CHAPTER I
INTRODUCTION

1.1 Background

Education is an important component in improving the quality of humanresources. 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 a foundation and framework of the development of science and technology. In everyday life we use and need mathematical concepts and principles, as a tool in applications other disciplines as well as in the development of mathematics itself. Seeing the importance of the role of mathematics in everyday life, mastery of the subject areas of mathematics is a must. Mathematics is one of the most important subjects that provide several vital skills to the learners. The characteristics of math abilities also as principle and process standards in mathematics that will be developed in the National Council of Teachers of Mathematics (NCTM, 2000) are problem solving, reasoning, communication, connection, and representation. The five of characteristics are the goal to be achieved in mathematics learning. In addition to these 5 ability math

Material can develop other ability. One of the measurable abilities in mathematics is spatial ability (Subroto, 2016).

Spatial ability is the overarching concept that generally refers to skill in representing, transforming, generating, and recalling symbolic, nonlinguistic information. Spatial ability consists of spatial perception, mental rotation and spatial visualization. Spatial perception to identify vertical and horizontal objects although the position of the object is manipulated, Mental rotation includes the ability to rotate a space and imagine the rotation of geometry quickly and precisely, and Spatial visualization is a ability to visualize or see a configuration where there is movement on the part of the configuration.Spatial ability may be defined as the ability to generate, retain, retrieve, and transform well-structured visual images. It is not a unitary construct. There are, in fact, several spatial abilities, each emphasizing different aspects of the process of image generation, storage, retrieval, and transformation. Spatial abilities are pivotal constructs of all models of human abilities. Spatial ability can be seen as a form of intelligence where a person demonstrates the capacity to mentally generate, transform, and rotate a visual image and thus understand and recall spatial relationships between real and imagined objects.

One of the causes of low mathematics learning outcomes of students due to students' mathematical spatial ability is still low, this causes the student's mathematical value is low. The students' spatial mathematical ability still needs to be improved, because spatial ability is the ability of students in imagining abstract objects which are then visualized into concrete objects.

Based on observations made by researchers at SMP Negeri 4 Pakkat there are various problems regarding the success of teaching and learning activities in the classroom. The first problem identified by researchers at SMPN 4 Pakkat is found that teachers still use conventional learning models where learning is more teacher-centered. The teacher dominates in the learning process and gives less opportunity for students to ask questions and express their opinions about the

subject matter. This condition resulted in the students being less active and less interested in expressing ideas or explaining the problems given in following the math lesson.

The role of teachers is still more in learning activities than students. The teacher assumes that the student is the object or the target of learning where the various efforts of the learning process is mostly done by the teacher. Activities such as finding, collecting, solving and conveying information and mathematical problems are done by teachers. It is shown only for learners to gain knowledge. So as to cause students to become passive, and there is no feedback from students to teachers in learning activities.

This is indicated when the teacher has finished explaining the subject matter, no one student asked about the material. Students who are silent as if already understood with the material. But in reality, when the teacher gives a problem then there are still many students who are unable to do it because students who do not understand about the material does not express the response of opinion, criticism or question to the teacher during the learning process.

Based on the observation there are also students who do not pay attention to the teacher explaining the material in front of the class. As a result students will less understand the subject matter. Student activity only repeats the procedure or memorizes without giving more opportunities to interact with others which will result in students becoming bored. This condition is supported by the observation of VIII students of SMP Negeri 4 Pakkat at the time of the learning process by the teacher where the students just sit quietly listening to the teacher who is explaining the material even the students are not accustomed to give explanations or ideas of the problems given.

The facts show that students' mathematical spatial ability is still low in observing the relationship of object position in space This is seen based on diagnostic test given by the researcher to grade IX-B students of SMP Negeri 4 Pakkat. This diagnostic test is done by researchers with give 3 questions to 33 students. These three problems are designed so that the completion can show the

indicator of mathematical spatial ability. This is the results presented from one of the student answers based on a given diagnostic test question.

Question 1.

Windy bought a book with size 15 x 5 x 8 cm and then will be stored into the box size of 30 x 36 x 20 cm. How many books can be put into the box!

Answer 1:

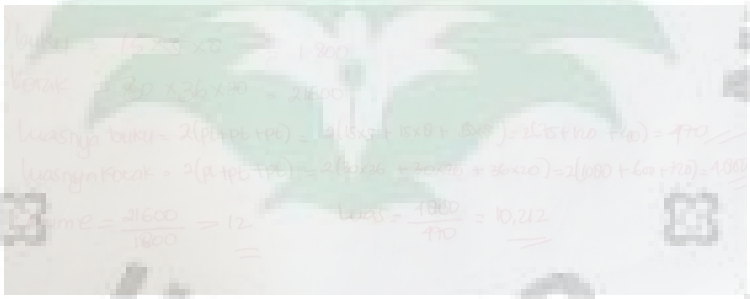

Figure 1.1 Observation result of student's answer number

From the answer above, we can see that the students did not understand the problems mentioned number 1.a but, they can find the volume and area of book and box.

