

## CHAPTER I INTRODUCTION

### 1.1 Background Problems

Education is one aspect of life that plays an important role. Mathematics as part of the school curriculum is certainly directed to support the achievement of educational goals. Mathematics is a tool for developing human ways of thinking, because mathematics is very necessary both for everyday life and in the face of advances in science and technology so that mathematics needs to be provided to each student from birth. According to Puskur (in Saragih, 2015) the purpose of mathematics lesson in elementary, middle level school, and university is to prepare students to be able to adapt in the ever changing life and in the developing world, through training that is focused on logical basic thinking , rationale, critical, accurate, honest, efficient and effective. So to improve human resources can also be done by improving mathematics learning, and many reasons why mathematics learning requires serious attention.

Mathematics needs to be taught to students because always found in everyday life and can improve human resources.

Given the importance of mathematics in everyday life and in various sciences, the quality of learning provided by the teacher is important to note, choosing the right model and method of learning mathematics will make mathematics favored by students.

The reasoning ability is one of the things students must have in learning mathematics. Mathematics and reasoning are two things that are inseparable, namely that mathematics is understood through reasoning and reasoning can be understood and trained through learning mathematics. This is in line with the explanation of the Ministry of National Education's Dirjen Dikdasmen Regulation NO. 506 / C / PP / 2004 which states the reasoning indicators that must be achieved by students. Indicators that point to reasoning include: (1) the ability to present mathematical statements in writing and drawing, (2) the ability to do mathematical manipulation.

(3) the ability to check the validity of an argument (4) the ability to draw conclusions from statements.

Likewise, the researcher felt during implementing the Integrated Field Experience Program (PPLT) at SMA Negeri 2 Balige. Researchers find students who tend to just memorize concepts in mathematics. When students were asked whether they understood the concept in question, their answer was not understood. They admit to only memorizing. Of course this further strengthens why students' reasoning abilities are getting lower.

The low ability of students' mathematical reasoning is influenced by several factors, including the learning model used by teachers is less varied. According to observers, 70% of mathematics learning in class still uses *oriented-teacher*.

Based on the results of research from the Curriculum Research and Development Agency (Balitbang, 2007: 11-14), is teachers only understand the structure of learning subjects, without understanding the principles of development, learning does not refer to indicators that have been made, so it is not directed, just follows the flow of textbooks that are in the students and learning methods in the class are less varied the last the plan for implementing the learning prepared by the teacher is not operational (only as a supplement to the administration).

Based on the author's observation, the reality and condition of the teachers in several schools, it turns out that some teachers are still not able to develop the learning tools properly. The lack of learning tools compiled by teachers is due to the teacher's understanding of how to prepare learning devices well. Facts in the field some teachers are less able or difficult and lazy in making, developing and implementing learning tools (in Suprianto, 2013: 3).

Less varied methods are one of the triggers for low student reasoning abilities. In line with Istarani's (2012) opinion: Learning has the essence of planning or design (design) as an effort to teach students. That is why in learning students do not only interact with the teacher as one source of learning, but may interact with the entire learning source used to achieve learning goals.

The availability of quality learning tools is a factor that can support the learning process to run smoothly. Learning devices play an important role in improving the professionalism of a teachers, because a teacher must develop and use learning tools to the maximum extent possible and improve all things related to the learning process. This is supported by the opinion of Ibrahim (in Putri Ayuningtyas, et al, 2005) revealing:

A teacher needs to prepare learning tools. Learning devices are a set of media or means that help and facilitate the Teaching and Learning Process (PBM) to achieve the stated goals. Learning devices are likened to "learning golden triangle". The golden triangle of learning contains learning objectives, learning experiences, and evaluation procedures, which are interrelated between one another. A series of quality learning tools, need to be developed through development research. Learning tools needed in managing PBM are: Syllabus, Lesson Plan (RPP), Student Activity Sheets (LKS), Learning Outcomes Assessment, and Learning Media.

