CHAPTER I

INTRODUCTION

1.1 Background

Education is an important component in improving the quality of human resources. Therefore, changes or educational development is something that should happen in line with changes in life. Changes in the sense of improving education at all levels need to be continuously carried out in anticipation of future interests. A good education is capable of supporting development in the future, which means being able to develop the potential of students, so as to face and solve the problems of life suffered.

The development of science and technology has brought a change in almost every aspect of human life, because of various problems can only be solved by the efforts of mastery, knowledge and technology, hence it needs the capability to acquire, manage and utilize the information to survive in an ever-changing circumstances. This capability requires thinking among others of systematic thinking, logical, critical, which can be developed through the study of mathematics.

Mathematics is one of the basic sciences and scientific thinking means indispensable students to develop the ability to think logically, systematically, communicate ideas, and solve problems in everyday life. Mathematics is also a science that works to serve other sciences. In other words mathematics grow and develop for self as well as to serve science and other sciences in its development and operation. Therefore, the mathematical one of the subjects taught at every level of education.

According to Johnson and Myklebust in Abdurrahman (2012:202) "Matematika adalah bahasa simbolis yang fungsi praktisnya untuk mengekspresikan hubungan – hubungan kuantitatif dan keuangan sedangkan fungsi teoritisnya adalah untuk memudahkan berpikir".

Mathematics became one of the most important subjects in elementary and junior high schools, it can be seen from time course math in school more than the other subjects. The main cause of the importance of mathematics is because it can train students to think with a clear, logical, systematic, responsible, has a good personality and problem solving skills in everyday life.

According to Cornellius in Abdurrahman (2012:204) said that :

> Lima alasan perlunya belajar matematika karena matematika merupakan (1) sarana berpikir yang jelas dan logis, (2) sarana untuk memecahkan masalah dan 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.

While based on the learning mathematics outcomes, Lenner in Abdurrahaman (2012:204) said that "kurikulum bidang studi matematika hendaknya mencakup 3 elemen, (1) konsep, (2) keterampilan, dan (3) pemecahan masalah".

From the above statement, one aspect that is emphasized in the curriculum is to improve students' problem-solving abilities. Problem solving is a part of the mathematics curriculum which is very important because in the learning process and its completion, students gain experience possible to use knowledge and skills already held to be applied to solving problems that are not considered routine.

According to Soedjadi (2000:198) said that:

> Pendidikan sangat penting memberikan pengalaman dan menumbuhkan kemampuan, khususnya dalam memecahkan masalah yang berkaitan dengan matematika yaitu (1) pemecahan masalah dalam matematika; (2) pemecahan masalah dengan matematika; (3) pemecahan masalah dengan pemikiran matematik.

While According to Gagne (in Wena.2011:54) said that :

> Apabila seseorang telah mendapatkan suatu kombinasi perangkat aturan yang terbukti dapat dioperasikan sesuai dengan situasi yang sedang dihadapi maka ia tidak saja dapat memecahkan suatu masalah, melainkan juga telah berhasil menemukan sesuatu yang baru.sesuatu yang dimaksud adalah perangkat prosedur atau strategi yang memungkinkan seseorang dapat meningkatkan kemandirian dalam berpikir.

Mathematics teachers had a task that is trying to enable students to solve the problem because one of the focuses study of mathematics is problem solving, so the basic competencies that must be owned by every student is a minimum standard of knowledge, skills, attitudes and values that is reflected in the mathematics learning with the habit of thinking and acting to solve problem.

Hamdani (2011:79) said that:

> Tugas guru dalam rangka optimalisasi proses belajar mengajar adalah sebagai fasilitator yang mampu mengembangkan kemauan belajar siswa, mengembangkan kondisi belajar, dan mengadakan pembatasan positif terhadap dirinya sebagai seorang guru. Jadi, metode pembelajaran merupakan salah satu faktor atau komponen pendidikan yang sangat menentukan berhasil tidaknya suatu pembelajaran.

