

# CHAPTER I

## INTRODUCTION

### 1.1 Background Problem

Natural Science (IPA) is a knowledge obtained through data collection by experimentation, observation, and deduction to produce a reliable explanation of a symptom (Permendiknas, 2006). Thus science is not only concerned with mastering facts, concepts, or principles but also a process of discovery. Science is needed in human life through identifiable problem solutions.

Biology, which is part of science, is essentially a collection of knowledge in the form of facts, concepts, and theories. Therefore, in the biology learning process, teachers must consider more effective and efficient learning strategies and methods, one of which is through practicum activities (Arianty, 2015). Biology learning is the interaction of students with the learning resources, and the learning environment in gaining meaningful experiences so that they can be implemented in their lives. In essence, learning is a process of delivering students to their learning goals. A biology is a tool in achieving goals because biology discusses natural objects, phenomena caused by nature (Hasan *et al*, 2019).

The existence of a laboratory in biology learning is very important. The laboratory is a place to train students in the skills to carry out various kinds of scientific activities such as practice, conducting experiments, and other scientific activities related to learning material (Hamidah, 2014).

According to Ketut *et al.*, 2013, the laboratory is a place for conducting experiments and investigations. This place can be a closed room or experiment room for conducting experiments and investigations. Besides, according to Widyarti (2005), a laboratory is a room where practical or research activities are carried out which is equipped with laboratory equipment and complete laboratory infrastructure.

Practicum develops basic scientific skills in conducting experiments. Experimental activities are activities that are mostly carried out by scientists in their findings. To conduct experiments, some basic skills are required such as

observing, estimating, measuring, comparing, manipulating laboratory equipment, and other scientific skills. Practicum develops problem-solving skills and a deeper understanding of the concepts and principles of science, especially biology, for students. Through the practicum, students will appreciate the theories produced in previous research and can help students understand the material that has been studied in the classroom (Munandar, 2015). Practicum provides an opportunity for students to get a real picture of what is obtained in theory and sense contact occurs. Besides, in practicum activities, students do not just observe directly but must appreciate, be directly involved in the making, and take responsibility for the results (Hastuti, 2013).

HOTS are a thought process that is not just memorizing and relaying known information and the ability to connect, manipulate, and transform existing knowledge and experience to think critically and creatively to make decisions and solving problems in new situations (Rofiah *et al.*, 2013). Indicators of higher-order thinking skills in students also often escape the attention of teachers. HOTS are one of the main assets for students in studying science, especially biology. Students need certain HOTS to solve the problem of phenomena that are contained in problems found in biology subjects. This is because biological concepts are closely related to various systems of living things and their complex environments. If explored more deeply, biology subjects are developed through the ability to think analytically, inductively, and deductively to solve problems related to natural events around them. By training students to develop these skills, indicates that the teacher empowers students to think reflective, critically, and analyze. As a result, students can make appropriate, careful, systematic, and logical decisions and consider various points of view. Conversely, if students are dominant in low-level thinking aspects, it will result in the habit of doing various activities without knowing the purpose and reasons for doing them.

The government then implemented the 2013 curriculum with the perspective of facing the demands of education in this globalization era. The theme of curriculum development is said to be a curriculum that can produce productive, creative, innovative, and effective Indonesians through the strengthening of positive values, skills, and integrated knowledge. The learning

system contained in the 2013 curriculum emphasizes higher-order thinking skills (Lusyana and Wangge, 2016). HOTS are defined as using the mind more broadly to find new challenges. This higher-order thinking skill requires a person to apply new information or previous knowledge and manipulate information to reach possible answers in new situations (Heong *et al.*, 2011).

Student learning outcomes are measurements and assessments of student learning efforts expressed in symbols, numbers, letters, and sentences that reflect the results achieved. However, seen from the learning outcomes obtained by students, it is still far from satisfactory (Astriyani, 2016). Seeing conditions like this, it is necessary to make efforts to improve student learning outcomes. Many factors that influence student learning outcomes are low. One of these factors is the low level of HOTS.

