

THE EFFECTIVENESS OF CONTEXTUAL LEARNING USING COOPERATIVE TYPE NUMBERED HEADS TOGETHER (NHT) SETTING AND SAINTIFIC TO THE MATHEMATICAL PROBLEM SOLVING ABILITIES OF SENIOR HIGHT SCHOOL STUDENTS

by: Putri Solekhah^[1], Dr. Ali Mahmudi^[2]
Universitas Negeri Yogyakarta
putrisolekhah8@gmail.com^[1], ali_uny73@yahoo.com^[2]

Abstract

This research aim to describe effectiveness of contextual learning using cooperative type Numbered Heads Together (NHT) setting and saintific to the mathematical problem solving abilities of senior hight school students. The research was quasi experimental research used control group Pterest-Posttest Design. The population in this reseacrh was for 1st grade students in Senior Hight School 1 Sedayu, Bantul. The sample of the research consist of two classes which was randomly selected that are X MIA 1 and X MIA 3 classes. First class as 1st experiment class was given by contextual learning using cooperative type Numbered Heads Together (NHT) setting, while second class as 2nd experiment class was given by saintific learning. The instrument used in this research were test instrument to measure mathematical problem solving abilities that consist of pretest and posttest also learning accomplished's sheet to measure precentage learning accomplished according to learning plan which has been made.. The result indicated to: (1) mathematics learning by contextual learning using cooperative type Numbered Heads Together (NHT) setting is effevtive observed by student's mathematical problem solving abilities (2) mathematics learning by saintific aproach is effevtive observed by student's mathematical problem solving abilities (3) mathematics learning by contextual learning using cooperative type Numbered Heads Together (NHT) setting is more effective than saintific learning observed by student's mathematical problem solving abilities.

Keywords: effectiveness, contextual, NHT, saintific, problem solving

INTRIDUCTION

Problem-solving is an ability that is very necessary in the future, both in general and problem solving in mathematics. According to the statement of NCTM (2000), that he problem solving is a part of the learning mathematics, so it is important for the learning of mathematics.

In fact, the ability of mathematics' problem solving in Indonesia is still not good. This according to the results of PISA 2012, which states that Indonesia is the 2nd rank to bottom of 65 countries participating.

To answer these problems, in this research applied two kinds of learning models to improve students' mathematical problem solving. In the 1st experimental class applied contextual learning using cooperative type Numbered Heads Together (NHT) setting. In the 2nd experimental class applied scientific learning.

Contextual learning according to Ibrahim (2000: 10) as follows:

1. The teacher presents the goals/competences to be achieved and to motivate students to learn.
2. Teachers tell information to students with demonstration or through reading materials.
3. The teacher explains to the students how to form a group study and helps students make the transition efficiently.
4. The teacher guided learning groups when they do their work.
5. Teachers evaluate learning outcomes of the material that has been learned or each group presented their work.
6. Teachers appreciate the effort and the learning outcomes of individuals and groups.

Step cooperative learning Numbered Heads Together (NHT) according to Polya (2004) as follows:

1. Understanding the problem
2. Devising a plan

3. Carrying out the plan
4. Looking back.

While the scientific step by Permendikbud Number 103 years 2014 as follows:

1. Observing
2. Question
3. Gather information
4. Associate
5. Communicate.

After applying both of learning methods the researcher expected both of methods will be increasing the students' mathematical problem solving. However, according to the mathematical problem solving skills, contextual learning using cooperative type NHT setting more provide opportunities to enhance problem solving abilities of senior high school students compared to scientific learning.

RESEARCH METHOD

Type of research

This research is quasi eksperimental research used control group Pterest-Posttest Design.

Tine and Place of Research

This research did February 27th – April 27th 2016 in Senior Hight School 1 Sedayu, Bantul, Yogyakarta.