However, the reality has not been as expected. The study mentions that the focus and attention on improving students' mathematical thinking skills are rarely developed.Utomo and Ruijter (Suparno.2000:31) said that:

> Pada latihan pemecahan soal ternyata hanya sebagian kecil siswa yang dapat mengerjakannya dengan baik, sebagian besar tidak tahu apa yang harus dikerjakan. Setelah diberi petunjuk pun, mereka masih juga tidak dapat menyelesaikan soal-soal tersebut, sehingga guru menerangkan seluruh penyelesaiannya.

While according to Herman (2006:39) said that:

> Salah satu penyebab rendahnya penguasaan matematika siswa adalah guru tidak memberi kesempatan yang cukup kepada siswa untuk membangun sendiri pengetahuannya. Matematika dipelajari oleh kebanyakan siswa secara langsung dalam bentuk yang sudah jadi (formal), karena matematika dipandang oleh kebanyakan guru sebagai suatu proses yang prosedural dan mekanistis.

During the learning of mathematics seem not touching the the substance of problem solving. Students tend to memorize math concepts, so that the student's 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 teaching-learning process.

Based on the results of initial observations (on 2 February 2016) were conducted to SMP Negeri 1 Pangkalan Susu. School learning is still using the old pattern (teacher-centered learning, mathematical concepts and rules given in

finished form from the teacher to the students, giving examples, interaction in one direction, and the occasionally teacher asked students to answer, giving the task at home). Activities of students during the learning activities is listening to the teacher's explanations, noting the things that are considered important. Although the school curriculum of 2013, which specialize students learn in groups, but the liveliness of the students in the group can be seen only 2 or 3 people are active. Students hesitate to ask the teacher and his friend (especially students who are weak), although given the encouragement and motivation. Students are smart prefers to work alone and if you have trouble to ask the teacher directly without passing through the results of the discussion in the group. Teachers train students have problems when doing routine (using formulas and rules that exist in the material being taught). Teacher less attention to the development of student learning, and often do not associate the student previous knowledge with new material that is being taught. Learning tends not meaningful for students that indicates a lack of involvement of the student in the learning process.

Researchers also conduct an initial study of the test (diagnostic test) for students of class VII SMP Negeri 1 Pangkalan Susu. The test is given in the form of shaped test descriptions to see the students' ability to solve problems in mathematics.

Like this :

Dua buah pesegi dengan sisi masing-masing adalah 3x cm dan 5x cm!

a) Nyatakan jumlah keliling masing-masing persegi tersebut !
b) Nyatakan jumlah luas masing-masing persegi tersebut !
c) Jika x = 4, hitunglah luas dan keliling persegi tersebut ! .

In solving the above students have not been able to work on the problems to create a mathematical model well. Here is the level of student ability in completing a given test.

Table 1.1 Students' Percentage of Problem Solving Aspect

Aspect	Students' percentage that have understood	Students' percentage that do not understood
Understanding the problem	71.83%	28.17%
Devising a plan	64.78%	35.22%
Carrying out the plan	21.12%	78.88%
Looking back	0%	100%

From the results of diagnostic tests to problem solving student researchers get 100% of students have not been able to solve problems diagnostic tests correctly, with details of 28.17% of students are not able to understand the problem, 35.22% of students have not been able to understand how to plan for solving the problem, 78.88% of students have not been able to understand how to implement the solution of the problem. This is shown by the inability of students to associate, organize and define the concepts and principles that have been studied to resolve problems based on mathematical models and the students are not able to complete the operation arithmetic correctly and not able to determine the outcome of the answer, and there is 100% of students do not understand how recheck the obtained results. In this aspect the students are not able to substitute the results obtained into the formula or equation and can't prove the results obtained.

Therefore, it required an effort to improve students 'problem-solving skills by providing learning activities that support the development of students' problem-solving abilities. One step that can be done by teachers to improve students' mathematical problem solving is to choose a model and approach appropriate learning and competence-oriented students, especially the ability of solving mathematical problems by implementing the learning method of problem solving.