Question 2

Look at the following picture!  In order for form a cuboid net, the plane to be omitted is numbered .... and draw another example of the cuboid nets

Answer 2:

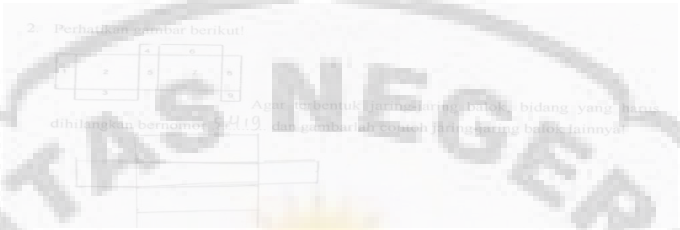

Figure 1.2 Observation result of student's answer number 2

From the answer above, we can see that the students have not been able to solve the problem that relates with spatial ability . She/He thinks number 5 should be eliminated , but She/He can draw the example of beam nets

Question 3.

Given the KLMNOPQR cube. Complete the points in the net below:

Answer 3:

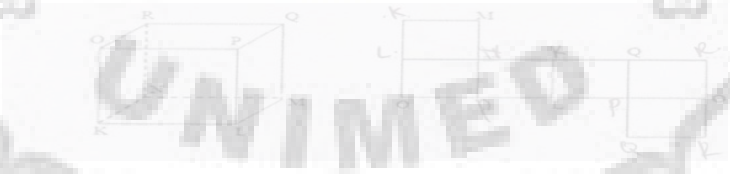

Figure 1.3 Observation result of student's answer number 3

From the answer above, we can see that the students have not been able to complete the points in the nets above with correctly. The students replied in vain regardless of the matter.

From 33 students got the result of spatial ability test of student conducted by researcher, at first indicator of spatial ability that is identifying parts of cube and cuboid get 11students (33,33%) who can answer question number 1 correctly and accurately, then there are 4 students (12,12%) who can answer question but not yet complete and there are 18 students (54,54%) the answer is totally inappropriate. In the second indicator about to visualize the geometry into the horizontal field obtained results there are 4 students (12,12%) who can answer

completely, there are 15 students (45,46%) which the answer is correct but not yet complete and appropriate and there are 14 students (42.42%) who have not been able to answer. In the third indicator of spatial ability to identify the object when the position and shape is manipulated, it is found that there are 14 students (42,42%) who can answer although not correct and there are 19 students (57,58%) whose answer is incomplete and incorrect.

Based on these problems, researchers can surmise that the students will have difficulty in the future to manage the problem so that it will also affect Student's mastery and understanding in mathematics. Student's Mathematical Spatial ability still low because the learning model used by mathematics teachers poorly in developing student's ability. They still using conventional learning. It requires students to strive themselves in learning. it is not suitable to be applied to the student in this modern era. According Trianto (2009:56) that:

> "Pembelajaran kooperatif bernaung dalam teori konstruktivis. Pembelajaran ini muncul dari konsep bahwa siswa akan lebih mudah menemukan dan memahami konsep yang sulit jika mereka saling berdiskusi dengan temannya. Siswa secara rutin bekerja dalam kelompok untuk saling membantu memecahkan masalah-masalah yang kompleks. Jadi, hakikat sosial dan penggunaan kelompok sejawat menjadi aspek utama dalam pembelajaran kooperatif"

Students should be encouraged to play an active role in learning, teachers must be also able to involve in technological sophistication in learning so that students feel more passion and learning are more interesting. So, Student's Mathematical Spatial ability will be improving well when teachers use the right teaching methods. One of the right methods to improve that ability is implementing cooperative learning method. This method of stimulating among students to help each other in solving a problem, so that every student has the opportunity to understand the learning well. As stated of Rosita (2013) that:

> "Pembelajaran kooperatif adalah terjadinya pengembangan yang positif dan saling ketergantungan antaranggota kelompok, sehingga terjadi saling membantu antara siswa yang memiliki kemampuan yang memadai terhadap siswa yang kemampuannya kurang memadai. Dalam pembelajaran kooperatif, lebih dititikberatkan pada kerja sama siswa dalam menyelesaikan tugas yang dibebankan guru pada siswa, sehingga selain siswa bertambah pengetahuannya atau prestasinya meningkat,

komunikasi interaksi sosial dan kerja sama siswa juga akan tercipta dan meningkat"

In this case the authors choose two types of learning that is cooperative learning model type TPS and STAD.

