

# CHAPTER I

## INTRODUCTION

### 1.1. Background

Law Number 20 Year 2003 about National Education system states that the national education serves to develop skills and to form the character and dignified civilization nation in the context to intellect the life of the nation. Education aims to develop the potential of students to become a human being that faithful and pious to God Almighty, noble, healthy, knowledgeable, skilled, creative, independent, and become citizens that democratic and accountable.

Education plays an important role in preparing qualified human resources and capable of competence in the development of science and technology, so education should be implemented as well as possible to obtain maximum results. Entering the 21st century, the national education system faces a very complex challenge in preparing the quality of human resources that can compete in the global era. The appropriate effort to prepare the qualified human resources and the only place that can be viewed and should serve as a tool for building a high quality of human resources is education (Trianto, 2009:4).

To realize this fact, required a high level of capability that is logical thinking, creative and proactive collaboration capabilities. This way of thinking can be developed through the study of mathematics. One subject that cut across all the sciences is mathematics. Today, mathematical methods pervade literally every field of human endeavour and play a fundamental role in economic development of a country. In our march towards scientific and technological advancement, we need nothing short of good performance in mathematics at all levels of schooling. Unfortunately performance of students in mathematics at the end of secondary education has not improved in the past decade (Umoinyang in Tella 2007). As stated by Sudrajat in the seminar of the role of mathematics in the development of science and technology that mathematics is a basic science that is needed for the foundation for modern technology and science. In addition, mathematics provides the high skills on a person in terms of abstraction, problem analysis and logical

reasoning. This shows that math is needed also by other disciplines due to develop the science of mathematics that is needed as the foundation. Given the importance of the science of mathematics, it is expected that students can learn the science well. By mastering mathematics, the students will also be easier to learn other subjects especially in science and engineering.

Science education had emphasized the importance of mathematics in science teaching and learning (Iroegbu, (1997). Abdullahi (1982) said, concerning science and mathematics. Although mathematics and science are taught as separate subjects in schools from instructional point of view, science activity in the classroom has mathematical implications as working mathematical problems has scientific imports (Adesoji & Ibraheem, 2009:15).

Trigonometry is the branch of mathematics which treats of the relations of the sides and angles of triangle, which the methods of deducing from certain given parts other required parts, and also of the general relation which exist between the trigonometrical functions of arcs or angles (BrainyQuate, 2001).

Trigonometry has a very close relationship in our lives, both directly and indirectly. Trigonometry is the mathematical science that is very important in life. Trigonometry applications spans all fields such as astronomy, geography, music theory, electronics, economics, medical, engineering, and many more. By using trigonometry we can measure the distance of a star sky without having to go there. By trigonometry we can measure angles without having to climb the cliff height. We can measure the width of a river without having to cross it. That is the benefit of studying trigonometry in everyday life. The first thing that is needed to be understood in understanding the basic concepts of trigonometry is to know and to understand the forms and formulas of a triangle, especially the right angle triangle. Basically a triangle always consists of 3 sides, hypotenuse, opposite side, and adjacent side. And the three angles are right angles, opposite angle and adjacent angle, where if added the angles of a triangle must be 180 degrees. The main purpose of studying trigonometry in mathematics is to find the value of an angle or the length of a side of a triangle (Iksan, 2013). Along with the times, trigonometry continues to be developed, integrated with other disciplines in order

to be benefited together. Originally trigonometry comes as a solution to solve the size of simple plane, with the growing age of trigonometry is often used in the world of applied science (real life), the development of other sciences, as well as the development of mathematics itself. Trigonometry is very beneficial in the science of astronomy, because the size of celestial bodies are impossible to measure by using a ruler, it must be calculated by using scales and angles, so that its size can be estimated accurately. Double angle trigonometric formulas is used for these values due to the size of the angles that are not specific. In addition to the field of astronomy, trigonometry is also very closely related to the work of a surveyor (land geometer). Measurement of soil is a branch of natural science to determine the three-dimensional of place position of a point on the earth's surface (Nisa, 2012).

