CHAPTER I
INTRODUCTION

1.1. Background of Research

Mathematics is one of the most important subjects that provide several vital skills to the learners. Most of jobs needs ability and understanding of mathematics. That is why mathematics is basic science that have a main action in developmental of science and technology. Technology nowadays made and dominated by mastery mathematics early. It also the reason why mathematics is one of subject matters that should be given to students since in kindergaten up to higher education.

According to NCTM (in Walle, 2007: 1), in this changing world, those who understand and can do mathematics will have significantly enhanced opportunites and options for shaping their futures. Mathematical competence opens doors to productive futures. A lack of mathematical competence keeps those doors closed. NCTM challenges the assumption that mathematics is only for the select few. On the contrary, everyone needs to understand mathematics. All students should have the opportunity and the support necessary to learn significant mathematics with depth and understanding.

The purpose of learning mathematics was explained well on the Regulation of National Education Minister (Permendiknas) number 81A of 2013 about Concept and Learning Strategies. It stated that the learning process is needed using some principles which contained of: (1) students center, (2) developing the creativity of students, (3) creating fun and challenging condition, (4) contains the value of ethics, aesthetics, logic and kinesthetic, (5) provides a diverse learning experience through the implementation of various strategies and joyful learning methods, contextual, effective, efficient, and meaningful.

Two international researches conducted to demonstrate the ability of mastery in mathematics learning showed that Indonesian student capability still in

the low level. Based on data of Education for All (EFA) 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. Meanwhile 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 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 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.

Although the government has released Curriculum of 2013 and expected the teachers to develop their teaching way and do their function in the classroom as a facilitator of learning, the real fact that researcher found when doing Integrated Field Experience Program (PPLT) in SMA Negeri 2 Balige was different. The learning process mostly happened in conventional way. Teachers directly provide mathematical formulas to the students and the students only see, memorize, and apply the formulas. Then mathematics was presented as very bored lesson and most of them sleeping in the class. As a result, the math test scores of students are still low.

The statement above is evident based on the data which researcher found when doing Integrated Field Experience Program (PPLT), all of students in grade XI of Science (XI MIA1 – XI MIA6) passed the mid – odd semester examination with the average value 75.04. While the minimum standar criteria (KKM) was 75.

Interview was also conducted with mathematics' teacher in SMA Negeri 2 Balige, Mrs. Hanita Friska Simangunsong, S.Si. 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 sould be given to students.

Actually there is a lot of learning methods that have been used in learning process of mathematics. Whether Curriculum of KTSP or Curriculum 2013 which is used in the school, problem – based learning is one of suitable model. PBL makes students work with classmates to solve complex and authentic problems that help develop content knowledge as well as problem – solving, reasoning, communication, and self-assessment skills. These problems also help to maintain student interest in course material because students realize that they are learning the skills needed to be successful in the field (White, 2011: 1).

In another side, Larson and Timothy (2013: 204) said that cooperative learning involves quickly formed groups that may work together for a few minutes or a whole class period. 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. Numbered Heads Together (NHT) is one of the cooperative learning model that requires student works together and cooperatives so that the problem can be solved well. Spancer Kagen as the developer of this learning model designed the learning such that the students can check and look at their insight about the content of material.

Millis (2010: 11) recognize the close kinship between cooperative learning and problem – based learning – both on highly structured group work. PBL and cooperative learning are ideally suited for each other. PBL fits into the cooperative learning framework like a hand in a glove. Well, the characteristics of Problem – Based Learning (PBL) and Numbered Heads Together (NHT) refers to student centered learning which improve the conceptual understanding in mathematics. Furthermore, Tokuhama – Espinosa (2014: 204) explain process of finding solution at the group level considering PBL as a type of cooperative learning, and vice versa. It means PBL and cooperative learning is similar.

Based on those descriptions above, researcher comes with any doubts whether both of learning models in this case are: PBL and cooperative learning type of NHT, have different effect toward students' learning outcomes, particularly to the students' problem solving ability. Therefore, the researcher has interested to do research entitled "The Difference of Effect of Problem – Based Learning and Numbered Heads Together toward Students' Problem Solving Ability on The Topic of Statistics in Grade XI SMA Negeri 2 Balige."

1.2. Problem Identification

Based on the background above can be identified the problem as follows:

1. The conventional way is often used in SMA Negeri 2 Balige 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.
2. The result of mid – odd semester examination in SMA Negeri 2 Balige shows 45.95% students of grade XI got score under the KKM score.
3. Most of students in SMA Negeri 2 Balige had low problem solving ability of mathematics and ignoring steps which sould be passed when solving problems.

1.3. Limitation of Problem

Based on the limitation scope of research location, research time and the research variable causes this study is limited in the scope as follows:

1. Students' problem solving ability on the topic of Statistics for Class XI in SMA Negeri 2 Balige for Even Semester 2014/2015.
2. The learning activities for this study are given by using problem – based learning and numbered heads together.

1.4. Problem of Research

Based on the background above, the problems are formulated as: "Is students' problem solving ability of mathematics which taught by using Problem – Based Learning (PBL) higher than students' problem solving ability of mathematics which taught by using Numbered Heads Together (NHT)?".

1.5. Objectives of Research

The objectives of the research are as follows:

1. To know whether there are differences of effect of students' problem solving ability of mathematics that taught by problem – based learning and numbered heads together on the topic of statistics in grade XI SMA Negeri 2 Balige.
2. To determine whether students' problem solving ability of mathematics which taught by Problem – Based Learning (PBL) is higher than taught by Numbered Heads Together (NHT) in grade XI SMA Negeri 2 Balige.

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 math.
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. Problem – based learning model is learning model which use the real problem as a keyword of the learning process such that they can learn actively by think, communicate, find and process data, and finally make conclusion of essential concept of the subject.
2. Numbered heads together is learning model which holds each student accountable for learning the material by having students work together in a group, giving the numbers and put their heads together to develop a complete answer to the given question.
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.