Population and Sample of Research

The population in this research were all students of 1st grade of 1 Sedayu Senior High School, Bantul, Yogyakarta in the school year 2015/2016, while the sample is 1st grade sains class of 1 Sedayu Senior High School, Bantul, Yogyakarta drawn at random with consideration of the homogeneous classes. A total of 64 students, divided into two classes, namely X MIA 1 class and X MIA 3 class.

Procedure

The research design used in this research was not randomized experimental research. In this design the 1st experimental group and 2nd experiment group were not chosen at random. Before the experiment began, given a pretest in

the form of an essay to see the capabilities of the mathematical problem solving.

Furthermore, students in the 1st experimental class applied contextual learning using cooperative type Numbered Heads Together (NHT) setting that given worksheets that use contextual approach by researcher as a learning resource. Students in the 2nd experimental class applied scientific learning with textbooks appropriate with curriculum 2013 from the government as a source of learning.

After the treatments were completed, teacher give posttest with equivalent test form. The results of mathematical problem solving ability on each model of learning in each group were then compared their effectiveness of contextual learning using cooperative type Numbered Heads Together (NHT) setting and the scientific learning according to ability of students' mathematical problem solving.

Data, Instrumen, and Data Collection Techniques

Data in this research are the value pretest and posttest students' mathematical problem solving abilities obtained from instrument test learning outcomes and data of precentage of learning activities implementation obtained from implementation lesson observation sheet.

The data is then analyzed through several stages, namely descriptive analysis and statistical analysis. At this stage of descriptive analysis were calculated minimum value, maximum value, average, median, mode, standard deviation and variance. While on stage statistical analysis of the normality test, homogeneity test, prior knowledge and final ability test, and hypotheses test to answer the problem that has been determined.

Data Analysis Techniques

Data obtained from the pretest and posttest mathematical problem solving abilities in both of the experimental classes were tested for normality and homogeneity as a prerequisite test to doing hypothesis testing. Furthermore, tested 1st, 2nd, and 3th hypothesis.

FINDING AND DISCUSSIONS

Pretest and posttest data problem-solving abilities in both classes in the research of this descriptively show increase of students' mathematical problem solving.

Tabel 1. Average Value of Each Problem Solving Steps

Steps		A	B	C	D
1 st Exsperimen	<i>Pretest</i>	9,75	6,00	6,88	1,25
	<i>Posttest</i>	18,81	16,88	34,56	16,13
2 nd Exsperimen	<i>Pretest</i>	9,94	5,06	6,75	0,75
	<i>Posttest</i>	17,03	15,47	32,94	15,06

Description:

A = Ability to understand problem solving

B = Ability to plan problem solving

C = Ability to solve the problem according to the plan

D = Ability to interpret an answer to concerns-original

Mathematical problem solving ability of students the most significant increased in the 'Ability to solve the problem according to the plan', although the three other steps were also increased. Table 1 shows that the increase in problem-solving abilities 1st experimental class higher than 2nd experimental class for each phase.

The data obtained are then tested for normality and homogeneity. On the normality test of data pretest-posttest of 1st experimental class and data pretest-posttest of 2nd experimental class on the ability of solving problems using SPSS 23 respectively show a significance value of 0.052; 0.121; 0.200; and 0.088 is greater than α 0.05. This means that the data of mathematical problem solving ability of students pretest-posttest 1st and 2nd experimental class is derived from normal distributed data.

Furthermore, the data homogeneity pretest and posttest mathematical problem solving ability using SPSS 23 respectively show a significance value of 0.557 and 0.867 that is greater than 0.05 α . This means that the data pretest and posttest students' mathematical problem solving ability homogeneous.

To know effectiveness of contextual learning using cooperative type Numbered Heads Together (NHT) setting to the mathematical problem solving ability of students, tested 1st hypothesis using SPSS 23. The significance value is

0.000 or less than 0.05. This means that contextual learning using cooperative type Numbered Heads Together (NHT) setting is effective to the mathematical problem solving abilities of senior high school students.

It is in line with the research by Eni Sulistyaningsih (2014) which conclude that the learning using cooperative type Numbered Heads Together (NHT) setting is effective to the mathematical problem solving abilities of students.

