CHAPTER I

INTRODUCTION

1.1. Problem Background

Along with the rapid development of science and technology nowadays, it also participates and influences the development of education. The progress of science and technology provide a challenge for education to increase the quality and effectiveness of education as a national demand in line with the development of society. This significantly affects the education program and curriculum in schools. Curriculum objectives can be achieved well if the program is clearly and applicably designed. In this case the teachers are required to have proficiency in designing the program and determine instructional strategies that must be adopted. Teachers should be skilled at selecting and using appropriate teaching methods to be applied in an effective learning system.

Mathematics which called the queen of science is subjects that taught from primary to secondary level. But until recently mathematic is regarded as a difficult and boring subject and even scary. This is because the mathematics learning tends to lead to pure mathematics, fast and abstract, lacking attention ability and soul of the students. It makes students have trouble follow math subject, which in turn makes them unhappy about mathematic.

Student's displeasure to the mathematic is caused by the teacher can't teach mathematic matter in a professional way. In other words the teacher can't or less use the methods of mathematic teaching that can foster student interest or motivation to do and learn (Kasiati, 2008). This is also confirmed by Chomaidi in Syahputra (2002:2) stated that:

> "Learning strategies to students has been a tendency to be just moving the science course. This strategy should be changed and directed to activities that can stimulate the students creativity in the process of learning - teaching. In this strategy since elementary school and junior high school, students must be conditioned in such a way that they used to discover, explore, and discuss anything related to teaching."

Junior High School is the education that prepares students to be members of the public who have the ability to hold a reciprocal relationship with the social environment, culture, and the universe as well as to develop more capacity in the world of work/higher education. Students at this level generally were aged between 11-16 years. At that age they do not have perfect analysis and abstraction capabilities. And according to the theory of cognitive development from the famous Swiss psychologist, Jean Peaget, which stated that children are more or less at that age can perform operations that involve the objects and they can also be a logical reason as far as it was applied in the specific or concrete example (Santrock, 2007).

After the initial observations with the mathematics teacher and some students at SMP Negeri 1 Sidikalang, facts on the field indicate that till nowadays there are still many difficulties that experienced by students in learning mathematics material. One difficulty is to understand the concept of the subject matter sub surface area and volume of cylinders. They always memorize the formula of that matter. Beside it, they are less to develop the concept surface area and volume of cylinders. As the result, they get a lot of trouble when they answer the questions daily, general, and UN tests which related to the surface area and volume of cylinders. And finally students get low achievements.

As Usman (2007:36) said that one of cautions of the low student's learning achievement beside low concept comprehension is caused by less variety teaching method, in which in several this time the teachers oriented to the traditional approach that placed learner only as a listener. With a variety learning models expect that students not only as a listener, but can become actors in the learning that can enhance mathematic learning achievement.

Beside choosing the exact teaching methods, it's important to pay attention for the student's initial ability. Because it's very influencing the learning - teaching process. If it has been known the student's initial ability, the teacher wouldn't be wrong to choose the appropriate teaching model to be implemented in class. Wishing that the learning objectives can be achieved optimally.

To solve the problems then all parties involved either directly or indirectly, should take active part in efforts to improve the quality of teaching in the units of education, including the government. One of the government's efforts have been made to improve the quality of teaching is through education programs and teacher certification training. The purpose of this training is to enhance teachers competence and knowledge, especially about the methods, approaches, strategies, and skills in teaching. Although as stated by Prof. Dr. Baedhowi, M.Si., in the results of his research in 2008 which stated that the main motivation of the teachers involved certification related to the financial namely for an allowance. That become issue, after taking part the certification it did not increase the teachers competence automatically.

Recognizing this fact, the certification program alone is not sufficient as an effort to improve the competence of teachers (Dirjen PMPTK: 2010). So go back to the personality of the teachers in trying to improve the quality of instruction. Stock of knowledge about learning strategies derived from the training very effective when applied in the process of learning - teaching. One method that is appropriate and has piloted namely the usage of teaching aids in teaching mathematics.

Teaching aids which intended as manipulative model can affect student success in learning mathematics because the uses of teaching aids can help students in studying abstract mathematical objects. As advocated by Gravemeijer (1994) that a broad attention has to be given to visual models, model situations, and schemata that arises from problem solving activities because it will help students to move through from informal to formal knowledge and from intuitive level to level of subject matter systematic.

But the reality is that the learning - teaching is not fully utilizing teaching aids. This is due to lack of understanding about the importance of teaching aids, lack of cost, time, and effort. As the results, students can't enhance their low outcomes when they have test about matter surface area and volume cylinders since their comprehension about that matter is less deep. Besides the use of teaching aids, learning models also affect learning - teaching. As expressed by

Usman (2007:9) that: "A competent teacher will be more able to create an effective learning environment so that student's learning achievements are at an optimal level."

In order students can learn well, the methods of teaching should be kept as precise, efficient, and effective as possible. Said to be effective if the learning method can produce something as expected. Said to be efficient if the applied learning method relatively use little energy, effort, cost and time as possible.

One alternative model of learning in KTSP is a cooperative learning model type STAD. Cooperative learning model is usually called a model of mutual cooperation. Studying characteristics of cooperative learning is not the same as the regularly studying group. STAD (Student Teams Achievement Divisions) as one type of model of cooperative learning is a cooperative learning model for mixed grouping that involves the team's recognition and responsibility for the learning of individual group members.

Learning with cooperative model type STAD expect that students often benefit from working in pairs or groups to construct understanding or help one another master skills (Aggarwal, J.C., 2001:400). Actually STAD is not enough to facilitate students group for understanding concept of surface area and volume of cylinders. However, by combining it with the use of teaching aid it's expected that it can more widely facilitate students group for understanding concept of surface area and volume of cylinders. By this teaching method, researcher hope that there is an improvement of student's learning achievement.

