

Improving fifth-graders' learning outcomes of cube and cuboid nets using number head together cooperative learning

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ABSTRACT

This research is background by a low learning outcomes of students on learning cube and cuboid nets caused by learning that still uses conventional models and still teacher centered so that students are not yet active in the process learning. Type of research is classroom action research using quantitative and qualitative approaches. This research was conducted in the second semester of the 2021/2022 academic year. The research subjects were teachers as observers, researchers as practitioners, and 21th students consisting of 11 males and 10 females. The results showed an increase in the results: (1) RPP cycle I an average of 93.05% (A), cycle II 100% (A), (2) implementation in the teacher aspect of cycle I an average of 92.18% (A), and the second cycle 96.87% (A), (3) the implementation of the aspects of the students in the first cycle is 92.18% (A), the second cycle is 96.87% (A), and (4) The average student learning outcomes in the first cycle is 76.9% (B), the second cycle is 90.96% (A). The conclusion of the research is that using the numbered head together model increase student learning outcomes of cube and cuboid nets in elementary school in Padang.

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INTRODUCTION

Mathematics learning the class V in elementary schools in the 2013 curriculum learns about spatial structures, one of which is geometrical nets (cubes and blocks). The material for cube and cuboid nets is taught in class V in the second semester, which is found in basic competencies 3.6 explaining and finding simple cube and cuboid nets and 4.6 making simple cube and cuboid nets. Cube and cuboid nets a part of space that is limited by a collection of points contained on the entire surface of the wake or wake space whose sides are flat (not curved) (Faradilla et al., 2022). The various shapes of flat-sided spaces start from the simplest such. as cubes, cuboid, pyramids to very complex ones such as polygonal pyramids or shapes that resemble crystals. Solihati

(2020) block nets are basically the same as cube nets however on the grid of beams the arrangement is not square, but square length by square or rectangle by square long.

The ideal implementation of learning according to Surya (in Naution, 2019) are: (1) student-centered, (2) the occurrence of educational interactions between teachers and students, (3) developing a democratic atmosphere, (4) varied teaching methods, (5) professional teachers, (6) meaningful learning material, (7) conducive learning environment, (8) supporting facilities and infrastructure. Then according to Masniladevi, et al (2018) mathematics is learning that can develop thinking skills in students and is able to communicate a problem and solve the problem. Febriana (2019) also mentions that learning mathematics in elementary school students requires aids in the form of media and teaching aids that can clarify the material presented by the teacher and it is hoped that rediscovery will occur and be meaningful, learning mathematics in schools must be done with a pattern of construction and reconstruction to determine for themselves which direction students want to explore in finding meaningful knowledge for themselves.

Based on observations made by researchers in elementary school in Padang on September 20th and 21th, 2021, researchers found problems both in terms of planning and implementation of learning, namely: As for problems in terms of planning, researchers found on the first day of observation on September 20, 2021 researchers observing the learning implementation plan used by teachers, from these observations the researchers found problems including: (1) The lesson plans used were still obtained from the internet and teacher books without the TIM principle (take, imitate, modify), (2) The learning indicator has multiple activities, (3) It does not contain the D (Degree) element in the formulation of learning objectives. (4) Teachers have not used media and LKPD in learning activities.

The second observation was made on September 21, 2021 when it takes place math learning material regarding addition and subtracting fractions with different denominators. Problems that still tend to use conventional models that use lecture methods, question and answer and giving assignments in learning. So that learning looks boring to students. Conditions like this result in a lack of attention and activity of students in learning so that it can result in low absorption of students to the material being taught and can affect student learning outcomes. This can be seen in the daily assessment scores (PH) for mathematics KD 3.6 and 4.6 in the second semester of the 2021-2022 academic year in elementary school in Padang, 11 students of 21 students scored below the standart, where the standart must be achieved the number of fifth grade students at elementary school in Padang is 80.

Based on the problems described above, an action is needed to improve mathematics learning outcomes by involving students in finding the concept of the lesson by thinking creatively and being able to work together and help each other to achieve learning goals in good interaction, namely the Numbered Head Together type of cooperative learning model. (NHT). Cooperative learning model is a learner-centered learning. As explained by Ningsih (2019) cooperative learning is student-centered learning, this is evidenced by the students activeness during student on going learning with activities for the material and the process of tasks, and giving explanations to the group. In this model, students are formed into several groups to solve problems. With each student in the group getting a different number so that each student has his own responsibility in his group which will increase knowledge and skills in learning. Meanwhile, according to Miguel & Kagan, (in Widarto,2017) cooperative learning is an approach to organize class activities into learning experiences academic and social.

