

## CHAPTER I INTRODUCTION

### 1.1. Rationale

Mathematics is a subject that is very important at every level of education, from primary to higher education. This is because mathematics can train students to think logically, be responsible, have a good personality and have skill in solving problems in real life. There are many reasons for students to learn and master mathematics. As Cockroft (1982) (in Abdurrahman, 2009: 253) given the reasons that mathematics always used in terms of education since all fields of study require appropriate mathematical skills, it is a powerful means of communication, it can be used to present information in a variety of ways, it can improve the ability of logical thinking, accuracy, and spatial awareness, and to give satisfaction to the efforts to solve challenging issues.

However, many students who still think that mathematics is a subject which is frightening, because it is one of the main causes of failure of students in the National Examination. Based on interview with one of mathematics teacher in SMA Negeri 1 Batang Natal, Mrs. Dewi, conclude that student's mathematics achievement generally is still low. From the results of semester examination, there are only about 70%-78% of students who achieve a minimum standard of mastery learning. It means that there is still 22%-30% of students who have not been thoroughly studied. If it is reviewed from their daily scores when conducting learning process, not all of the subject matters have the low percentage of mastery learning. But one of the subjects is trigonometry. Student's math test score on trigonometry is low. It is caused of there are many formulas that must be memorized and used in trigonometry and students can not apply the formulas to solve a problem, and they are also have difficulty to derive a formula to obtain a new formula that can be used for certain problems.

Students' attitudes toward math and mathematics learning is closely related to students' achievement in mathematics. Suydam & Weaver (1975) (in Turmudi, 2008: 87) conclude that students learn more effective when they are

interested in what they learn and they achieve well if they loved math. To be positive attitudes toward mathematics, concern should be directed towards the continuous creation, development, maintenance, and encouragement.

This is certainly part of the math teachers' roles to improve students' attitudes and achievement. Mathematics teacher needs to guide learners to engage in higher levels of cognition when using meaningful materials and relevant strategies for learners (Rao, 2005: 121). In order for students to be positive in math, the attractive strategies is needed to motivate them in learn, give a sense of security to learn, and fun for them. In addition, teachers should also be able to choose more effective strategies in implementing the learning. But, learning model which is used by teachers sometimes is not relevant with the subject or topic that is learned.

Killen (1998) (in Sanjaya, 2006: 131) suggested that: "No teaching strategy is better than others in all circumstances, so you have to be able to use a variety of teaching strategies, and make rational decisions about when each of the teaching strategies is likely to most effective".

Learning strategies that is used by teachers are extremely diverse. There are teacher-centered and student-centered approaches. The National Council of Teachers of Mathematics (NCTM) (in Macpherson , 2007) recommends that:

Students be provided opportunities to work together cooperatively in large and small groups on significant problems that arise out of their experiences and frames of reference. Group assignments should help learners combine new knowledge with prior knowledge, leading to the construction of new ideas within the group. Students should question, discuss, make mistakes, listen to the ideas of others, provide constructive criticism and summarize discoveries.

Education experts recently gave attention to learning strategies and encouraged to use the student-centered strategy, one of the strategies is cooperative learning. Cooperative learning is a series of learning activities undertaken by students in heterogeneous groups to achieve a common goal. Some studies show that using cooperative learning can improve student achievement

while increasing the ability of social relationships, growing acceptance of self and others lack, and enhancing self-esteem. Cooperative learning also can realize students need in learning to think, solving problems, and integrating knowledge with skills.

More clearly, Slavin (1995) (in Biehler & Snowman, 2009) argued that:

Students who learn cooperatively tend to be more highly motivated to learn because of increased self-esteem, the proacademic attitudes of group mates, appropriate attributions for success and failure, and greater on-task behavior. They also score higher on tests of achievement and problem solving and tend to get along better with classmates of different racial, ethnic, and social class backgrounds. This last outcome should be of particular interest to those of you who expect to teach in areas marked by cultural diversity.

Cooperative learning strategy is developed in an effort to increase student's participation and generate effective interaction among group members through discussion. Cooperative small group as learning atmosphere where students interact with others in small group to complete academic task and to accomplish a common goal.

