

CHAPTER I

INTRODUCTION

1.1. Background of Study

Mathematics is the science that underlies the universal development of science and technology . Therefore, mathematics was made one of the very important basic science is taught at every level of education. In learning mathematics are required to think logically, systematically, thoroughly and critically, to process information, or solve a problem so useful in daily life as well as the language or as a development of science and technology. As has been said Cornelius (in Abdurrahman, 2009:253) that:

Five reason for the need to learn mathematics (1) A means of thinking clear and logical (2) A means to solve problem in daily life, (3) the means to know the relationship patterns and generalization of experience, (4) a means to develop creativity, and (5) a means to increase awareness of cultural development.

In other words, mathematics should be thought for students in order simplify or made it easier to solve problems. Mathematics is not an individual knowledge that cannot be perfect by their self, but it's there because of mathematics helps people to understand problems and to hold sociality, economics, and worlds. Mathematics makes us smarter, lose less money, have an easier time in college, meet more and more in the future, and increase our career options.

Realizing the importance of mathematics, then learning math should be a necessity and fun activities. But in fact learning math is often considered something scary and boring, this occurs because during this learn math simply tend to calculate the numbers as if there is no meaning and relation to the improvement of the ability of thinking to solve the question. Whereas with learn math we are trained to always think logically and critical in solving problems, and can train the honesty, diligence, and perseverance. According to Woodard (in Zakaria et all, 2013: 1), weaker students feel anxiety toward mathematics, and this anxiety affects their performance

in mathematics. Students who lack mastery in mathematics are less successful, despite being in secondary schools for a long period of time.

Two international researches conducted to demonstrate the ability of mastery in mathematics learning showed that Indonesian student capability still in the low level. EFA (2015 : 126) Global Monitoring Report that released by United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 2012, the Education Development Index (EDI) position of Indonesia was in level 64th from 120 countries in the world. OECD (2014: 5) in the survey of Program for International Study Assesment (PISA) in 2012 showed that from 65 survey countries for mathematics, reading and science skills, Indonesia was in 64thlevel with the mean score of mathematics skill was 375 while the average of OECD (Organization for Economic Co-Operation and Development) was 494.

EFA (2012: 19) provides the real condition of education in countries respected to six goals of education which was arranged in global meeting in Senegal, 2000. While PISA 2012 in OECD (2014: 6) provides the most comprehensive picture of the mathematics skills developed in schools that has ever been available, looking not just at what students know in the different domains of mathematics, but also at what they can do with what they know. Both of the survey suggest that improvement of mathematics education in schools need to be considered by various parties, including government, education observers and by teachers as the perpetrator of education itself.

Therefore the quality of mathematics education in Indonesia should be improved along with the development of the times. And talk about improving the quality of education cannot be separated from efforts to improve the quality of process and learning outcomes

Poor quality of education especially in the field of mathematics influenced by several factors. Among them, math lessons are presented in a form that is less attractive and hard to impress studied so many students who do not respond to lessons and bored.

Abdurrahman (2009:252) says: "from the various fields of study that has been taught in school, mathematics is a study of the most difficult lesson to students

are not better learning disabilities and learning difficulties”. Difficulty learning mathematics problem-solving ability resulted in students is low. Students tend to memorize mathematical concepts and just take notes, even though they don't understand what they are memorized and note so that when students are given math problems they don't understand how to solve them with concepts that they have memorized.

Specifically, based on the explanation of the mathematics' teacher in SMAN 5 Medan Mr. L. Pakpahan, there is a problem in which students are still difficult to solve mathematical problems. It can be understood because students are less involved in instructional process. Although the curriculum 2013 has been applied in the school but teacher still use the conventional method to teach the material. Teacher actively leads the learning process. It makes students feel so boring during the learning process. In other words, the learning model which used by teacher has not been proper with students' proclivity and need.

The learning process that's still in conventional way, where the teacher as a center of learning, make students less involved in the learning process so that student learning outcomes becomes low, causing a mathematical problem solving ability and independence of learning students are unable to grow and develop. This is in accordance with the said Trianto (2009:5):

The main issue in formal education (schools) nowadays is still low the learners absorption. It can be shown from students' outcomes that always cause for concern. This achievement is certainly a result of the learning conditions are still conventional and do not touch the realm of dimensions learners themselves, namely how to actually learn it. In the sense of something more substantial, that the learning process today still gives dominance teachers and do not provide access for students to develop independently through his discovery in his thinking process.