According to Suhaimi and Nasidawati (2020) model numbered head together is learning model group learning that each member of the group responsible for group tasks group assignments, so nothing separator between one student and another in one group to give and take. As explained by Shoimin (2017) the Numbered Head Together type of cooperative learning model is a group learning model in which each group member is responsible for his group assignments, so that the responsibility between one student and another student in a group gives and accept opinion. Every student has the same opportunity to support his group in order to get the maximum score. So that students are motivated to learn and learning objectives can be achieved. Maharani and Indrawati (2020) learning using the NHT type can increase student motivation to be more enthusiastic in learning because students are required to express their understanding of the learning material to get satisfactory learning outcomes at work group.

Meanwhile, according to Affandi (2019) NHT type of cooperative learning is a type special structural design to affect the pattern interaction students in obtaining the material covered in a lesson and check their understanding of lesson content. So that students are motivated to learn and learning objectives can be achieved. This NHT type learning model also has characteristics according to Suwandari (2020), namely: 1) learning based on constructivism, 2) the NHT model means numbering thinking together, 3) learning in groups with one of the students who will represent their respective groups. each without telling the group in advance who will represent it, 4) the NHT type learning model places students as implementers and the teacher only acts as a facilitator, motivator, and mentor.

Huda (2017:130) explains the model steps NHT has six steps, 1) Students are divided into groups, 2) Each student in the group is given number, 3) The teacher gives assignments/questions to each group to do it, 4) Each the group began to discuss to find answers deemed most appropriate and ensure all members the group knows the answer, 5) Teacher calling one number at random, 6) Students with the dialed number representing the answer from the results of their group discussions. According to Mariani, Andrizal, and Helbi (2020) put forward the advantages of the Numbered learning model Head Together (NHT) are: 1) Can improve cooperation among students, because in their learning students placed in a group for discussion, 2) Can increase the responsibility of learners in a way together, because each group is given a different task different things to discuss, 3) Train students to unite mind, because Numbered Head Together (NHT) invites participants students to unite perceptions in groups, 4) Train learners to respect the opinions of others, because of the results of the discussion asked for responses from each student.

Based on the background described above, the general problem formulation in this study is: How to improve learning outcomes of cube and cuboid nets using the NHT cooperative learning model in fifth graders' elementary school in Padang? And the specific formulation is how are the planning, implementation, and learning outcomes of cube and cuboid nets using the NHT type cooperative model in fifth graders' elementary school in Padang?. In line with the above formulation, the general objective of this study is to describe the improvement in learning outcomes of cube and cuboid nets using the NHT cooperative model for fifth graders' elementary school in Padang, and the specific objectives are to describe planning, implementation and learning outcomes of cube and cuboid nets using a cooperative learning type NHT at fifth graders' elementary school in Padang.

METHOD

Types of Research

The type of research used is Action Research Class. Parsons and Brown (in Farhana, Awira, & Muttaqien, 2019) state that action research allows teachers to study their own classes, for example their own instructional methods, and their own assessments in order to understand and can improve its quality or effectiveness. This classroom action research uses a qualitative approach and is supported by a quantitative approach because the data obtained in this study are not only qualitative data but also quantitative data derived from test score data or student learning outcomes. According to Creswell (in Kusumastuti and Khoiron, 2019) qualitative approach is an approach to exploring and understanding meaning obtained by an individual or group of people, considered from social or humanitarian problems. Explained by Kunandar (in Mansurdin, 2021) classroom action research is an activity carried out by teachers or collaborates that aims to improve the quality of a learning process in the classroom.

Time and Place of Research

This research was conducted in the second semester (January-June) in 2021/2022. The research was carried out in 2 cycles, the first cycle consisted of 1 meeting. The timing of the research refers to the elementary school academic calendar because research requires several cycles that require an effective learning process in the classroom. This research was conducted in fifth grade's of SDN 17 Gunung Pangilun, Padang City.

Subject of Research

The subjects of this study were teachers and students in fifth graders' elementary school in Padang, which consisted of 21 students including 11 male students and 10 female students. Those involved in this research are the writer as a practitioner and the class teacher as an observer

Procedure of Research

This research consists of 2 cycles, in each cycle there are several components, namely planning, implementation, observation, and reflection. Can be described as follows:

a. Planning

This activity begins by formulating an action plan for learning mathematics based on the use of the Numbered Head Together type of cooperative model, namely; 1) analyzing the 2013 curriculum, the relevant class V mathematics textbooks (companion books); 2) determine core competencies (KI); 3) determine basic competencies (KD); 4) determine indicators; 5) set learning objectives; 6) prepare observation sheets, and; 7) prepare evaluation test sheets

b. Action

Practitioners carry out learning activities in the classroom in the form of interaction activities between teachers and students, described as follows; 1) the researcher carry out the learning of cube and cuboid nets using the NHT model in accordance with the learning design made and referring to the steps of the NHT model according to Shoimin (2017); 2) the teacher (observer) makes observations using the observation sheet; 3) researchers and teachers

conduct discussions on the actions taken. Then do a reflection, and the results are used for improvement or further refinement.

