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Creative Thinking Ability to Increase Student Mathematical of Junior High School by Applying Models Numbered Heads Together

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ABSTRACT
Mathematical ability of students creative thinking is a component that must be mastered by the student. Mathematical creative thinking plays an important role, both in solving the problem and well, even in high school students. Therefore, efforts are needed to convey ideas in mathematics. But the reality is not yet developed the ability to implement a learning model that is expected to help improve KBKM students in mathematics. This research applies the model Numbered Heads Together (NHT) as an alternative to learning that is expected to enhance these capabilities. The research method was quasi-experimental with pretest and Posttest Control Group Design. The sample in this research is 130 eighth grader students of two school in Ambon. Each school represents high school rank and medium school rank. Each represents a high school rank and rank schools being. The hypothesis was tested at the 5% significance level. Analysis of the data by finding the mean, standard simpagan and n-Gain. From the analysis of the data found that: increase KBKM students in the experimental class and control class; (2) Learning with NHT better than Conventional method.

Keywords: Ability to think creatively mathematical, model Numbered Heads Together

A. Background

Mathematics as a subject, should be given to all students from primary schools to equip students with the ability to think logically, analytical, systematic, critical, and creative, as well as the ability to cooperate. At a certain subject, mathematics can be regarded as a network concept because it consists of some of the concepts related to one another. In the study of mathematics as a network concept, the main difficulty experienced by students is to link one concept with another concept (Widdiharto, 2008: 6). Often the lesson plan designed by the teacher greatly influenced by supporting books that became the reference of teachers and students in the classroom, so that the learning process in the classroom is not optimal considering the existing conceptions in students.
Teachers as managers in the learning process highly expected to resolve the problem. Therefore, the conception of the development of cognitive psychology teacher and the teacher's views about students' conceptions an important part in such a context. The thought process as well as a variety of intelligence possessed by the student, modality and learning styles, as much as possible be managed to be an effective learning strategy and harmony.

Some of the methods and strategies may have been done by the teacher in the learning process to provide positive reinforcement to students by providing a variety of props, and displays very important information. Creating a positive action is an important factor in stimulating brain function that can show and create a good learning styles. By using the appropriate method or strategy that means teacher in learning more save energy, time and improving learning achievement students. Althoug not easy to run, but with confidence, motivation and capabilities it possesses, creative teachers can develop and implement a range of methods or strategies learning with reference to the characteristics of the students.

Problem mathematical faced by students are often not immediately able to find the solution, while the students are expected and required to be able to resolve the matter. Students seemed to just listen, copy or imitate what is given by the teacher. Students are not allowed or encouraged to develop her potential, and creativity. Therefore, he needs to have the skills to think that her students can find the right way to solve his problems. The habit of copying or imitating someone else's job to make students become people who use only. Habits such students to learn concepts as rote without a deep understanding, and students are not able to apply it. Things like this make students less able to think creatively and are not trained to do the analysis before making a decision.

Ruseffendi (2006) argues that, there are ten factors that influence the success in the learning process such as: the child's intelligence, readiness of children, child talent, willingness to learn, the child's interest, the model presentation of material, personal and attitudes of teachers, the learning environment, teacher competence and

outside conditions , Therefore, the learning of mathematics should be focused on the development of creative thinking, students are free to try their own solutions. This means avoiding the conventional teaching method, emphasizing the "convergent thinking" so that students memorize mathematical rules and then theorem, for a problem with the level of difficulty of learning in order to find a solution. Thus, learning mathematics, now and in the future it is not permitted to stop only on the achievement of basic skills, but instead should be designed to achieve a high level of mathematical competence (high-order competencies).

Constructive mathematics learning should provide a challenging task that the students are trying to build their own prior knowledge informally, and use problem solving strategies to explore mathematically real experience of real context). Brown (2001) used the strategy to help students find new ideas to the solution generally is that a given task should be challenging and assume that students are not as recipients of knowledge, but as an agent of knowledge creation. Therefore, what is important for students not only the introduction of context that encourages students to participate fully, but how effectively their role on the context.

