

CHAPTER I

INTRODUCTION

1.1 Background

Mathematics is a study that be the basic of science and technology that is very important in every aspect of human life. Therefore, mathematics is very important to teach in every level of education such as SD, SMP, SMA and university. Beside of that mathematics is mother of all science, so mathematics is very important to teach. The statement is supported by the statement Cockroft (in Abdurrahman, 2012:204) said that :

Matematika perlu di ajarkan kepada siswa karena (1) selalu digunakan dalam segi kehidupan; (2) semua bidang studi memerlukan keterampilan matematika yang sesuai; (3) merupakan sarana komunikasi yang kuat, singkat dan jelas; (4) dapat digunakan untuk menyajikan informasi dalam berbagai cara; (5) meningkatkan kemampuan berpikir logis, ketelitian, dan kesadaran keuagan; dan (6) memberikan kepuasan terhadap usaha memecahkan masalah yang menantang.

Beside that statement above, Cornelius (in Abdurrahman , 2012:204) also said that:

Lima alasan perlunya belajar matematika karena matematika merupakan (1) sarana berpikir yang jelas dan logis; (2) sarana untuk memecahkan masalah kehidupan sehari-hari; (3) sarana mengenal pola-pola hubungan dan generalisasi pengalaman; (4) sarana untuk mengembangkan kreativitas; dan (5) sarana untuk meningkatkan kesadaran terhadap perkembangan budaya.

Meanwhile, based on the outcomes of mathematics, Lerner (in Abdurrahman, 2012: 204) argues that "mathematics studies curriculum should include three elements: (1) concept, (2) skills and (3) problem solving ".

From the above statement, one aspect that is emphasized of the curriculum is to improve students' problem solving ability. Problem solving is a part of mathematics curriculum which very important because in the learning process and the solution, enabled students to gain experience using the knowledge

and skills already possessed to be applied to solve problems that are not considered routine.

The importance of problem solving ability was explained too by Hudojo (2005: 133)

Pemecahan masalah merupakan suatu hal yang esensial dalam pembelajaran matematika di sekolah, disebabkan antara lain (1) siswa menjadi terampil menyeleksi informasi yang relevan, kemudian menganalisisnya dan akhirnya meneliti kembali hasilnya; (2) keputusan intelektual akan timbul dari dalam merupakan hadiah intrinsik bagi siswa; (3) potensi intelektual siswa meningkat; (4) siswa belajar bagaimana melakukan penemuan dengan melalui poses melakukan penemuan.

Cooney et.al (in Hudojo, 2005: 130) states that:

Bila seorang siswa dilatih untuk menyelesaikan masalah, maka siswa itu akan mampu mengambil keputusan sebab siswa itu menjadi mempunyai keterampilan tentang bagaimana mengumpulkan informasi yang relevan, menganalisis informasi dan menyadari betapa perlunya meneliti kembali hasil yang telah diperolehnya.

And then in additional Husna, dkk (2013 :82) state that :

The purpose of teaching problem solving in general is to (1) build knowledge of new math, (2) solve problems that arise in mathematics and in other contexts, (3) implement and customize a variety of appropriate strategies to solve problems and (4) monitor and reflect on the process of mathematical problem solving.

Thus, problem solving should get more attention, considering the role in developing the intellectual potential of students. To find a solution of mathematical problem solving the students must utilize their knowledge, and through this process they will often develop new mathematical understanding.

A student is called having problem solving ability in mathematics when students have criteria, or commonly known as the indicator. There are four important phase to solve mathematics problem. In this research problem solving ability will be measured through students' ability to complete a problem by using problem solving steps as follows:

1. Understanding the problem
In this step, students should be able to point out the principal parts of the problem include the unknown and the data.
2. Devising a plan
In second steps, there are some alternatives to do include students can find the connection between the data and the unknown.
3. Carrying out the plan
Students be able to implementing problem solving strategies based on plan and operate of integers correct.
4. Looking back
Student be able to look back at the completed solution, by reconsidering and reexamining the result and the path that led.
(Polya, 1973).