c. Observation

Observation of the implementation of the action in a systematic and objective manner. Practitioners and teachers try to recognize and record all indicators of the results of changes that occur, both those caused by planned actions and the impact of interactions that occur in learning mathematics with the NHT cooperative model. The results of observations are recorded in the form of an observation sheet.

d. Reflection

Reflection is an activity carried out to restate the results of actions that have been taken and are held every time the action ends. Reflection aims to thoroughly examine the actions that have been taken based on the data that has been collected.

Data, Instruments, Data Collection Techniques, and Data Analysis Techniques.

The data in this study is primary data in the form of observations from each action in the learning process of building cube and cuboid nets with the NHT model for students in class V studied in the form of lesson plans, implementation of learning from teacher activities and students and student learning outcomes. The assessment instrument in this study to collect data is; a) learning implementation plan assessment sheet; b) observation sheet on the implementation of learning using the NHT model; and c) evaluation question sheets and skill and knowledge assessment rubrics as well as attitude assessment journals.

Data collection techniques were obtained from study results and research conclusions. The technique used in collecting data related to the research conducted in class V SDN 17 Gunung Pangilun Padang City was obtained from: (a) observation, (b) test, (c) non-test. Quantitative data analysis is used to determine the improvement made by the teacher with a classification scale according to Purwanto (2017:102) as follows:

$$\text{Range} = \frac{\text{score obtained}}{\text{score maximal}} \times 100 \%$$

With the success rate is as follows:

Table 1. Success Rate

Assignment Level	Predicate	Letter Value
86%-100%	Very Good	A
76%-85%	Good	B
60%-75%	Enough	C
≤59%	Not Enough	D

RESULTS

Cycle I Meeting 1

In improving student learning outcomes in the learning of cube nets using the Numbered Head Together (NHT) type cooperative model, the researcher plans to develop a learning implementation plan (RPP) based on basic competencies 3.6 explaining and finding simple

geometrical nets (cubes and blocks) and 4.6 create simple cube and cuboid nets. This planning is carried out based on the semester academic program according to the time of the research carried out. Planning is prepared for the 1st meeting in the first cycle of 3x35 minutes. Assessment of the lesson plans is carried out through observation sheets or observations of lesson plans with assessment aspects, namely: 1) subject identity, 2) indicator formulation, 3) formulation of learning objectives, 4) selection of teaching materials, 5) selection of learning resources, 6) selection of learning media, 7) learning methods, 8) learning scenarios, and 9) assessment.

Based on the results of the assessment conducted by the observer (teacher) the score obtained is 75% with sufficient qualifications (C). The implementation in the first cycle of meeting 1 with the cooperative model of the NHT type was carried out on March 25, 2022 at 08.00-09.45 a.m. Based on the observations made by the observer (class teacher) on the activities of practitioner teachers (researchers) in the implementation of learning activities in the first cycle of meeting 1, the score obtained in the teacher aspect was 31 out of a score of 32. Thus the percentage obtained was 86,11% with sufficient qualifications (A). Meanwhile, the score from the student activity was obtained 29 out of a score of 32 with a percentage of 90.62% and sufficient qualification (A). The learning outcomes of students on the material of cube space nets using the NHT type cooperative model in the first cycle of meeting 1 are a combination of the average value of knowledge and skills. The average value of class V in the first cycle of meeting 1 is 75.53 with a percentage of 47.61% with less qualifications (D). Then the number of students who completed was 10 people and 11 people who did not complete.

Cycle I Meeting 2

In improving student learning outcomes in the learning of cuboid nets using the Numbered Head Together (NHT) type cooperative model, the researcher plans to develop a learning implementation plan (RPP) based on basic competencies 3.6 explaining and finding simple cubes and cuboid nets and 4.6 create simple cube and cuboid nets. This planning is carried out based on the semester academic program according to the time of the research carried out. Planning is prepared for meeting 2 in the first cycle of 3x35 minutes. With the material taken is the building cuboid of space nets.