This study uses a model Numbered Heads Together, requires active students and can help improve learning achievement and attitudes toward mathematics. The study was conducted in Ambon grade of junior high school students (experimental class) and class VIII2 (control group) the school year 2014/2015, to see an increase in mathematical creative thinking abilities, as well as to minimize the difficulties faced by students in learning

B. Formulation of the Problem

The problem studied in this research is formulated as follows:
Is the increase in creative thinking abilities of students who obtain a mathematical model of learning with Numbered Heads Together (NHT) is better than mathematical creative thinking abilities of students who received conventional learning (PK)?

C. Research Purposes

In accordance with the formulation of research problems, the purpose of this study is:
To examine comprehensively upgrade mathematical creative thinking of students who received NHT learning model and conventional learning (PK).

D. The advantage of Research

The results of this research will be useful for:

1. Teacher: for teachers of this study can give a correct understanding of the material on a particular topic, so that students can understand the material to develop students' mathematical creative thinking abilities through the NHT.
2. Student: for students of this study provide a new experience and a lot for students to participate actively in the learning of mathematics in the classroom, so that in addition to developing the mathematical creative thinking abilities of students so there is an increase in student achievement, also makes the learning of mathematics more meaningful and useful.
3. Researcher: for researchers of this study can improve the ability of researching, developing as a theory NHT learning model introduced in mathematics education and a rewarding experience that can help them to develop the ability to think creatively mathematical students at various levels of education.

E. Review of Literature

1. Mathematical Creative Thinking Ability Students

The most common definition of thinking is the development of ideas and concepts in a person. The development of ideas and concepts of this goes through there grew the relationship between the parts information stored in a person in the form notions. The activity of thinking also involves the whole person and also involves the feelings and will of man. Means mentally to understand something experienced or looking for a way out of the problems being faced. In thinking contained dubious activities and ensure, to design, calculate, measure, evaluate, compare, classify, sort out or distinguish, connect, interpret, see the possibilities that exist, making analysis and synthesis, reason or draw conclusions from premises that is, to judge and decide.

Meyer (2005) classifies thinking into three main components, namely (1) think is a cognitive activity that occurs within the mental or a person's mind, not visible, but can be inferred based on observed behavior, (2) thinking is a process that involves multiple manipulations knowledge in cognitive systems. Knowledge stored in the

memory together with the information now, so changing one's knowledge of the situation at hand, and (3) the activity of thinking is directed to produce solutions to problems.

Creative thinking is mathematical thinking in solving mathematical problems. If in solving math problems routine, and students can complete in a manner different from that taught by teachers in the classroom, then these students can be said to be creative in mathematics. According to Briggs and Davis (2008) creative in mathematics is not a solution that is completely new, for example, when students find out the solution of a problem, it means the same creative to find a new answer. This leads to answers obtained by the students is the result of his own thoughts.

Krismiati (2009) argued that it is a product of creative thinking in problem solving. In solving the problem, one would think to look for ideas that are used to solve the problem so that those ideas into creative products. Besides McGregor (2007) states that, creative thinking is the thinking that led to the acquisition of new insights, new approaches, new perspective, or a new way of understanding things. Torrance (Filsaime, 2008) looked at creative thinking as a process that involves elements of originality, fluency, flexibility, and elaboration.

From the definitions that have been raised can be said that the creative thinking of students were able to be able to come up with ideas or ideas, make decisions and make generalizations.

Mathematical ability of students creative thinking can be done in various ways such as discussions, work on various questions with multiple choice or description with varying levels of complexity. According Ruseffendi (2006), to come up with creative abilities students need activities in which there are: (1) exploration for the broadest study material in accordance with the will of the students; (2) the invention positioned students to find their own theory learned or find their own ways of solving the problem; (3) discussion of means to position students in groups so they can share their opinions and knowledge; and (4) the project is a task to be completed and a problem solving activity in completing a given project.

