

CHAPTER I

INTRODUCTION

1.1. Background

Education is a process to help people to develop themselves and to promote human dignity, so that people are able to cope with any changes that occur, heading in a better direction. As stated by John Dewey (in Sagala, 2009:3) that education is the process of forming the basis of the fundamental skills, both related to intellectual, or emotional or feeling that power is directed to human nature and to one another. Learning is a process, in which students not only absorb the information submitted by teachers, but involves a variety of activities and actions that must be done to achieve better learning outcomes. Sagala (2009: 61) states learning is two-way communication, taught by the teachers as educators, while the study carried out by learners or students.

Mathematics is one of the basic sciences and scientific thinking means much needed students to develop the ability to think logically, systematically, communicatory ideas and solves problems in everyday life. Slameto (2003:72) states that mathematics is way of thinking towards a clear, precise, meticulous, which underlies all science and philosophy and even the success of a country depends on the progress of mathematics. Mathematics is a subject that always exists in the level of education, from the kindergarten, elementary, junior high, senior high school, and even through college.

In each level of education, one of the areas of study that have never missed to learn is math. Mathematics is a field of study that supports the development of science and technology. Therefore mathematics teaching compulsory and occupy an important role in education. It aims to equip the students to have the ability to think, logical, analytical, systematic, critical and creative. Nevertheless, there are still many students who have a negative view of mathematics. Many people view mathematics as a field of study that the most difficult to learn. Even so, everyone should learn it because it is a means for solving problems in everyday life.

According to Cornelius (in Abdurrahman, 2009:253):

"Everyone has to learn math, because math is a means of clear and logical thinking to solve problems in everyday life, a means to know the patterns and generalizations relationship, means to develop activities and tools to increase awareness of cultural development".

However, the high demand for mastering mathematics is not directly proportional to the results of students' mathematics learning. Things that support the poor quality of students' mathematics learning researchers found when conducting interview of teacher of mathematics on February 2nd, 2012 in the Mts. Al-Washliyah Tembung. After discussion from mathematics teacher indicate that the teaching and learning process, teachers only rarely engage students and emphasize the students to memorize formulas only. There are many students who still cannot understand math concepts well and have not been able to apply the formula of any given problem.

Many factors lead to low math learning outcomes of students, both internal factors and external factors, but the teacher is an important factor in the overall education system. Not a few teachers who still adhered to the paradigm of *transfer of knowledge* in learning mathematics. This paradigm assumes that the object or target student learning, so the learning process more efforts made by teachers, ranging from the search for, collect, solve, and communicate information is intended for learners acquire knowledge.

Facts on the ground show that most students in these schools to learn mathematics only through methods of memorizing it, as memorized formulas, understanding and so on without knowing basic concepts. Students just think a simple and practical way to obtain the ultimate goal, so when faced with a somewhat different context the same time; students are not able to think to look for alternative solutions. Such understanding is called instrumental understanding, i.e. understanding just memorizes formulas without knowing the reasons and explanations.

Ansari (2008:3) reveals that things like this will lead to two consequences. First, students are less active and less learning patterns establish the concept of making it less inviting critical attitude. Second, if students are given

about the different exercises, they are confused because they do not know where to begin their work."

That is why understanding the concept becomes important and the demands in the mathematics curriculum. As purpose of learning mathematics in KTSP 2006 [litbang.kemdikbud.go.id/.../Buku%20Standar%20Isi%20SMP\(1\).pdf](http://litbang.kemdikbud.go.id/.../Buku%20Standar%20Isi%20SMP(1).pdf) is:

1. Understanding mathematical concepts explains the relationship between concepts and applies concepts or algorithms, flexibly, accurately, efficiently, and appropriately, in solving the problem.
2. Using the pattern and nature of reasoning, mathematical manipulation in making generalizations, compiles evidence, or explains mathematical ideas and statements.
3. Solve problems that include the ability to understand the problem, devise a mathematical model, solve the model and interpret the obtained solution.
4. Communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem.
5. Having respect for the usefulness of mathematics in life, the curious, attention, and interest in studying mathematics, as well as a tenacious attitude and confidence in problem solving.

Understanding required in math goals are relational understanding, i.e. understanding of the concepts contained in a schema or structure of complex knowledge that could be used on a broader problem-solving and complex.

Hudojo (2001:3) supports the importance of understanding the concept by stating that in the process of learning mathematics, learning principles must first be selected, so as to learn mathematics can proceed smoothly, for example,

studied the concept of B that is based on the concept of A, one first needs to understand the concept of A. Without understanding the concept of A, that person may not understand the concept of B. This means that learning mathematics should be gradual and sequential, and based on the past learning experience.

Based on that it would be a matter of understanding concepts in mathematics should be placed on a priority. With the understanding of a concept, the wide variety of questions and problems will be easily solved. With the trends emerging situation as above, then in this case the need for the application of learning approaches that are expected to enhance students' understanding of mathematical concepts.