Assessment of the lesson plans is carried out through observation sheets or observations of lesson plans with assessment aspects, namely: 1) subject identity, 2) indicator formulation, 3) formulation of learning objectives, 4) selection of teaching materials, 5) selection of learning resources, 6) selection of learning media, 7) learning methods, 8) learning scenarios, and 9) assessment. Based on the results of the assessment conducted by the observer (teacher) the score obtained was 36 out of a score of 36 with a percentage of 100% with very good qualifications (A). The implementation in the first cycle of meeting 2 with the cooperative model of the NHT type was carried out on March 28, 2022 at 08.00-09.45 a.m. Based on the observations made by the observer (class teacher) on the activities of practitioner teachers (researchers) in the implementation of learning activities in the first cycle of meeting 2, the score obtained in the teacher aspect is 30 out of a score of 32. Thus the percentage obtained is 96.87% with qualifications very good (A). Meanwhile, the score of the student activities was obtained by 30 out of a score of 32 with a percentage of 96.87% and very good qualifications (A).

The learning outcomes of students on the material of building blocks using the NHT cooperative model in the first cycle of meeting 2 are a combination of the average value of

knowledge and skills. The average value of class V in the first cycle of meeting 2 is 83,67 with a percentage of 71.42% with sufficient qualifications (C). Then the number of students who completed was 15 people and 6 people who did not completed.

Cycle II

The planning of the learning of cube and cuboid nets in the form of lesson plans was carried out in the second semester according to the time of the research carried out. Planning is prepared for the second cycle meeting with a time allocation of 3x35 minutes. Assessment of the lesson plans is carried out through observation sheets or observations of lesson plans with assessment aspects, namely: 1) subject identity, 2) indicator formulation. 3) formulation of learning objectives, 4) selection of teaching materials, 5) selection of learning resources, 6) selection of learning media, 7) learning methods, 8) learning scenarios, and 9) assessment.

Based on the results of the assessment conducted by the observer (class V teacher) the score obtained was 36 out of 36 with a percentage of 100% with very good qualifications (A). The implementation in cycle II with the cooperative model of the NHT type was carried out on April 1, 2022 at 08.00-09.45 a.m. Based on the observations made by the observer (class teacher) on the activities of practitioner teachers (researchers) in the implementation of learning cycle II, the score obtained in the teacher aspect is 31 out of a score of 32. Thus the percentage obtained is 96.87% with very good qualifications. (A). While the score from the activities of students obtained 31 out of a score of 32 with a percentage of 96.87% and very good qualifications (A).

The learning outcomes of students on the material of building cuboid using the NHT cooperative model in cycle II are a combination of the average knowledge and skills scores. The average value of class V in the second cycle is 90.96, obtaining a percentage of 90.47% with very good qualifications (A). Then the number of students who completed was 19 people and 2 people who did not complete.

Based on the results of the description above, the use of the Numbered Head Together type of cooperative model has been carried out well and the researchers have succeeded in using this NHT type of cooperative model on the material of cube and cuboid nets in fifth graders' elementary school in Padang which improves student learning outcomes. Sofyan, Feronika, and Milama (2019) learning outcomes include an evaluation of the level mastery, achievement of specific learning objectives (indicators) and general learning objectives (competence standards/basic competencies) as well as an evaluation of the competency achievement of the participants' learning outcomes teach in class. The increase in student learning outcomes can be seen in figure 1.

Judging from the results of collaboration between observers (class teachers) and practitioners (researchers) the research conducted using the Numbered Head Together (NHT) type cooperative model in fifth graders' elementary school in Padang, the expected results have been achieved. This can be seen from the observations of aspects of lesson plans, teachers, and students. Then it can also be seen from the learning outcomes of students who have increased from cycle I meeting 1, cycle I meeting II to cycle II.

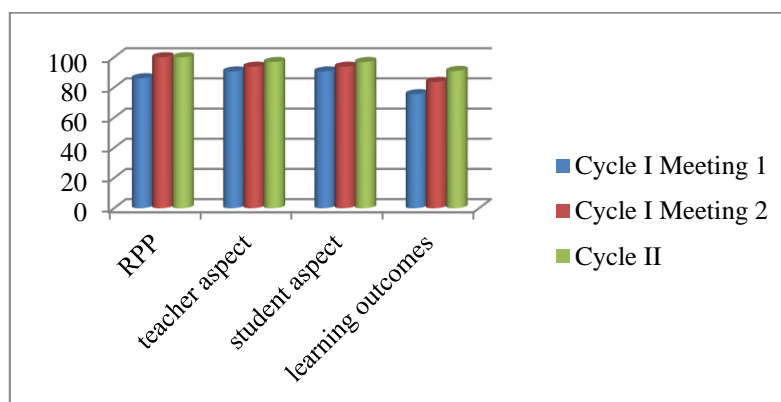


Figure 1. Research Improvement Result Chart

CONCLUSION

Based on the results of research and discussion it can be concluded that the application of numbered head together models for cube and cuboid nets learning of fifth grade at SDN 17 Gunung Pangilun can improve learning outcomes of students.

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