Munandar (2002) describes the characteristics of creative thinking abilities as follows:
1. The current thinking skills (fluency)
Current thinking skills include the ability to spark ideas, solve problems and provide answers to a problem, give many examples or statements related to the concept in certain situations.
2. The flexible thinking skills (flexibility)
Flexible thinking skills include the ability to generate ideas, provide answers varied, using a variety of strategies completion, giving examples related to the concept and to find alternative solutions to many different.
3. Skills think originality (originality)
Original thinking skills (a novelty) includes the ability to give birth to new expressions, unique, unorthodox thinking of ways to express statements that a new, unique or unusual.
4. Skills itemize (elaboration)
Detailing thinking skills include the ability to explain in detail, enrich and develop an idea or product, add or itemize in detail of the situation so that it becomes more attractive, or answer specific mathematical situations.

Aspects of abilities measured in this study are: 1. Smooth concerning (a) solve problems and provide answers to the problem; or (b) provide many examples or statements related to a specific mathematical concepts or situations. 2. Aspects of flexibility includes the ability (a) using a variety of problem-solving strategies; or (b) provides a variety of examples or statements related to a specific mathematical concepts or situations. 3. Aspects of authenticity include the ability to (a) use strategies that are new, unique or unusual to resolve the issue; or (b) give examples or statements that are new, unique or unusual. While aspects of detail includes the ability to explain in detail the mathematical procedure, answer, or specific mathematical situations.

2. Model Numbered Heads Together

Model Numbered Heads Together (NHT) is one type of cooperative learning that emphasizes the special structure designed to influence the pattern of interaction of students and has a goal to improve student mastery. NHT melibatkatkan many students in reviewing the material covered in the lesson and check the students' understanding of the lesson content. Characteristic of the NHT learning is the teacher only appoint a student from each group for each case. In appointing the student, the teacher did not tell in advance who will represent the group. According to Nur (Susantyo, 2009) in this way will ensure total involvement of all students and is an excellent attempt to increase the responsibility of the students in group discussions.

Advantages of NHT according Shoimin (2014), namely: a) every student be ready; b) can conduct discussions in earnest; c) Students who are good can teach students who are less intelligent; d) There was an intense interaction between students in answering questions; e) No student who dominates the group because there is no number limit.

Disadvantages of NHT according Shoimin (2014), namely: he) Not very appropriate in the number of students that a lot because it takes a long time; b) Not all members of the group called by the teacher because of the possibility of a limited time.

3.Syntax Model Numbered Heads Together (NHT)

Syntax (step - step) following the implementation of the NHT.

Stage	Steps
Numbering	Students are divided into groups, and each student in the group are numbered
Asking question	The teacher gives the task / questions on each group's work
thinking Together	Each group began discussions to find an answer that is considered most appropriate and ensure all group members know the answer.
Answer	Teachers call one randomly. Students with the dialed number answers presented the results of their group discussions.

F. Research Hypothesis

Of the problems are formulated, the hypothesis proposed in this study as follows: an increase in the ability to think creatively mathematical learning with students who obtain modelNHT better than mathematical creative thinking abilities of students who received conventional learning (PK).

G. Design and Research Instruments

Penelitian ini merupakan penelitian kuasi eksperimen. Menurut Ruseffendi (2010) penelitian kuasi eksperimen subjek tidak dikelompokkan secara acak, tetapi peneliti menerima keadaan subjek seadanya. Desain penelitian yang digunakan adalah desain pretes-postes atau *The Pretest Posttest Control Group Design* (Tuckman, 1978; Ruseffendi, 2010). Desain eksperimen yang penulis gunakan dalam mengelompokkan subjek penelitian, perlakuan dan pengambilan data untuk masing-masing peringkat sekolah.

Experimental Design Comparison group pretest-postest

O	X	O
O		O

by:
O: Measurement tests of mathematical reasoning abilities of students (pretest and posttest)
X: Treatment of Learning through the NHT.

Each class is given a pretest and posttest study to measure students 'mathematical ability to think creatively and see the impact of learning on students' mathematical ability to think creatively. The research instrument consists of a set of test to measure students' mathematical ability to think creatively. Then performed a descriptive analysis of data obtained by calculating the average, and the percentage of each indicator so by overview.