Cooperative learning refers to work done by student teams producing a product of some sort under conditions that satisfy five criteria: (1) positive interdependence, (2) individual accountability, (3) face to face interaction for at least part of the work, (4) appropriate use of interpersonal skills, and (5) regular self-assessment of team functioning. (Richard & Rebecca: 2007)

Cooperative learning has many variations of model. Based on research of Dotson (2003) found that cooperative learning structures could increase student achievement. Two of the cooperative learning structures are Think Pair Share and Numbered Heads Together Models.

Think Pair Share is a learning model which proposed by Franklin Lyman (1985), aims to teach students to be more independent in solving problems which can generate students' self-confidence. In addition, TPS also teaches students to accept differences and work together with others. TPS is a learning model indicating how to think and share with group.

Educational research on the use cooperative learning type TPS has been studied previously. Ahyar (2011) said that there is significant differences in student's achievement who are taught by TPS and Snowball Throwing models. Students' mean score in statistics taught by TPS and Snowball Throwing respectively are 79.123 and 68.889. It concludes that average value of students on the subject of statistics by implementing TPS is higher than Snowball Throwing. Another educational study about TPS is research of Rahim (2010) which also found the improvement of students achievement on the subject of algebra factorizes.

Numbered Heads Together is a learning model developed by Kagan (1998) to involve more students in examining a variety of subject matter in a lesson and to examine their understanding about content of the lesson. Educational research on the use cooperative learning type NHT has also been studied previously. Tambunan (2011) found that students mathematics problem solving on the topic of algebra by implementing NHT and STAD respectively have average value of 75.475 and 72.456. It indicates that NHT better than STAD in the topic of algebra.

Since not all learning models are suitable to achieve all the goals and circumstances and each learning model has its own characteristics. As well as in mathematics, then not all learning models are effective used for each topic in mathematics such as trigonometry. Therefore, the selection of in appropriate learning model will be able to make effectiveness of learning decreases that indicates the decreasing of students achievement, thus there needs to be concern to the model that is used by teachers in learning process.

Based on the above explanation, it should be conducted further study which entitled: **“Comparison of Student's Mathematics Achievement by Implementing Think Pair Share (TPS) and Numbered Heads Together (NHT) on Trigonometry for X Grade Students in SMA Negeri 1 Batang Natal in the Year of 2012/2013”**

## **1.2. Problems Identification**

Based on the background, some issues that can be identified as follows:

1. Mathematics is a frightening lesson for students
2. Student's achievement on math test scores especially on trigonometry is low
3. Learning model which is used by teachers is not relevant

## **1.3. Problems Limitation**

Based on the identification of the research problems, the scope of this study is limited on:

1. Learning models which is used in this study are Think Pair Share (TPS) and Numbered Heads Together (NHT)
2. Objects of this study are students in X grade of SMA Negeri 1 Batang Natal
3. Data in this study is data of student's math scores that is got from students' math posttest scores.
4. Study is focused on topic of Trigonometry

## **1.4. Research Question**

Research question in this study is: "Is student's mathematics achievement who taught with TPS higher than student's mathematics achievement who taught with NHT on trigonometry for X grade students in SMA Negeri 1 Batang Natal in the year of 2012/2013?"

## **1.5. Research Objective**

Objective of this study is to know whether student's mathematics achievement who taught with TPS higher than student's mathematics achievement who taught with NHT on trigonometry for X grade students in SMA Negeri 1 Batang Natal in the year of 2012/2013.

### 1.6. Research Benefits

The results of this study are expected to provide benefits for:

1. Teachers
  - a. It helps math teachers in effort to find the effective learning to improve student's achievement in math.
  - b. It can be study reference for teachers and motivates them to conduct many research in others subject.
2. Students
  - a. Students achieve math better by applying effective learning model in learning process.
  - b. It can improve students' learning creativity, collaboration, and responsibility to make learning more qualified.
3. Researchers
  - a. It can be an input for a similar study
  - b. It can serve as guidelines in performing their teaching duties in the future.