During the learning of mathematics impressed not touching the substance of problem solving. Students tend to memorize math concepts, so that the students' ability to solve problems is lacking. Because students are not always motivated to want to look for his own ideas, only the teacher who has always played an active role in the learning process.

And in other occasions, Arends said that (in Trianto, 2009 : 90) "it is strange that we expect students to learn yet seldom teach then about learning, we expect student to solve problems yet seldom teach then about problem solving."

The above statements are also supported by researcher's preliminary of students at SMP Negeri 13 Medan in eighth grade. In this observation, students given problem indicating the mathematical problem solving. There are 23 students who took the test, the students are not able to fulfill the indicator of mathematical problem solving ability from the problem given. It can be seen from students' answer sheet when the students have the test about students' mathematical problem solving ability where the average score is 37,39. While based on the mastery level in problem solving ability, there is none get very high level (0%), 1 person (4,34%) who has high ability, 1 person (4,34%) who has medium ability, 12 person (52,17%) who have low ability, and 9 persons (39,13%) who have a very low ability. There are only 2 persons (8,69%) who achieve the learning completeness.

Based on the above explanation that became one of the main problems is the students are not taught about the steps to resolve mathematical problems and questions given is a problem that can be resolved through existing procedures. There were indications that the mathematical problem solving ability of students is still relatively low.

To anticipate such problems, a teacher should be able to choose appropriate learning models that can improve students' mathematical problem solving ability. The learning model used must be able to make students active, because the student activity capable of influencing their knowledge.

And the statement above added by Zulkarnain (2016 : 390), he said that : In this case students who possess basic skills require teachers' ability to shift their teaching from traditional to become active and innovative so that the learning process runs according to educational development that suits the present needs. Innovative learning leads the students to become creative, independent and able to develop their thinking to overcome existing problems.

Duren and Cherrington (in Yusuf, 2002 : 82) investigated the effects of cooperative group work versus individualistic effort on the learning problem solving strategies. They summarized that students in cooperative groups were more active in problem solving process and more open to solve the problems in different ways”

In group problem solving has the advantage, among others: (1) problem-solving strategies, which are arranged more powerful and complex. Problem solving in groups give students the opportunity to practice the strategy; (2) the group can resolve more complex problems than individuals (3) each member can practice planning and monitoring capabilities they need to make himself a better problem solver; (4) in the discussion, each member of a turn in the opinion and can double check their misconceptions; (5) when it got into trouble, the students are not so afraid to deal with it, because basically they do not independent but in groups.

Maheady, dkk (2006) said that:

A clear and consistent finding of educational research has been the importance of active student responding. During lectures and discussions, active responding most often takes the form of student responses to teacher questions. This whole group responding to questions, however, does not permit every student to respond and does not assure that all students are actively engaged. Previous research has shown that Numbered Heads Together is an efficient and effective instructional technique to increase student responding and to improve achievement.

In mathematical problem solving, can be done by working together. One model of learning that applies the principles of cooperation is a cooperative learning model of Numbered Heads Together (NHT). NHT is a model of learning by using a problem-solving approach, which is also able to involve students actively in learning. By using NHT, students are expected to help each other in order to develop mathematical problem solving abilities that increase their academic achievement (Dalud, 2014 : 303).

NHT learning model is the kind of cooperative learning that is designed to influence the pattern of interaction of students and as an alternative to the traditional class structure. Numbered Head Together (NHT) developed by Spencer Kagen in 1993 to involve more students in reviewing the material covered in the lesson and check their understanding of the subject content (in Trianto 2009: 82) . Teachers divide students into three to five member teams and have them number off on them so each student has a number between 1 and 5. Teachers ask students a question. After that, students put their heads together to figure out and make sure everyone knows the answer. Finally, the the teachers call a number and a student from each group with that number raise hands and provide answer to the whole class (Arends, 2011 :371)

Another alternative is a model learning Think Pair Share (TPS). The learning model TPS requires students to be able to present the problems and find strategies to solve mathematical problems that they face both corporately and individually. Thus, mathematical problem solving ability is expected to improve student achievement through learning using learning model of TPS (Dalud, 2014 : 303).