To know how far the effect of teaching methods and student's initial ability to the student's learning achievement at IX grade SMP Negeri 1 Sidikalang, the researcher interested in doing this research. Based on the rationale reasons above, the researcher determined the title of the research **" The Difference of Student's Learning Achievement Viewed from The Teaching Models and Student's Mathematic Initial Ability on Cylinders Sub Topic at IX Grade SMP Negeri 1 Sidikalang".**

1.2. Problem Identifications

Problems are identified in learning process as follow:

1) Students have difficulty in understanding concept of surface area and volume of cylinders and they often memorize the formula.

2) Low interest of students to mathematic subject especially subject matter sub surface area and volume of cylinders.

3) Low learning achievement especially in subject matter sub surface area and volume of cylinders.

4) Teaching methods are less vary and tend to be monotonous.

5) The learning of mathematic is tend to pure mathematic, practical, abstract and less attention to students ability.

6) Lack of use teaching aids/exemplary material such as cylinders teaching aid in learning activities.

1.3. Problems Restrictions

The main problem which can be determined from the problem identification above and also from the scope of this research is the significant difference of student's learning achievement of surface area and volume of cylinders taught by STAD using teaching aids and Direct Instruction at IX grade SMP Negeri 1 Sidikalang academic year 2012/2013.

1.4. Problems Formulation

The formulation of the problems in this research are:

1) Is there a significant difference of student's learning achievement of surface area and volume of cylinders taught by STAD with teaching aids and Direct Instruction?

2) Is there a significant difference of student's learning achievement of surface area and volume of cylinders between students with high and low abilities?

3) Is there an interaction between model of teaching and the student's abilities to student's learning achievement?

4) What is the difference level of student activity in learning surface area and volume of cylinders to students taught by STAD using teaching aids and Direct Instruction?

5) What is the difference of student's response in solving the test of surface area and volume of cylinders to student taught by STAD using teaching aids and Direct Instruction?

1.5. Research Objective

This research has the main objective as follow:

1) To find out whether there is a significant difference of the student's learning achievement of surface area and volume of cylinder taught by STAD using teaching aids and Direct Instruction.

2) To find out whether there is a significant difference student's learning achievement of surface area and volume of cylinders between students with high and low abilities.

3) To find out whether there is an interaction between model of teaching and the student's abilities to student's learning achievement.

4) To find out the difference level of student activity in learning surface area and volume of cylinders to students taught by STAD using teaching aids and Direct Instruction.

5) To find out the difference of student's response in solving the test of surface area and volume of cylinders to student taught by STAD using teaching aids and Direct Instruction.

1.6. Benefits of Research

The benefits which expected from this research are:

1) For teachers

    a. Provide an alternative for teachers to determine the learning method which can foster student's interest in learning process.

b. Provide information to teachers that the use of teaching aids can facilitate the teacher in presenting a subject matter related to the understanding the concept.

2) For students

The creation of a pleasant learning situation such that can increase the activity, creativity, and learning achievement.

3) For school

The result of this research gives the good contribution for the school in improving the teaching of mathematics at SMP Negeri 1 Sidikalang in optimizing school facilities and infrastructure that can support the learning process.

4) For researcher

Researchers can obtain experienced directly how to choose learning strategies and media appropriately so that when later jumped into the field, researchers already have insight and knowledge. In addition, researchers will have a basically teaching skills and develop learning by using teaching aids.

5) For the other researchers

Can be the source for the other researchers that are interested in undertaking similar research further.

1.7. Operational Definition

1) STAD Cooperative Learning Model

Cooperative learning model is learning approach that focuses on the use of small groups of students to work together in maximizing the learning conditions for achieving learning objectives. One example is STAD cooperative learning model. STAD cooperative learning is a

model for mixed groupings involving team recognition and responsibility for the learning of individual group members.

2) Teaching aids

Teaching aids is a tool to educate or teach what is taught so easily understood by students. Teaching aids can also be defined concrete objects which are models of mathematical ideas.

3) Direct instruction

Direct instruction is an approach to teaching within a teacher-directed classroom environment. The process emphasizes systematic sequencing of lessons, a presentation of new content and skills, guided student practice, the use of feedback and independent practice by students.

4) Interaction

Interaction is an action happening when two or more objects (factors) influence or have effect one another. The idea of this two way relation is very important for interaction concept, as contradiction with one way relation. It's said that by there exist of interaction can cover the effect of one factors and reverse (R.K. Sembiring, 1986: 445)

5) Learning achievement

The achievement is the result from an interaction of action learning and teaching. From the students, learning achievement is the top end of the experience and learning process (Dimyati and Mudjiono, 2009:33). The learning achievement is the picture of the student outcomes in following the learning process at a level that followed.

6) Surface area and volume of cylinders
   - Surface area of cylinders

The surface of the cylinders consists of cylinder lateral, upper side (cap) and under side (base). The cylinder lateral side is formed by a rectangle with length $2\pi r$ and width t. The following formulas of areas are usually used in the cylinders:

The area of the base = the area of the cap = πr^2

The area of cylinder lateral = $2\pi r \times t = 2\pi rt$

The area of cylinder surface = $2\pi rt + 2\pi r^2 = 2\pi r(r + t)$

The area of un-caped cylinder surface = $2\pi rt + \pi r^2$,

in which $\pi = 3.14 \; or \; \pi = \frac{22}{7}$, r = the radius of cylinder and t = the height of cylinder.

- Volume of cylinders

If r is radius of base cylinders (a circle) and t is height of cylinders, then:

Volume of cylinder = the area base x the height of cylinder
= the area of circle x the height of cylinder
= $\pi r^2 \times t$
= $\pi r^2 t$