

# CHAPTER I

## INTRODUCTION

### 1.1. Background of the Study

The era of industrial revolution 4.0 had a very big impact on the development of human resources in supporting education. Education is something that every human must have to be able to achieve a change or have a positive impact on human life (Suharyar et al., 2022). Education is also inseparable from learning activities where there must be interaction between educators teachers and students to achieve the learning goals (Yulistiana & Setyawan, 2020).

Education is currently also required to be able to follow flow of globalization, especially in the 4.0 industrial revolution that entered Indonesia. Education in Indonesia must be able to create new generations that are able to compete with other nations. Various kinds of technological advances have begun to be widely applied, so that education has a big influence with 21<sup>st</sup> century learning. Improving the quality of learning and human resources, starting from elementary school education to tertiary institutions is the key and a strong grip for society to compete in the industrial revolution 4.0 (Mardhiyah et al., 2021).

Schools as an educational institution are required to be able to have 21<sup>st</sup> century abilities. These 21<sup>st</sup> century abilities consist of critical thinking skills, problem solving skills, creative thinking skills, collaboration skills and communication skills. One of the abilities included in higher order thinking is problem solving ability (Septikasari & Frasandy, 2018). Wankat & Oreovocz also describe the interaction map and the complexity of problem solving. Mapping the problems encountered is very necessary because the problem solving process involves various cognitive activities of students (Dewi et al., 2017).

Problem solving ability is one of the important abilities that must be possessed by every student because people's daily life cannot be separated from problems. Problem solving ability is the focus to be achieved by the teacher. With problems, students can actualize what they get from learning to then apply it in their life (Sumiantari et al., 2019).

Problem solving skills are also an important part in learning science. Solving abilities are used to teach students to apply scientific knowledge and abilities acquired in learning. Problem solving abilities provide direct (real condition) experience students so that they are able to increase students' abilities in constructing, understanding and applying science concepts (Mariawan, 2013).

Problems that often occur in current learning is learning that is still teacher-centered. Based on initial observations at school in February 2023 by researchers at SMP Hang Tuah 2 Medan on class VIII students, the learning that was carried out seemed passive and conventional, namely in the form of lectures, questions and answers and then assignments from student books. In addition, students only see and listen to the teacher when teaching without giving problems in learning material. When asked by the teacher, almost 90% of students were silent and could not answer the question. Even though when the teacher reiterated whether there were students who did not understand, 90% of students answered that they understood. In addition, the questions given by the teacher to students are not included as problem solving questions.

One of the learning models that can be used to improve student problem solving is Problem Based Learning model. Problem Based Learning is an effective learning model that encourages students to be able to learn through authentic problem solving (Marra et al., 2014). The purpose of implementing Problem Based Learning is to help students develop and become creative and innovative. For this reason, the problem-solving skills of students taught using the Problem Based Learning method are better than those taught using the lecture method (Simanjuntak et al., 2021). In addition, Arends (in Sagala et al., 2017) argues that Problem Based Learning is a learning model designed to help students develop themselves in solving problems and simulating real situations into independent learning.

Besides that, scientific attitude is also needed in creating an active and skilled generation. In learning science, scientific attitude is an attitude that must be possessed by a scientific scientist who will carry out scientific work. The characteristics of scientific attitude, namely developing curiosity about the environment, believing that every effect has a cause, having an open view

(Guswita et al., 2018). The Ministry of National Education also mentions (in Guswita et al., 2018) that "scientific attitude is an important matter and is developed in learning because it can train courageous and polite attitudes in asking questions and arguing, curious, caring for the environment, willing to work together, diligent, careful, creative, and innovative, critical, disciplined, honest, objective, and has a high work ethic".

The relationship between problem solving ability and scientific attitude lies in the complex situations experienced by students and students go through and feel these problems. In this case, problem solving skills can be described as one of the most important skills one has to achieve in order to generate solutions in problem situations. It can be seen that the concept of attitude is handled in different ways. Scientific attitude are expressed as facts obtained through learning, guiding individual behavior and causing bias in the decision-making process (Gürbüz, 2021). According to Jayasree and Rao in the Gürbüz article (2021), as investigative and behavioral considerations that facilitate finding solutions to problems, generating information, and transferring research competencies into an experience.