Based on the initial observation which researcher has done in January 27th, 2016 in SMA Negeri 5 Medan, researcher found main problem which related to students' learning outcomes. Most of students had low problem solving ability. Whereas, Slavin (2005: 249) stated “problem solving is a skill that very essential for the learners”.

Hamalik (2001:151-152) says “problem solving as an activity associated with the the selection of way out or a way that is suitable for action and changing conditions now heading to the desired situation”. Slameto (2010:86) stated that “Problem solving is seen as a process to find a combination of a number of rules that can be applied in an effort to overcome the new situation”. Problem solving ability is very important for students and their future. The lower ability of solving the problem is students have difficulty in learning mathematics, lack of interest in learning teaching mathematics considers difficult to understand because students become lazy to learn mathematics. To acquire the ability to problem-solving students have a many experience in solving the problem. Students who have a many training to a higher value than students are less practiced.

Actually, as a reference to the real facts above, Mink (2010: 188) proposes that there are seven difficulty factors in learning problem solving: (1) wrong order; (2) key words; (3) extraneous numbers; (4) hidden word numbers; (5) implied numbers; (6) multiple steps; and (7) exact mathematical vocabulary.

The low of students’ mathematical problem – solving ability also shown when the researcher did initial observation in grade XI SMA Negeri 5 Medan. With topic Statistics, the researcher gave this question below:

1. *The following figure illustrates parents occupation of 48 students. Determine how many parents who work as:*
 - a. PNS
 - b. Farmer
 - c. Entrepreneur
2. *Consider the price of gold for 5 days in the month of May 2013 below. Give an appreciation of the data and make the conclusion from the diagram*



From the test, Based on the test results and the answer given most students only focused search for the answer without making strides in solving the problem. Of the 30 students who take the test, retrieved level overview of students' mathematical problem solving ability as follows: there is a level of 46.67% of students who are very good at understanding the problem. There is a level of 26.67% of students who are very good at devising a plan, 50% who are very good at carrying out the plan and 3.3% who are good at looking back. Of these cases can be concluded that the students still has low ability in looking back.

The lack of problem solving ability becomes a topic that teacher must focus on. Teacher, with all of his or her professionalism, must engage students to learn problem solving. Teacher, for example, prepares students with many exercises. In doing the problem solving, the openness is truly important. Here is the point in which teacher and students interact all together in constructing knowledge. The more exercise, the more experience students. The exercises will help students to enrich their experiences in problems explorations. This point is represented by Gutierrez and Boereo (2006: 34) as follows:

... I understand problem solving to refer to the solving of problems by the forming and solving of equations; this is the narrow sense of the term. But the essential mathematical activity is that of exploring problems in an open way, extending and developing them in the search for more results and more general ones. Hence [all algebra learning] ... is based on problem explorations. This is the broad sense of the term.

Interview was also conducted with mathematics' teacher in SMA Negeri 5 Medan, Mr. L.Pakapahan. Researcher found that most of the teachers have received continuous training about various learning methods. But, in the implementation, most of them still using conventional way because of limitation of time and the content of material which could be given to students.

The same thing is also said Trianto (2009: 5) "empirically, based on the results of the analysis of the poor performance of learners due to the dominance of conventional learning process. In this learning atmosphere tends to teacher-centered classroom so that students become passive". Therefore, in order to overcome the problems of lack of student learning outcomes it is necessary to apply a model of

learning that can improve students' mathematical problem solving abilities. There are many models of learning that can improve students' mathematical problem solving abilities which are models of PBL and cooperative learning model that includes, (TPS, STAD, Jigsaw, Group Investigation, NHT and TGT).

Actually there is a lot of learning methods that have been used in learning process of mathematics. Cooperative learning is one of the most commonly used forms of active pedagogy. Taking place through an individual's interaction with his or her environment and peers, cooperative learning is largely based on the idea that students learn through social contexts (Tsay and Brady, 2010). Slavin (2005: 8) also stated that in cooperative learning method, students work together in four member teams to master material initially presented by the teacher.