Students with conceptual understanding know more than isolated facts and methods. They understand why a mathematical idea is important and the kinds of contexts in which it is useful. They have organized their knowledge into a coherent whole, which enables them to learn new ideas by connecting those ideas to what they already know.

Life is synonymous with problem. Applied learning model must be able to train and develop the ability to solve an authentic problem-oriented than the actual lives of the students, to stimulate higher level thinking skills that can enhance students' conceptual understanding. So, learning strategy should be able to change students' learning styles of students studying passive to active with a cozy atmosphere, conducive, open and democratic society that makes learning math more meaningful, reasonable, challenging, fun and suitable for students. Appropriate learning model is to make math more meaningful, reasonable, challenging, fun and suitable for students. One alternative is to modify the learning process by using learning model is *Problem Based Learning* (PBL).

According to Sanjaya (2011: 214) Problem Based Learning defined as a series of learning activities that emphasize the process of resolving the problems faced by science. There are three main characteristics of PBL. First, PBL is a series of activity learning, meaning the implementation of PBL there are a number of activities to do students. PBL did not expect the students just listen, take notes,

and then memorize the subject matter, but through PBL students active thinking, communicating, searching and processing the data, and finally conclude. Second, learning activities geared to resolve the problem. PBL puts the problem as keyword of the learning process. That is, no matter there can be no learning. Third, problem solving is done by using a scientific approach to thinking.

Then, to apply Problem Based Learning to support of the student mathematical conceptual understanding the teacher has to choose the material of subject properly. To implement PBL, teachers need to select learning materials that have problems that can be solved. These problems can take from a textbook or from other sources such as from events occurring in the environment, from the events in the family or social events. According to Sanjaya (2011: 215) Problem Based Learning have five strategies, as follow as.

- When the teacher wants the students to remember not just the subject matter, but to master and understand it fully.
- If the teacher intends to develop students' skills of rational thinking, the ability to analyze the situation, to apply their knowledge in new situations, recognize the difference between fact and opinion, as well as develop the ability to make an objective judgment.
- When the teacher wants the students' ability to solve problems and create intellectual challenge students.
- If the teacher supports the student to take more responsibility in their learning.
- If teachers want the students to understand the relationship between what is learned and the reality of its life (the relationship between theory and reality).

In Hung (2011) said that working in groups, students identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem. The teacher must build students' confidence to take on the problem, and encourage the students, while also stretching their understanding. In Loague (2001) states PBL assessments should be authentic, which is to say that they should be structured so that students can display their understanding of problems and their solutions in contextually-meaningful ways.

Based on the above, the researcher is interested to carry out research entitled: “**Improvement the Conceptual Understanding Ability of Student through Problem Based Learning (PBL) Model on Topic Polyhedral (Cube and Rectangular prism) in Mts. Al-Washliyah Tembung A.Y. 2012/2013**”.

1.2. Problem Identification

1. Student still low to understand of mathematics concepts.
2. The involvement of the students in the learning process is very less

3. The application of learning strategies used by teacher is less varied with the subject matter.
4. There are still applied paradigm *transfers of knowledge* in mathematics learning

1.3. Problem Limitation

Because problem of research are breadth and lack of expertise and time, then the researcher need to limit problem. The limit problem studied is improvement the conceptual understanding ability of student through Problem Based Learning (PBL) model on topic polyhedral (cube and rectangular prism) in Mts. Al-Washliyah Tembung.

1.4. Problem Formulation

1. Is Problem Based Learning (PBL) model can improve the conceptual understanding ability of mathematics on topic polyhedral (cube and rectangular prism)?
2. How is the implementation of mathematics learning process on topic polyhedral (cube and rectangular prism) by applying Problem Based Learning (PBL) model in Mts. Al Washliyah Tembung?
3. How is the Problem Based Learning (PBL) model can improve the conceptual understanding of student on topic polyhedral (cube and rectangular prism) in Mts. Al-Washliyah Tembung?

1.5. Research Objectives

1. To know whether the implementation of Problem Based Learning (PBL) model can improve the conceptual understanding ability of mathematics on topic polyhedral (cube and rectangular prism) in Mts. Al Washliyah Tembung.
2. To know the implementation of Problem Based Learning (PBL) model in mathematics learning process on topic polyhedral (cube and rectangular prism) in Mts. Al Washliyah Tembung.
3. To know the process of Problem Based Learning (PBL) model in improving the conceptual understanding on topic (cube and rectangular prism) in Mts. Al-Washliyah Tembung.

1.6. Research Benefits

1. For teachers, for consideration and input so that students can choose one of the alternative learning models are appropriate, effective and efficient in engaging students in the learning process.
2. For students, the learning model can enhance students' understanding of mathematical concepts in solving mathematical problems.
3. For researchers, additional insight and experience as prospective teachers in the future and information and reference material for other researchers associated with this research.
4. For schools, as an input to school administrators in order to improve the learning model and the quality of education.