To find out effectiveness of scientific learning to the mathematical problem solving ability of students, the 2nd hypothesis tested using SPSS 23 obtained significance value of 0.0095 which is less than 0.05. This means scientific learning is effective to the mathematical problem solving abilities of senior high school students.

It is in line with the research by Anwar Rifa'i (2016) which conclude that the saintific learning is effective to the mathematical problem solving abilities of students.

To find out which one is more effective between contextual learning using cooperative type Numbered Heads Together (NHT) setting and scientific learning to the mathematical problem solving ability of students, first tested the average different value pretest both classes of experiments to determine whether there are differences in average or not between the two experimental classes. With the help of SPSS 23 is known that significant value for the mathematical problem solving ability is 0.479. The significance value greater than 0.05, so there is no average difference between contextual learning using cooperative type Numbered Heads Together (NHT) setting and scientific learning to the mathematical problem solving ability of students. So that the ability of mathematical problem solving's prior knowledge of both groups at the the same level.

If the ability of mathematical problem solving's prior knowledge of both groups at the the same level, then to see which is more effective between contextual learning using cooperative type Numbered Heads Together (NHT) setting and scientific learning to the mathematical problem solving ability of students tested the average different value posttest. Based on the cal-

culations have been done, the significance value for the mathematical problem solving ability is 0.028. This means that there is a difference between the average of contextual learning using cooperative type Numbered Heads Together (NHT) setting and scientific learning to the students' problem-solving abilities. Consequently necessary to tested the 3th hypothesis.

Furthermore, the 3th hypothesis test using SPSS 23 obtained significance value of 0.014 or less than 0.05. The average value of students in the 1st experimental class is 86.5, which is higher than the average value of students in the 2nd experimental class that is 80.75. This means that contextual learning using cooperative type Numbered Heads Together (NHT) setting is more effective than scientific learning according to the mathematical problem solving abilities of senior high school students.

This happens because on the contextual learning using cooperative type Numbered Heads Together (NHT) setting, students can exchange idea and cooperate with each other in the solved mathematical problems. In addition, step on NHT particular random dialing requires a sense of responsibility of each student to be able to solving a given problem. And according to Anita Lie (2008: 60), says that in the structure developed by Kagan the cooperative type Numbered Heads Together (NHT) setting required students learn to help each other in small group in order to solve mathematical problem.

CONCLUSION AND SUGGESTION

Conclusion

Based on the results of data analysis and discussion, we can conclude some of the following.

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1. Contextual learning using cooperative type Numbered Heads Together (NHT) setting is effective to the students' mathematical problem solving ability.
2. Scientific learning effective to the students' mathematical problem solving ability.
3. Contextual learning using cooperative type Numbered Heads Together (NHT) setting is more effective compared by scientific learning to the problem-solving ability mathematical students.

Berdasarkan hasil analisis data dan pembahasan yang telah dilakukan, dapat disimpulkan beberapa hal sebagai berikut.

1. Pembelajaran kontekstual dengan *setting* kooperatif tipe *Numbered Heads Together* (NHT) efektif ditinjau dari kemampuan pemecahan masalah matematika siswa.
2. Pembelajaran menggunakan model saintifik efektif ditinjau dari kemampuan pemecahan masalah matematika siswa.
3. Pembelajaran kontekstual dengan *setting* kooperatif tipe *Numbered Heads Together* (NHT) efektif dari pada pembelajaran menggunakan model pembelajaran saintifik ditinjau dari kemampuan pemecahan masalah matematika siswa.

Suggestion

Based on the research that has been done the math teacher suggested to use contextual learning using cooperative type Numbered Heads Together (NHT) setting and saintific learning, so give a positive impact on students' mathematical problem solving ability. Furthermore, to obtain a more optimal result in terms to increasing the ability of students' mathematical problem solving teacher suggested using contextual learning using cooperative type Numbered Heads Together (NHT) setting .

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