Cooperative learning model TPS (Think Pair Share) is a type of cooperative learning designed to influence students' interaction patterns. First developed by Frag Lyman and colleagues at University of Maryland accordance Arends in 1997, states that think pair share an effective way to create an atmosphere of variation patterns of a class discussion. "Assuming that all of recitation or discussion needs settings for controlling the class as a whole, the procedure used in think pair share can give a better student to think, to respond and help each other" (in Trianto 2009: 81). Thinking : the teacher poses a question associated with the lesson and ask students thinking alone about the answer. Pairing :the teacher asks students to pair off and discuss what they have been thinking about. Sharing : in teh final step, the teacher asks the pairs to share what they have been talking about with the whole class. It is effective to simply go around the form pair to pair and continue until about fourth or half of the pairs have had a chance to report (Arends, 2011 : 370-371).

Based on the above background, the researcher intends to conduct a research entitled : **“The Comparison of Students’ Mathematical Problem Solving Ability Taught by Cooperative Learning Model of Numbered Heads Together and Think Pair Share at SMP Negeri 13 Medan Academic Year 2016/2017”**.

1.2 Problem Identification

Based on the background of the problems that have been described problem identification in this research are

1. Most of students in SMP Negeri 13 Medan had low mathematical problem solving ability
2. The conventional way is often used in SMP Negeri 13 Medan student centered learning has not been applied fully in the teaching and learning process of mathematics.
3. Teacher in SMP Negeri 13 Medan rare using cooperative learning in Learning mathematics so less provide opportunities for students to express their ideas.

1.3 Problem Limitation

This research needs to restrict to get targets as expected. The limitation of this research are :

1. Students' problem solving ability on the topic of Similarity for Class IX in SMP Negeri 13 Medan for odd Semester 2016/2017.
2. The learning activities for this study are given by using numbered heads together and Think Pair Share.

1.4 Problem Formulation

Based in the background above, the author formulates the problems of the study as follows :

1. Is students' mathematical problem solving ability taught by cooperative learning model of Numbered Heads Together is higher than cooperative learning model of Think Pair Share in IX grade SMP Negeri 13 Medan Academic Year 2016/2017 ?

1.5 Research Objective

Based on the identification of the problem that has been described, the objectives of this research is:

1. To know whether students' mathematical problem solving ability taught by cooperative learning model of Numbered Head Together is higher than cooperative learning model of Think Pair Share in IX grade SMP Negeri 13 Medan Academic Year 2016/2017.

1.6 Research Benefit

After the research is expected to result of research can provide significant benefits, namely:

1. For the teacher, as a material consideration in choosing a model of learning that can improve students' mathematical problem solving ability.
2. For students, it can make-students having enthusiasm to improve mathematical problem solving ability.
3. For the school, it can be used as consideration and suggestion to improve the quality of teachers and learning system at the class.

4. For researchers, as reference materials to improve teaching and learning as future teachers and as study materials for further research.

1.7 Operational Definition

To avoid differences or lack of meaning clarity, the following operational definition are important terms in this research :

1. Students' mathematical problem solving ability is students abilities in solving mathematical problem with regard the process of understanding the problem, planning to solving the problem, implement solving plan and looking back.
2. The syntaxes of NHT are:
 - a. Phase 1 : Numbering : teachers divide students into three to five member teams and have them number off so each student on them has a number between 1 and 5.
 - b. Phase 2 : Questioning : Teachers ask students a queation.
 - c. Phase 3 : Heads Together : After that, students put their heads together to figure out and make sure everyone knows the answer.
 - d. Phase 4 : Answering : Finally, the the teachers call a anumber a student from each group with that number raise hands and provide answer to the whole class
3. The syntaxes of TPS are:
 - a. Phase 1 : Thinking
The teacher poses a question associated with the lesson and ask students thinking alone about the answer.
 - b. Phase 2 : Pairing
The teacher asks students to pair off and discuss what they have been thinking about.
 - c. Phase 3 : Sharing
In the final step, the teacher asks the pairs to share what they have been talking about with the whole class. It is effective to simply go around the form pair to pair and continue until about fourth or half of the pairs have had a chance to report.