Two forms of cooperative learning, the oldest and most widely researched is the Student Teams - Achievement Divisions (STAD) and Teams – Games – Tournament (Slavin, 2005: 143). Student Teams Achievement Divisions (STAD) was developed by Robert Slavin and his colleagues at Johns Hopkins University and is perhaps the simplest and most straightforward of the cooperative learning approaches.

Teachers using STAD present new academic information to students each week or on a regular basis, either through verbal presentation or text. Students within a given class are divided into four- or five-member learning teams, with representatives of both sexes, various racial or ethnic groups, and high, average, and low achievers on each team. Team members use worksheets or other study devices to master the academic materials and then help each other learn the materials through tutoring, quizzing one another, or carrying on team discussions (Arends, 2012: 368).

While in another hand, kothiyal dkk (2013) state that Think-Pair-Share (TPS) is a classroom-based active learning strategy, in which students work on a problem posed by the instructor, first individually, then in pairs, and finally as a class-wide discussion. Students pair up to share thoughts on a problem or question initiated by the instructor. This can be modified to involve pairs of students

exchanging ideas to enrich the discussion. The technique is good for generating class discussion and sharing of opinions and ideas.

Based on background above, researcher interested in conducting research entitled:

“The Difference of Students’ Problem Solving Ability that Taught Using Cooperative Type Think – Pair – Share (TPS) and Student Teams - Achievement Divisions (STAD) in Grade XI SMA Negeri 5 Medan A.Y 2016/2017”.

1.2. Problem Identification

Identified problems based on the background of research above are:

1. Learning math is often considered something scary and boring
2. Students tend to memorize mathematical concepts and just take notes, even though they don't understand what they are memorized and note so that when students are given mathematics problems they don't understand how to solve them with concepts that they have memorized.
3. Students’ mathematical problem solving ability in SMA Negeri 5 Medan tends to be low. Based on the description of the mathematics teacher of SMA Negeri 5 Medan , students are not too good in solving problems.
4. Learning process in the classroom is not involving experiential situation so that students do not make many contribution to build their knowledge.
5. The conventional way is often used in SMA Negeri 5 Medan while respected to Curriculum of KTSP or Curriculum 2013, student centered learning has not been applied fully in the teaching and learning process of mathematics.

1.3. Problem Limitation

Based on the problem identification, the scope of this study is limited on the difference of students’ problem solving ability taught using cooperative learning model type of think – pair – share (TPS) and students teams – achievement division (STAD) in grade X SMA Negeri 5 Medan.

1.4. Problem Formulation

Based on the background above, the problems are formulated as: “How is the difference between Cooperative Learning model of Think – Pair – Share (TPS) and Student Teams – Achievement Division (STAD) towards students’ problem solving ability?”

1.5. Objectives of Research

The objectives of the research is:

To know any difference between cooperative learning model type of Think – pair – share and student teams – achievement division towards students’ problem solving ability in Grade X SMAN 5 Medan.

1.6. Benefits of Research

This research is expected will give the benefits as follows:

1. For students, helping them to increase their problem solving ability of mathematic
2. For teachers, opening their insight about developing the learning process well.
3. For school, increasing the quality of school caused by the increasing of students’ learning outcomes and teacher activities.
4. For researcher or advanced researcher, improving the insight, ability, information and experience in increasing the competency as teacher student.

1.7. Operational Definition

The operational definition of this study is described as follows:

1. Cooperative Learning Think- Pair-Share (TPS) type: The think, pair, share strategy is a cooperative learning technique that encourages individual participation and is applicable across all grade levels and class sizes. Students think through questions using three distinct steps:

Think: Students think independently about the question that has been posed, forming ideas of their own.

Pair: Students are grouped in pairs to discuss their thoughts. This step allows students to articulate their ideas and to consider those of others.

Share: Student pairs share their ideas with a larger group, such as the whole class. Often, students are more comfortable presenting ideas to a group with the support of a partner. In addition, students' ideas have become more refined through this three-step process.

2. Student Teams - Achievement Divisions is one of the systems of cooperative learning in which students learn to be formed into groups of four or five members representing the students with the skills and different genders.
3. Problem solving ability is the ability which gained by students to understand and complete the problems which are faced by using their skills and abilities to determine the concept they should use to be applied in solving the problem.