H. Population and Sample

The population in this study were all students of class VIII junior high school year 20014/2015 in Ambon consisting of high school rank and rank schools being. Two schools in the sample consists of selected high-ranking school SMPN 4 and ranks as the school was selected SMPN 2. The two classes used in research that VIII1 classes as the experimental class (learning by NHT) has 34 students, and the class has 34 students VIII2 as the control class (conventional learning) at SMPN 4.

I. Results and Discussion

1. Mathematically Creative Thinking Ability (KBKM)
   a. Data Mathematically Students Creative Thinking Ability
      Picture quality KBKM students performed through the calculation of mean and standard deviation. While improving student KBKM terms of school (PS can be seen in Table 1 below.

Table 1.
Mean Increased KKM Students

	group Data	N	$\bar{X}$&SD	Ability Creative Thinking Mathematically						
				NHT				CL		
				Pre	Post	<g>	N	Pre	Post	<g>
School Ranking	High	34	$\bar{X}$	11,21	28,09	0,50	34	8,88	24,88	0,44
			SD	2,20	4,31	0,13		1,92	2,72	0,06
	medium	31	$\bar{X}$	11,32	27,45	0,48	31	8,52	21,58	0,09
			SD	2,21	3,11	0,48		2,16	2,95	0,08

Skor Maksimal Ideal KPM = 45

Overall, students who obtain learning by NHT has KBKM pretest mean of 11.21 is higher than the average pretest KBKM students who obtain the PK of 8.88, and the mean posttest KBKM students who obtain the NHT learning at 28.09, higher than postes mean students who received PK at 24.88. Likewise, average <g> KBKM students who obtain the NHT learning of 0.50 is higher than average <g> KBKM students who obtain the PK of 0.44. Based on the criteria of Hake (1999), an increase in the medium category.

KKM picture quality indicators mean and percentage calculations students can be seen in Table 2 below. The ability to think creatively mathematically (KBKM) measured by the instrument used in the research include aspects: (1) a smooth; (2) flexibility; (3) originality; and (4) of detail.

There are 10 test items form descriptions that are used to reveal the students' work to see the ability of student learning outcomes on the four aspects above. Question 1a, 8b and 10a look at the performance of students on the aspects 1, Question 2a, 3a, 3b, 7a, 7c and 9a look at the performance of students on aspects of the 2nd, Question 6a look at the performance of students on aspects of all three, and the matter 4b and 5a numbers look at the performance of students in all four aspects. Here is presented the average and the percentage of students' work on the fourth aspect.

Table 2
Data recapitulation Average Percentage
Mathematically Creative Thinking Ability Students

Group Data	Average Percentage Ability Creative Thinking Mathematically											
	Indicator 1			Indicator 2						Indicator 3	Indicator 4	
	1a	8b	10a	2a	3a	3b	7a	7c	9a	6a	4b	5a
Class Experiments	0.80	3.69	1.45	2.40	2.45	2.51	0.89	3.57	1.68	2.03	1.72	1.85
	80.00 %	**46.15 %**	**48.21 %**	**60.00 %**	**61.15 %**	**62.69 %**	**89.23 %**	**44.62 %**	**55.90 %**	**50.77 %**	**57.44 %**	**92.31 %**
Class Control	0.78	3.65	1.43	1.91	1.82	1.91	0.86	3.48	1.63	1.91	1.58	1.80
	78.46 %	**45.58 %**	**47.69 %**	**47.69 %**	**45.38 %**	**47.69 %**	**86.15 %**	**43.46 %**	**54.36 %**	**47.69 %**	**52.82 %**	**90.00 %**

Of all the items the ability to think creatively mathematically, the lowest percentage in the experimental class and control class, located on the Question 7c and 8b (Table above). Question 7c and 8b concerning aspects of the first and second. Question 7c and 8b contains a very complex task for students. Due to the first, students are required to be able to extend their ideas for solving mathematical problems mathematically. Second, from the image students are required to be able to formulate a link between the facts in the relevant mathematical models and can be completed to obtain the right solution. The maximum score for question number 7 c is 8, of the work of the students in the experimental class, earned the lowest score is 1 and the highest is 4 while the control class, the results of student work to Question 7c lowest score is 1 and the highest is 4. the maximum score to question 8b is 8, earned the lowest score in the experimental class, is 2 and the highest is 6, while the control class, to question 8b is the second lowest score and the highest is 6. From the results of student performance against both about the ability to think creative mathematically it can be concluded that the mathematical creative thinking abilities of students in the first and second aspect to question 7c and 8b are in the low category.