Here are some reasons why learning tools are so important for a teacher, including (1) learning tools as a guide; (2) Learning devices as benchmarks; (3) Learning devices as enhancers of professionalism; (4) Learning tools make it easier for teachers to assist the learning facilitation process;

But in fact, the demands of the use of the 2013 curriculum now make some teachers have difficulty in implementing it both in the learning process and in the preparation of learning tools. From the results of observations and analysis conducted by researchers at SMA Balige 2, there are still some drawbacks: First, all this time some teachers make the learning devices as a formality of school administration completeness.

Of the important tool in learning is teaching devices. Teaching devices that focus more on devices and practice questions that result in learning are *teacher-oriented*.

If the teacher does not improvise and develop in the learning process, then the teaching devices will be more dominant in the learning. The impact is on the activeness of students in the learning process. Students will be more passive to accept and follow rules than to follow experiments and find answers or solutions themselves

as part of experience. The existing teaching devices also use closed questions that emphasize the end result rather than the process of how students can find answers.

In an effort to improve students' reasoning abilities, new breakthroughs in mathematics learning are needed, efforts to train and familiarize students with reason. One step that can be done by the teacher as a guide for students is to choose the right learning model.

One learning model that can help students practice in mathematical reasoning is a problem-based learning model. The model *problem based learning* begins with problems, and then students deepen their knowledge about what they already know and what they need to know to solve the problem. What was revealed Boud and Feletti (in Widya Kusumaningsih, et al : 2009) "*Problem based learning is a way of constructing and teaching courses using problems as a stimulus and focus for student activity*". This means that problem-based learning is a way to build learning by using problems as a stimulus and focus on student activities. "

In this learning the role of the teacher is to teach problems, encourage, motivate, and provide teaching devices, as well as providing facilities needed by students in the reasoning process.

Based on the background of the above problems, the authors are interested in conducting research with the title "**Development of Problem Based Learning Learning Devices to Improve Students' Mathematical Reasoning Ability at Balige 2 Senior High School "**

## **1.2 Problem Identification**

The problem identification of this discussion are :

1. Mathematics learning devices for class XI MIA students of SMA Negeri 2 Balige are used poorly.
2. Mathematical reasoning ability of class XI MIA students of SMA 2 Balige is still low.

3. In the learning process, the teacher is not maximal in providing problem-based questions that can improve students' mathematical reasoning skills in class XI MIA SMA 2 Balige.

### **1.3 Problem Limitation**

Problem limitation of this research are :

1. Problem-based mathematics learning devices include RPP, LAS and mathematics reasoning ability tests in the mathematics learning process of class XI MIA students of Balige 2 State High School have not been applied as it should be.
2. Mathematical reasoning ability of class XI MIA students of SMA 2 Balige is still low.

### **1.4 Problem Formulation**

The question of this study are :

1. How is the effectiveness of problem-based mathematics learning devices developed in the learning process of mathematics in class XI MIA SMA 2 Balige?
2. How can the improvement of mathematical reasoning ability of class XI MIA students of SMA 2 Balige use a problem-based mathematical learning devices that has been developed?

### **1.5 Research Objectives**

In line with the formulation of the problem above, the purpose of this research is:

1. Developing a problem-based mathematics learning tool that is effective in the learning process in class XI MIA SMA 2 Balige.
2. Improving mathematical reasoning skills in class XI MIA SMA 2 Balige using problem-based mathematical learning tools that have been developed.

## 1.6 Research Benefit

The benefits of this research are:

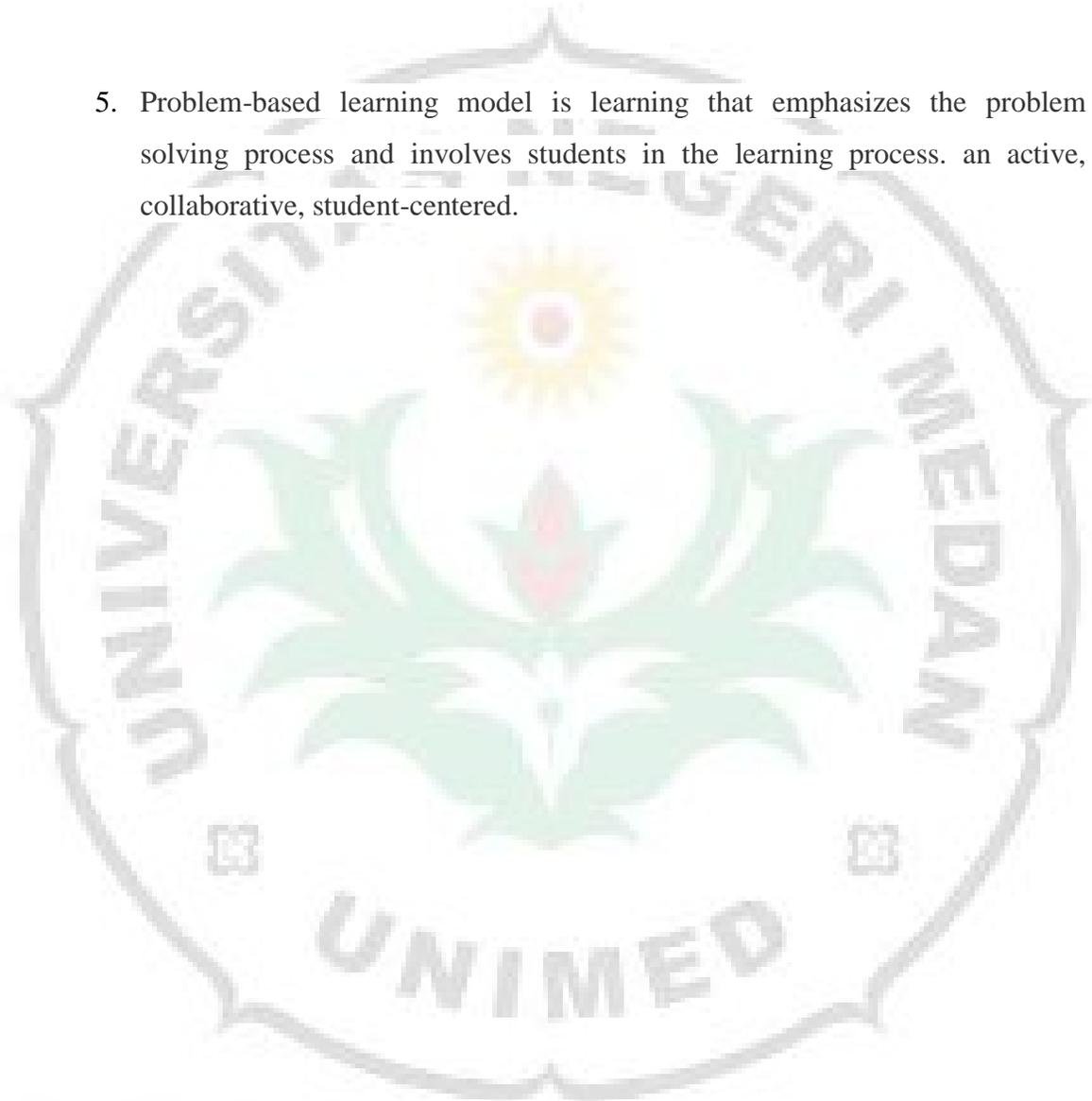
1. For researchers in carrying out teaching tasks as prospective teaching staff in the future.
2. For students, through the learning tools that have been developed students gain experience solving mathematical problems on trigonometric devices.
3. For teachers, can broaden the horizons of knowledge about learning tools that will be used in helping students to improve students' mathematical reasoning skills.
4. For schools, it is taken into consideration in taking innovation in learning mathematics at school.
5. As information devices for readers or other researchers who want to do similar research.

## 1.7 Operational definition

To unify various opinions about the terms used in this study, the following is the definition of each term used in this study, namely:

1. The ability of mathematical reasoning is the ability to think about mathematical problems logically and be able to sort out what important and not important in solving a problem to get a settlement.
2. Learning devices are a number of devices, tools, media, instructions and guidelines prepared by teachers and students in the learning process in the classroom.
3. Development is a systematic assessment of design, development and evaluation of a predetermined program.
4. Feasibility quality of learning devices, quality Learning tools that are feasible to use are defined by three criteria, namely validity, practicality, and effectiveness.

5. Problem-based learning model is learning that emphasizes the problem solving process and involves students in the learning process. an active, collaborative, student-centered.



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