Based on research by Angraini *et al.*, (2019) regarding the analysis of high-level thinking skills of senior high school students in class X in the city of Solok on biological content, it was found that there was a relationship between practicum implementation and HOTS as seen from the results of the research they had done. which states that activities such as analyzing the causes of a problem, designing or designing an activity such as a practicum in the laboratory or the environment, conducting discussions or debates about a problem, providing an explanation of a case or problem can support the development of HOTS.

Meanwhile, based on the research results of Arianty *et al.*, (2015) regarding the implementation of practicum and its relationship with the biology learning outcomes of class XI IPA Muhammadiyah Padang Panjang, it was found that there was a positive relationship between the implementation of practicum and the biology science learning outcomes of class XI IPA students at SMA Muhammadiyah Padang Panjang T.P 2014/2015. This relationship can be seen from the correlation coefficient value using the product-moment correlation obtained of 0.920 (very strong),  $r > 0$  is positive so that the correlation can be called a positive correlation.

Based on the results of interviews and observations made at SMA Negeri 3 Tanjungbalai that there are obstacles to carrying out practicum in all materials in the even semester of class XI IPA SMA Negeri 3 Tanjungbalai. Some materials

are practiced in even semesters, namely the digestive system and the respiratory system, but some materials are not practiced in even semesters, namely the excretion system, regulatory system, reproductive system, and the body's defense system.

The Coronavirus (Covid-19) pandemic situation currently causing the learning process and practicum implementation to be carried out online which results in very limited time for practicum implementation the current situation of the Covid-19 pandemic causes the learning process and practicum implementation to be carried out online which results in very limited time for practicum implementation. The practicum implementation time is carried out 40 minutes before the class ends after the teacher provides material about the digestive system and respiratory system to students in the WhatsApp group. Then the teacher explains the procedure for implementing the practicum by directing students to make video learning media related to the material previously mentioned. Regarding the digestive system, students will make instructional video media related to fish operations and explain the function of the digestive system in these goldfish. Regarding the respiratory system, students will make instructional video media that explain the meaning and function of each respiratory organ using the torso. Furthermore, students will send the results of the instructional media video after being given 1 week and sent via email. The teacher found that the results of the learning videos made by these students were taken from other famous people on the internet and YouTube. Because these problems cause biology learning to be considered not optimally monitoring HOTS. The low level of HOTS will ultimately lead to lower learning outcomes for students' biology. This can be seen from the average value of biology learning material in the odd semester of class XI IPA at SMA Negeri 3 Tanjungbalai which is still low and has not reached the minimum learning requirements (KKM), namely 75.

The above constraints can affect the number of biology practicum activities. This can be due to the lack of motivation of students in implementing the general. If practicum is not carried out according to the curriculum, namely (1) Generating student learning motivation, (2) Developing basic scientific skills in conducting experiments, (3) Practicum being a vehicle for learning a scientific

approach for students, (4) Practicum supporting a more realistic explanation of the material lesson. Of course, some learning objectives cannot be achieved by students, this can reduce students' understanding of learning materials that have an impact on HOTS and learning outcomes.

Based on these problems, it is deemed necessary to examine in more depth the analysis of practicum implementation in biology learning which focuses on material practiced in the even semester, namely the digestive system and the respiratory system, which will be used as a more in-depth study on the implementation of practicum carried out in high school Negeri 3 Tanjungbalai class XI IPA, therefore research will be conducted with the title is **“Analysis The Implementation Of Biology Practicum And It’s Relationship With Higher Order Thinking Skills and Student Learning Outcomes of Class XI IPA Senior High School 3 Tanjungbalai”**.

## **1.2 Problem Identification**

Based on the background of the problems above, the identification of various problems related to the analysis of the implementation of biology practicum and its relationship with higher-order thinking skills and learning outcomes of class XI students at SMA Negeri 3 Tanjungbalai include:

1. Not all material in the even semester is practiced, the material that is practiced is only the digestive system and the respiratory system, this is because the laboratory is not used optimally for practicum activities
2. The time for carrying out the practicum is very short so that the practicum schedule must be combined during the learning process
3. High order thinking skills and student learning outcomes are generally still very low.
4. Average value of biology learning material in the odd semester of class XI IPA at SMA Negeri 3 Tanjungbalai is still low and has not reached the minimum learning requirements (KKM).