The mean increase in mathematical creative thinking abilities of students in the experimental class dijarkan with NHT is 0.43 while the average increase in mathematical creative thinking abilities of students in the control class was taught by conventional teaching is 0.39. From the results of its work, the students in a matter of numbers 7c

and 8b, students can declare the situation a problem in the picture and the facts, but the students have not been able to declare the problem by using pictures and facts in resolving questions correctly. This indicates that students have not been able to take advantage of images and facts to solve than the problem. This is reinforced by the results of interviews with students that the cause is the student less careful and still difficult to determine the base and the height of the triangle in the picture, and students are still wrong in determining the area of a triangle so as to obtain completion wrong. From the above description it is said that the increase in mathematical creative thinking abilities of students in the experimental class is better than the students in the control class. This is because the learning provided in either the experimental class and the control class is different. This increase is not to say that the students in the experimental class mastered the four aspects of the mathematical ability to think creatively

In the experimental group there are the test results are not optimal due to a difficult test questions. After the test, there are some students who recognize that the problem is more difficult test in the study when compared to a matter that is usually given by the teacher in the learning prior to the study. The big difference in students' ability to think creatively mathematical possibility because most students try to solve problems by creative thinking test different ways of thinking that is using its own experiences. In addition there is the impression that students are afraid to work on the problems outside the way they have been taught teachers. As a result, the way of thinking has changed in test-taking led to the students' answers are less precise. The above findings when linked with constructivism theory that students must actively construct their own knowledge by answering questions raised and students can explore new ideas or different ways to find the concept and break it.

At NHT learning models, learning begins with an overview of the topics to be studied. Mathematical creative thinking abilities required at this stage is to give students an idea of the topics that will be studied as well as connecting with the knowledge they already had, before the new ideas in the topic. This is in accordance with the opinion of Munandar (2002) that the characteristics of current skills (fluency) is giving a lot of ideas, answers or questions. The second stage of the initial review of the topics to be studied. The ability to think creatively mathematically necessary at this stage students are expected to present ideas clearly had in mind, students realize that the topics to be learned there are different opinions with other friends causing cognitive conflict within him, there is dissatisfaction with the ideas and encourage students to make a change.

The third stage is the in-depth review of the topics that will be discussed in detail. Mathematical creative thinking abilities required at this stage is for the student to new ideas, the desire to change the structure of their understanding, students are given a challenging problem for the courage to present its opinions and argue about the subject being studied. This is in accordance with the opinion of Munandar (2002) that characterize the ability of original thinking (originality) that is able to create new and unique expression, considering how prevalent tidk for himself.

The fourth stage is the review. Mathematical creative thinking abilities required at this stage is to summarize or revise the idea and refine, add to complete it. This is in accordance with the opinion of Munandar (2002) that details the skills (elaboration) enrich and develop an idea or product, add or itemize in detail of a situation so that it becomes more attractive.

This indicates that if learning with NHT applied consistently can become an integral part of the curriculum then it is possible the four components / aspects of students' mathematical creative thinking abilities can be improved optimally. This is an advantage of learning by NHT to improve students' ability to think creatively mathematical, and data in this study generally support the theory.

J. Conclusion

Based on the research results are presented obtained the following conclusions.

1. Improved ability to think creatively mathematical ability of students who received NHT learning model is better than students who received conventional learning. Overall improvement of mathematical creative thinking abilities of students who received study with NHT medium category.
2. Learning with NHT more suitable to enhance the students' ability to think creatively mathematically.

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