Hamdani (2010: 84) said that:

> Metode problem solving (pemecahan masalah) adalah suatu cara menyajikan pelajaran dengan mendorong siswa untuk mencari dan

> memecahkan suatu masalah atau persoalan dalam rangka pencapaian tujuan pengajaran.

Solving math problems is also an effort made by an individual or group to determine the solution of a problem with the knowledge, understanding and owned skills by such person. John Dewey in Sujono (1988: 215) provide five key step in solving the problem are as follows:

> 1) Tahu bahwa ada masalah - kesadaran tentang adanya kesukaran, rasa putus asa, keheranan, atau keraguan; 2) mengenali masalah – klasifikasi dan defenisi termasuk pemberian tanda pada tujuan yang dicari; 3) menggunakan pengalaman yang lalu, misalnya informasi yang relevan, penyelesaian soal yang dulu, atau gagasan untuk merumuskan hipotesa dan proposisi pemecahan masalah; 4) menguji secara berturut-turut hipotesa akan kemungkinan-kemungkinan penyelesaian. Bila perlu, masalahnya dapat dirumuskan kembali; 5) mengevaluasi penyelesaian dan menarik kesimpulan berdasarkan bukti-bukti yang ada. Hal ini meliputi mempersatukan penyelesaian yang benar dengan pengertian yang telah ada dan menerapkannya pada contoh lain dari masalah yang sama.

By applying the method of problem solving, the students are expected not just to listen, take notes, and memorizing the subject matter but active students to think, communicate, and process data, can face many problems, both personal issues and problems to be solved alone group or collectively Similarly, think and act creatively, identifying and investigating, solving problems realistically, and able to solve a math problem in the form of a solution to the problem so it's easier to understand a mathematical concept. Like said by Noor (in Sibarani, 2012:8) that : "Pemecahan masalah penting dalam pembelajaran matematika yang bertujuan untuk meningkatkan pemahaman siswa terhadap penguasaan konsep, aturan-aturan dalil, dan sebagainya". In addition, through this method students can be directed to the application of the concept of problem solving that is the purpose of learning.

Hartanti (2012) said:

> Agar harapan setiap guru untuk menuju keberhasilan mengajar tercapai, maka guru harus memiliki kecakapan dan keterampilan dalam menyajikan pelajaran kepada siswa. Hal ini dapat dilaksanakan dengan memilih salah satu model pembelajaran yang tepat dalam rangka mengoptimalkan hasil belajar siswa.

Cooperative learning model that is emphasizes the existence of groups in the implementation of learning. This cause the students will interact with other friends in the learning process. So it is expected the students to be more active in the learning process and it is expected that students can practice their skills in solving problems. In an effort to cultivate student's mathematical problem solving abilities the necessary existence of study the cooperative model. One type of cooperative learning model is a cooperative learning model type *Team Assisted Individualization* or now known as *Team Accelerated Instruction.*

This type combines the advantages of cooperative learning and individual learning. Learning activities more widely used for problem solving. Characteristic of the type of TAI is each individual of students learning material that has been prepared by the teacher. Individual learning outcomes brought to the groups for discussion and mutually discussed by members of the group and all members of the group responsible for overall response as a shared responsibility.

Baltzley in Slavin (2005:198) said in math class taught by TAI models, mathematical learning helps students assume the limitations that he is weak in mathematics be managed to make improvements, but at the same time, gives students the opportunity to contribute to the success of his team.

Mainzer in Slavin (2005:193) also believes that students who are taught by TAI model of understanding how best to improve the team score is to complete the test. By doing so, students will cooperate with each other and encourage each other in order to complete the task test and the test class.

Then the type of cooperative learning model that is also used for the learning activities of problem solving is cooperative learning model type *Numbered Heads Together* (NHT).