One of the science subjects in even semester VIII grade junior high school is the Human Excretory System which consists of sub-chapters Structure and Function of Human Excretory System Organs and Disorders of the Human Excretory System. This material requires more understanding because the topic of this discussion is one of the subjects whose basic concepts are quite complicated so that this material is not easily understood by students. One of the difficulties of students in this material is the structure and function of organs, the process of forming urine in humans, and disorders or diseases that are often experienced by the community. Especially in the case of solving the problem of how to deal with disorders and diseases of the excretory system.

The excretory system material consists of 10 JP (4 meetings) with time allocation 3x40 and 2x40 minutes. Based on the schools observed and interviews with one of the science teachers at school, the learning model that is often given this material is only the conventional learning model which is lecture in nature so that the teacher only gives material without any student activity. The teacher does

not direct students to discuss problem solving in class. This is also evidenced by the scores of Hang Tuah 2 Middle School students which are still relatively low.

Problem Based Learning has advantages in this regard. Problem Based Learning is able to provide broad freedom to students in designing learning activities that build problem-solving skills and at the same time improve students' scientific attitude during the learning process and are able to provide good results for students. Based on the description of this background, the researcher is interested in conducting research at school with the research title: "**The Effect of Problem Based Learning Model on Problem Solving Ability and Scientific Attitude of of Human Excretory System Material in Eight-Grade SMP Hang Tuah 2 Medan**".

### **1.2. Problem Identification**

Based on the background of the problem above, researchers can identify problems:

1. Learning that takes at SMP Hang Tuah 2 Medan generally takes place using the lecture, question and answer and assignment methods.
2. Grade VIII students at SMP Hang Tuah 2 Medan are not actively involved and only listen, memorize and receive information without looking for problems in the material being studied.
3. Learning activities that do not hone students' scientific attitude so that learning is impressed passive, where students are not active in digging up information and asking and responding to teachers when learning takes place.
4. The low ability of problem solving can be seen in the questions given by the teacher, so this results in student learning outcomes which are still relatively low.

### **1.3. Scope of Study**

The scope of this study is the Problem Solving Ability and Scientific Attitude of students in excretion system material using the Problem Based Learning model in class VIII of SMP Hang Tuah 2 Medan.

#### **1.4. Problem Limitation**

There are limitations to the problems in this study so that the scope of the problems is not too broad and does not deviate from the research objectives. The limitations of the problem that will be limited are as follows:

1. The learning model used is Problem Based Learning model to see the effect of its application to improve problem solving skill and scientific attitude of students
2. The class population used is class VIII SMP Hang Tuah 2 Medan.
3. The material used is the Human Excretory System.

#### **1.5. Problem Formulation**

Based on the results of the identification of the problems that have been described, the problem formulation can be obtained. The problem formulation in this study is:

1. Is there an effect of applying Problem Based Learning model on problem solving ability and scientific attitude on the material of the human excretory system at eight-grade SMP Hang Tuah 2 Medan?
2. Is there an increase in students' problem solving ability and scientific attitude after applying Problem Based Learning model on the material of the human excretory system at eight-grade SMP Hang Tuah 2 Medan?
3. What aspect of problem solving ability and scientific attitude most improve through Problem Based Learning model?

#### **1.6. Research Objectives**

Based on the formulation of the problem that has been described, the objectives of this study are as follows:

1. To determine the effect of applying Problem Based Learning model on problem solving ability and scientific attitude on the material of the human excretory system at eight-grade SMP Hang Tuah 2 Medan.
2. To determine the improvement of students' problem solving ability and scientific attitude on the material of the human excretory system at eight-grade SMP Hang Tuah 2 Medan.

3. To find out the aspects of problem-solving abilities and scientific attitude increase through the Problem Based Learning model.

### **1.7. Research Benefits**

The results of this study are expected to provide benefits including the following:

1. For Students

Providing a more active learning process so that students have problem-solving skills and a high scientific attitude.

2. For Teachers

As a reference for teachers to use the Problem Based Learning model for students' problem solving abilities.

3. For Schools

As a learning model that can be applied in schools and a reference for the process of improving learning models in schools.

4. For Researchers

As a learning model that will be implemented and used in the future when researchers will become a science teacher in junior high school.