However, in fact, education in Indonesia has not achieved the desired results, because educational institutions have not been able to produce qualified human resources. Even the national education was considered to have failed to build the character of the nation. This is evident from the low value of the results of national examinations, especially the value of mathematics. Though mathematics is a field of study that underlies all disciplines. In the last of ranking Programme for International Student Assessment (PISA), maths literacy skills of students in Indonesia is very low. Indonesia ranks 61 out of 65 participating countries ranking. Based on data from the Institute of Education (2003), the results of statistical studies conducted internationally in the Trends in International Mathematics and Science Study (TIMSS) showed that Indonesia ranked 34th out of 45 countries for mastery learning in mathematics.

Score Indonesia is 411 are still below Singapore (605) and Malaysia (508), but remained in the Philippines (378). In general, the learning of mathematics in Indonesia, including learning trigonometry in high school is still far from satisfactory and sometimes arguably still disappointing. It can be seen from the results of EBTANAS and UAN score from year to year, for the mathematics that includes trigonometry are included in the category of "low" (Setiawan, 2004:1). Two major problems in mathematics education in Indonesia is

low student achievement (low of competitiveness in international event and low of student average score in EBTANAS especially mathematics) and their lack of interest in learning math (math is considered difficult and taught with methods that are not attractive because teacher explained, while students just noted). Allegedly, approach to learning mathematics in Indonesia are still using the traditional approach or mechanistic. It emphasizes on training on answer question or drill and practice, procedure and the use of formulas. Students are less accustomed to solving problems or applications that many around them (Zulkarnain,2012).

Mathematicians from the Technology Institute of Bandung, Iwan Pranoto, in a roundtable discussion organized Indonesian Teachers Association states that, mathematical illiteracy condition has not changed even since 2003. For seven years, from the scale of 6, Indonesian students' math skills are only at level-2. Another study from the Program for International Student Assessment (PISA) in 2010 showed a similar condition. The position of Indonesia was ranked third from the bottom, better than Kyrgyzstan and Panama. However, Iwan explained that it is not to worry about the position, but two other important facts. First, the percentage of students in Indonesia are below the level of two very large (76.6 %), and the percentage of students who are at level five and six are statistically nothing. According to the definition of math proficiency level of the Organisation for Economic Co-operation and Development (OECD), student below the level two will not be able to be function effectively in 21st century life (Nadia, 2011)

Meanwhile, according to Trianto (2009:5) the main problem in learning in formal education (school) today is the low absorptive capacity of learners. This is evident from the study of students that is always very alarming. This is based on the interest and willingness of students who lack in math. The definition of interest is the tendency of a person to an object or something popular activity, which is accompanied by feelings of pleasure, lack of attention, and the activity of doing. From this definition, we can say that without any interest in maths then it could not have liked math students, can't be addressed by the student and no student activity therein. Besides interest, willingness also is the basic thing that is

needed for students to learn because with the willingness of students to learn without force from others that means that he/she can learn from his own willingness. Student learning environments also affect student learning outcomes. As noted Trianto (2009:12), the learning environment is very important, namely:

- Effective learning begins from the student-centered learning.
- Teaching should focus on how students use their new knowledge. Learning strategies is more important than the result.
- Feedback is very important for the students, who come from the correct assessment.
- Develop a learning community in the form of group work is important.

In addition to the internal factors of students, external factors also affect the results of learning are teachers and students. One that leads to lower of students learning is the learning model that is conducted by teacher is still conventional.

As stated by Trianto (2009:5) that, "Based on the analysis of research about the low of learning outcomes of students due to the dominance of conventional learning process".

In the conventional learning environment tends to teacher-centered classroom so that students become passive. In this case, students are not taught learning strategies to understand how to learn, think and motivate yourself (self-motivation), but these aspects are key to success in a lesson. This problem is often found in the teaching and learning activities in the classroom. Therefore, it is necessary to apply a learning strategy that can help students to understand the teaching materials and applications as well as its relevance in everyday life.

Based on the interview (January 21, 2013) with the mathematics teacher in SMA Negeri 1 Berastagi, Mrs. Lindawati br Ginting, said that :

Students are difficult to study mathematics and one of the topics that they can't understand is trigonometry. Students think that trigonometry has many formula and they are difficult to remember and to apply that formula in the trigonometry problem. In learning process, the student

also inactive to ask or answer the question from the teacher. The evident, in daily examination of trigonometry, all of students can't reach the standard value and all the value is very concern, so the student achievement in the topic of trigonometry is low.

