning outcomes in the cognitive field on Social Arithmetic material. The test instrument is taken from the answers of students in completing the test questions that have been given. The test used in this research is a description test with 5 questions. After giving the test, the researcher obtained the test results for class VII-A students of SMP Negeri 1 Gunungsitoli Idanoi.

Constraints Found

Obstacles found during the implementation of learning with the Number Head Together (NHT) learning model, including students who are still not fully experts in their groups because it takes a long time to master their respective topics. In addition, time constraints led to less optimal implementation and results obtained. For this reason, the solution that is carried out in facing the obstacles above is that researchers always monitor and provide guidance and instructions to each group in solving the questions given, so that all students can understand the concept of the question as well as the answers to these questions. So that each group member has a responsibility in their respective groups to maintain their group.

Discussion

Based on the values obtained from the implementation of learning using the Number Head Together (NHT) model, it can be seen that learning outcomes are skills/skills that are converted to a category/value obtained from the learning process. Acquisition of student learning outcomes in the cognitive field using the Number Head Together (NHT) learning model, categorized well with the highest score of 92 obtained by 3 students and the lowest score of 56 obtained by 1 student. Student completeness reached 87.5% indicating that this learning model is effective in teaching and learning. So that in this case there are many advantages that can be obtained from the implementation of learning, namely: students are more active in learning activities, students easily understand the material provided, the material provided is evenly distributed to all class members and increases teamwork.

Learning outcomes based on indicators obtained the highest average indicator value is 90.6 with a value of 232 on indicator 3 and the lowest average is 64 with a value of 287 on indicator 5. While indicator 1 averages 87.1 with a value of 223 and indicator 2 an average of 78.1 with a score of 250 and indicator 4 an average of 81.2 with a value of 260. In general, the results show that learning with the Number Head Together (NHT) learning model can increase the activeness of students directly involved in learning activities.

CONCLUSION

Based on data analysis and processing as well as research objectives, the researchers concluded as follows: the results of learning mathematics in the cognitive field using the Number Head Together (NHT) learning model, namely the very good category of 46.8%, the good category of 40.7%, the moderate category of 9.4% and less by 3.1%. Overall, the results of learning Mathematics in the cognitive field of students reached the very good category, with an overall achievement of 87.5% being in the very good category.

Based on the research results, several suggestions were put forward including: Learning with the Number Head Together (NHT) model is effective learning, so it is expected that teaching staff can use this model in teaching. Before carrying out learning with the Number Head Together (NHT) learning model, a teacher must really be sure that he has prepared himself (teaching materials, learning tools, learning media, etc.), students, and a conducive classroom situation, due to the implementation of this learning. takes a long time.

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