Think- Pair- Share (TPS) is a cooperative learning that a combination of self-learning and learning in groups which students work together to solve a problem or answer a question about an assigned reading. This technique requires students to (1) think individually about a topic or answer to a question (*it is possible that students can solve these problems own*); and (2) share ideas with classmates. Discussing an answer with a partner serves to maximize participation, focus attention and engage students in comprehending the reading material.

While, Student Teams Achievement Division (STAD) is a type of cooperative learning with learning team- work. The main idea behind the model STAD is to motivate the students to encourage and help each other to master the skills presented by the teacher.

The reason for choosing TPS and STAD is where TPS is a thinking-paired-sharing activity in the think-pair-share type provides many advantages. Students individually can develop their own thoughts so that the quality of student answers can also increase and students who rarely or even never speak in front of the class at least give ideas or answers to their partners. While choosing STAD in this research because stad model motivate learners to be able to support each other so that increase motivation and achievement of student learners have ability of team cooperation in group to solve mathematical problem given, without any competition, they are also required to be able to comprehend the material as a whole .

By applying cooperative learning model of TPS and STAD type, it is expected to generate students 'relevance to mathematics materials and make students more active, encourage cooperation among students in learning a material, so as to improve students' mathematical spatial ability. But between the two types of learning models, will be examined which model of cooperative

learning is more effective so that it can be applied in the learning process to improve students' mathematical spatial ability.

From both of the learning models, the researcher intends to conduct research to see the difference of cooperative learning model of TPS type and cooperative type of STAD to students' mathematical spatial ability. For the selection of materials, the authors chose the material of cubes and cuboid which still lack students' understanding of the material.

Based on background above, research interested in conducting research entitled: **"The Difference Of Student's Spatial Ability Taught By Using Cooperative Learning TPS With STAD Types For Grade VIII in SMP Negeri 4 Pakkat"**

1.2 Problem Identification

Based on the background presented above, can be identified issue:

1. Student's Spatial Ability is still low
2. Students' still looked passive in the learning process, most students choose to remain silent and not ask questions.
3. Learning impressed only centered on the teacher (teacher centered), not centered on the learner (student centered).
4. The teacher in SMP Negeri 4 Pakkat have not implemented cooperative learning model such as TPS and STAD.

1.3 Problem Limitation

The problems limitation in this research are as follow:

1. The author focus with The Difference Of Student's Spatial Ability Taught By Using Cooperative Learning TPS With Student's Spatial Ability Taught By Using Cooperative Learning STAD Types For Grade VIII in SMP Negeri 4 Pakkat.
2. Learning in this Research topic is Cubes and Cuboid

1.4 Problem Formulation

The problems formulation in this research is : "Whether Student's Mathematical Spatial Ability taught by using Cooperative Learning TPS type is higher than Spatial Ability taught by using Cooperative Learning STAD Type for Grade VIII in SMP Negeri 4 Pakkat?

1.5 Research Purpose

Research purpose in this research are : to know whether student's Spatial Ability taught by using Cooperative Learning TPS type is higher than student's Spatial Ability taught by using Cooperative Learning STAD Type for Grade VIII in SMP Negeri 4 Pakkat.

1.6 Benefit of Research

The benefit of this research are:

1. For Teachers and prospective teachers, can be used as a references to choose a better learning model not only in cube and cuboid but also in another topics.
2. For Students, to use the cooperative learning Think-Pair-Share type can improve the student's spatial ability.
3. For School, is expected to be source of information or contribute ideas for improvement of mathematics teaching and learning.
4. For Researches, can be used to increase the knowledge about both of cooperative learning model so it will be easier to apply them to other learning topics.

1.7 Operational definitions

To avoid difference of meaning clarify about important terms contained in this research, The operational definition be stated as follow:

1. Spatial ability is the ability to visualize images which include the ability to recognize shapes and objects appropriately, to change an object in its mind and recognize the change, to describe something in mind and to change it in real form, reveals data in graphical form and sensitivity to the balance of relations, colors, lines, shapes and spaces.

2. 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.

3. Cooperative Learning Student Teams Achievement Division (STAD) type is Cooperative learning includes a small group who work as a team to solve a problem, a task, or to do something to achieve the objectives. One of the simple and effective method in cooperative learning. In cooperative model learning STAD, the students are divided into learn teams consisting of four-five people. The teacher presents a lesson, and then students work together within their teams to make sure that all team members have mastered the lesson. Finally, all students take individual quizzes on the material, at which time they may not help one another. Students' quiz scores are compared to their own past averages, and points are awarded on the basis of the degree to which students meet or exceed their own earlier performance.