### 1.3 Problem Scope

From the problems identified above, the problem of this research is limited to how the practicum is implemented in schools and its relation to learning outcomes and high-level thinking skills of SMA Negeri 3 Tanjungbalai:

1. This research focuses on the implementation of practicum on biology learning with practiced material, namely the digestive system and the respiratory system.
2. Students' high-order thinking abilities studied in the form of assessing the cognitive domain of students used the *Framework* Anderson and Krathwohl with the name revised Bloom's Taxonomy with cognitive dimensions. Includes 3 levels, namely: *analyzing, evaluating, and creating*. The high-order thinking skills of students who will be taken in this study are test questions on the material being practiced, namely the digestive system and the respiratory system.
3. Student learning outcomes were studied in the form of an assessment of the cognitive domain of students using *Framework* Anderson and Krathwohl with the name revised Bloom's Taxonomy with cognitive dimensions. Includes 5 levels, namely: *understand, applying, analyzing, evaluating, and creating*. The use of these cognitive dimension levels has been considered by analyzing competency standards and basic competencies. Student learning outcomes that will be taken in this study are the results of learning from test questions on the material being practiced, namely the digestive system and the respiratory system.

#### 1.4 Research Question

The problem of this research is formulated as follows:

1. How is the implementation of practicum in learning biology material on the digestive system and the respiratory system by students of class XI IPA at SMA Negeri 3 Tanjungbalai?
2. How is the high order thinking skills of class XI IPA SMA Negeri 3 Tanjungbalai on the subject of the digestive system and the respiratory system?
3. How is the student learning outcomes of class XI IPA SMA Negeri 3 Tanjungbalai on the subject of the digestive system and the respiratory system?
4. How is the relationship between the implementation of the digestive system and respiratory system practicum with higher-order thinking skills and learning outcomes of class XI SMA Negeri 3 Tanjungbalai?

#### 1.5 Research Purpose

This research is conducted to achieve objective as follows:

1. Knowing the implementation of practicum in learning biology material on the digestive system and the respiratory system by students of class XI IPA at SMA Negeri 3 Tanjungbalai.
2. Knowing higher-order thinking skills on the digestive system and the respiratory system of class XI IPA at SMA Negeri 3 Tanjungbalai.
3. Knowing the student learning outcomes on the digestive system and the respiratory system of class XI IPA at SMA Negeri 3 Tanjungbalai
4. Knowing whether the implementation of practicum in learning biology has a relationship with higher-order thinking skills and learning outcomes of class XI IPA students of SMA Negeri 3 Tanjungbalai.

## 1.6 Benefit of Research

After doing research, the benefit can be expected follows:

1. For researchers, it can provide knowledge, insight, and experience as prospective biology teachers, especially in practicing biology learning.
2. For teachers, it can provide information about the implementation of practicum in biology learning.
3. For schools, it can optimize the implementation of practicum in biology learning.

## 1.7 Operational Definition

The operational definition in this study is as follows:

1. Practicum implementation analysis is an activity to explore, parse, and search for learning activities that train students' competence by using laboratory facilities or outside the laboratory, namely practicum to be classified and grouped according to certain criteria.
2. High-order thinking skills and learning outcomes in this study are students' abilities in the cognitive realm that can be seen by the scores obtained by students after working on biology questions on the material being practiced, namely the digestive system and the respiratory system.
3. The digestive system is the digestive tissue of the organs that work to digest food. During the digestive system, food will experience the digestive system, both mechanical and chemical.
4. The respiratory system in humans is a collection of organs involved in the process of exchanging oxygen and carbon dioxide gases in the blood. The work of the respiratory system in humans involves all respiratory organs such as the nose and nasal cavity, throat (pharynx), larynx, trachea, bronchi, and lungs. These organs work together to help the body exchange gases between the lungs (alveolus) and blood vessels, which are then channeled to all parts of the body or exhaled into the air.
5. Online learning means learning that is carried out online, using learning application or social network. Online learning that is carried out without



doing face-to-face, but through existing platforms like WhatsApp, Google Classroom, Google Meet, and Zoom.



THE  
*Character Building*  
UNIVERSITY