Numbered Heads Together (NHT) is a type of cooperative learning that is designed to affect the pattern of interaction of students and an alternative to the traditional classroom structure and involve more students in identifying the material contained in the lesson.

Lie (2008) write the steps cooperative learning model type *Numbered Heads Together* (NHT), which is: a) Siswa dibagi dalam kelompok. Setiap siswa

dalam setiap kelompok mendapat nomor. b) Guru memberikan tugas dan masing-masing kelompok mengerjakannya. c) Kelompok memutuskan jawaban yang dianggap paling benar dan memastikan setiap anggota kelompok mengetahui jawaban ini. d) Guru memanggil salah satu siswa yang bernomor sesuai pilihan guru. Siswa dengan nomor yang dipanggil melaporkan hasil kerja sama mereka.

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 afficient and effective intructional technique to increase student responding and to improve achievement.

Both of this cooperative learning model TAI and NHT have a similarity that is work in groups, but also there are some differences. On cooperative learning TAI type each of students learning material before teacher explained in front of class then this an individual learning outcomes brought to the groups for discussion and mutually discussed by members of the group so each of students have some prepare and on cooperative learning NHT type each of students must know solution of question that given by teacher with discuss on group because the teacher will be call one member of each group randomly to be presented the result of discussion in front of the class. Based on that, researchers are interested in conducting a study entitled: **"The Comparison of Students' Mathematics Problem Solving Ability between Cooperative Learning Model of TAI and NHT for Grade VII in SMP Negeri 1 Pangkalan Susu".**

1.2 Problem Identification

As for the identification of problems in this study that obtained from the description of the background are:

1. Teachers do not provide enough opportunity for students to build their own knowledge;

2. Students' ability to solve problem is lack;
3. Students are not always motivated to want to look for his own ideas;
4. Only teacher who always played an active role in the teaching-learning process;
5. Only a minority of students who can work on problem-solving exercises;
6. Not all students who worked in groups play an active role (only 2 or 3 people are active);
7. When students do not understand the problem that given by teacher, they hesitate to ask teacher or his friends;
8. Students that categorize smart, prefers to work alone in the group;
9. Teacher less attention to the development of students learning;
10. Learning tends not meaningful for students;
11. Students lack of ability to associate, organize and define the concepts and principles that have been studied.

1.3 Problem Limitation

Based on the identification of problems, some problem that will be studied in the research is limited in accordance with the benefits to be analyzed more effectively, clearly, and focused. Thus, the problem to be studied in this research is limited to the mathematics problem solving ability taught by cooperative learning Team Accelerated Instruction (TAI) and Numbered Heads Together (NHT) of students for Grade VII in SMP Negeri 1 Pangkalansusu.

1.4 Problem Formulation

Based on the background, problem identification and problem limitation above, the problem formulation in this research is: "Whether Student's Mathematics Problem Solving Ability taught by using Cooperative Learning model of TAI is higher than taught by using Cooperative Learning model of NHT for Grade VII in SMP Negeri 1 Pangkalan Susu ?"

1.5 Research Objective

The purpose of this research is: to know whether student's mathematics problem solving ability taught by using cooperative learning model of TAI is higher than taught by using cooperative learning model of NHT for grade VII in SMP Negeri 1 Pangkalan Susu.

1.6 Research Benefit

After doing research the expected results of this research can provide benefits to all the community include:

1. For students, through the study of mathematics by cooperative learning model Team Accelerated Instruction (TAI) and Numbered Heads Together (NHT) is expected guided positive attitude and creative learning in solving problems.
2. For teachers, the results of this research can expand the knowledge that considered and input of developing a model of learning in helping students to solve mathematical problems.
3. For researchers, it can add to their repository of knowledge for themselves, especially regarding the development and needs of the student before entering the actual learning process.
4. For schools, beneficial to take the right decision in improving the quality of teaching, as well as being a consideration or referral to improve student achievement, especially in the field of mathematics studies.

   As the material is preliminary information and comparisons for readers and other writers who are interested in doing similar research.