From the some descriptions above researcher can conclude that many of students are not able to understand the subject matter well. This can happen due to lack of student interest in learning so that every student learning seems less active and saturated in learning. In addition to the student, activity that is still lacking in learning, things that affect students' learning is their ability in terms of completing the given problem.

From the results of diagnostic test that is conducted, the researchers noticed that students still have low capability in solving problems in essay questions. The result of survey that conducted by researcher (March 30, 2013) by conducting diagnostic test to the students of grade X of SMA Negeri 1 Berastagi in topic of trigonometry. From 32 students who take the test, the avarage score that are obtained is 24 (score scale 0 – 66), by changing the diagnostic test into score in scale five is got the student achivement in trigonometry is:

**Tabel 1.1. Student Outcome in Trigonometry Topic in Diagnostic Test**

Score	Letter Value	Category of Student Outcome	Total of Student	Percentage of Student Total
93% – 100%	A	Very High	0	0 %
85% – 92%	B	High	5	15.625 %
75% – 84%	C	Medium	2	6.25 %
65% – 74%	D	Low	8	25 %
≤ 64%	E	Very Low	17	53.125 %

From the result test can be also seen that 10 students (31.25%) have score under the minimum completeness criteria that is 10. From the data, it can be concluded that student achievement in the topic of trigonometry is low.

Seeing this situation, it should be the task of the teacher is not only teaching science alone, but also plays a role in terms of helping students in each solve existing problems. Teachers are also expected to master math learning concepts well and able to think critically in terms of finding the solution of problem. In this case, the teacher has the task of trying to improve the ability of students to understand the material so well that with it, the results can also be improved student learning. In addition to learning outcomes, things that should be considered by the teacher are the activity of the students. Students are expected to be more active in the learning process so that there is good feedback between teachers and students so that students can be more interested in learning math

One way to enhance the activity and student learning outcomes is the adoption of cooperative learning model. Learning is using small groups so that students work together to achieve learning objectives. Students in cooperative learning group discussions, help each other and work together to overcome learning problems. Cooperative learning consists of several types that have the advantages of each. One of them is the strategy of Think Pair Share (TPS). TPS strategy is a type of cooperative learning that is designed to influence the patterns of student interaction. This strategy can give students more time to think, to respond and help each other. In this case the teacher will use the three steps that students will think of themselves in response to the issue, after which students will be paired up and are able to discuss and share events ending with the class about what was discussed by each partner. Thus, students can be more active in following and learning can improve student learning outcomes.

Based on explanation above, then research in interested to conduct a research entitle: **Implementation of Think Pair Share (TPS) to Increase the Activity and Student Outcome in Trigonometry Topic in Grade X of SMA Negeri 1 Berastagi in the Year of 2012/2013.**

## **1.2. Problem Identification**

Based on the background above, some problems can be identified as follows:

1. Mathematics students outcome are still low.
2. Mathematics is a field of study that is considered difficult by students.
3. Students still dominant passive and tend to only receive information from the teacher
4. The use of learning model that is chosen by teacher irrelevant.

## **1.3. Problem Limitation**

Based on the problem identification, the problem that is exist is limited on implementation of TPS to increase the activity and student outcome in the trigonometry topic in grade X of SMA Negeri 1 Berastagi in the year of 2012/2013.

## **1.4. Problem Formula**

Based on the problem limitation above, then the problem can be formulated as follows.

1. How does the increasing of the activity and student outcome in the topic of trigonometry by implementing TPS?
2. How does student respond to the implementation of TPS in the topic of trigonometry?

## **1.5. Research Objective**

1. To know the increasing of activity and student outcome in grade X in the topic of trigonometry by implementing TPS.
2. To know student respond by implementing TPS in the topic of trigonometry.

### 1.6. Research Benefit

1. For student, to increase student outcome especially in the topic of trigonometry.
2. For teacher, as information material, overview and consideration in choosing learning model that can increase activity and student outcome.
3. For school, can use the result of research as reference that can be used by the other teachers.
4. Academicians gain an overview of cooperative learning model in type of TPS.

