

CHAPTER I

INTRODUCTION

1.1. Background of Problem

The development of science and technology has significantly impacted the field of education. Learners are now faced with the demand to be active and independent in the learning process, particularly given the era of technological and communicative progress. Indonesia is committed to keeping pace with these changes, continuously striving to enhance human resources through its education system. The primary focus is on producing intelligent, skilled, independent, and morally upright young generations (Indriana, 2011).

Education is acknowledged as a key factor in enhancing human capital, propelling intellectual growth, and acquiring skills in various fields. The availability of learning resources and infrastructure remains a challenge, especially in supporting independent and optimal learning. Teachers need to possess the skills to develop teaching materials, including utilizing science literacy as an effective learning approach (Basrowi and Juariyah, 2020).

One form of teaching material that needs to be developed is science literacy-based teaching materials. The development of science literacy-based teaching materials refers to creating materials designed through a series of studies and genuinely constitutes new research findings that aid learners in understanding related materials. These materials are equipped with formative test questions and case article reviews. In the context of science literacy, reading interest becomes a crucial aspect in creating an effective educational environment. The development of science literacy-based teaching materials is a primary concern, especially for enhancing the science literacy skills of students (Fitriana, 2014).

In recent years, the development of science literacy skills among Indonesian students has garnered public attention. The quality of education, particularly in science education, in Indonesia is considered low compared to other developing

countries. The weak education system in Indonesia is reflected in the low levels of science literacy in international assessments, such as the Program for International Student Assessment (PISA). Indonesia consistently scores below the average in various PISA periods. Responding to the urgent need to address inadequate literacy skills among students, the Ministry of Education and Culture of the Republic of Indonesia introduced Regulation Number 23 of 2015. This regulation focuses on instilling and developing character as an effort to tackle the issue. The School Literacy Movement then emerged as a response to this policy (Antoro, 2018). The importance of science literacy lies in its connection to human understanding of the environment, economy, health, and various other issues faced by modern society. Science literacy becomes a primary key in facing technological developments and scientific advancements. Therefore, mastering science literacy is a necessity for individuals to adapt effectively to changing times.

Based on pre-development interviews conducted by the researcher at SMAN 3 Tarutung regarding biology learning in the classroom, the sources mentioned that students currently do not use learning resources other than the material presented by the teacher. The learning process tends to be teacher-centered, where only about 70% of students actively participate. Some students are reluctant to ask questions, express opinions, or answer questions from the teacher. Additionally, it was found that the implemented learning process has not achieved the learning objectives optimally. These findings align with previous research, such as Supriadi (2001), who noted that the biology textbooks used did not cover recent discoveries and lacked motivation in terms of students' affective awareness. Furthermore, the book tended to emphasize content dimensions rather than process and context dimensions, with science themes being the main focus of student knowledge. Hutabarat's research (2019) also indicated that the most commonly used Grade XI biology books presented science themes as the main element of knowledge, while there were few situations that encouraged students to think critically about questions or problems.

Based on observations and interviews, the researcher concludes that improvements need to be made in the biology learning process to enhance student learning outcomes. One recommended improvement is the development of a learning

model that uses various strategies, considering science literacy aspects. For example, teaching material through experiments can stimulate high-level thinking and be contextual, thus significantly improving students' science literacy skills (Zainiyati, 2017). The implementation of innovative teaching models like this is expected to have a positive impact on the biology learning process and student outcomes at SMAN 3 Tarutung.

According to Cobanoglu and Sahnin (2009), textbooks often contain significant errors or misconceptions and lack inquiry questions. The approach often applied is still memorization-oriented, indicating that students tend to be proficient in memorizing information but less skilled in applying their knowledge (Aqil, 2017). Sandi (2013) states that one of the factors contributing to low science literacy is the lack of balance in science literacy categories presented in textbooks. Meizuvan's research (2015) also supports this finding by stating that the low science literacy skills of students are due to a lack of facilitation in learning that encourages science literacy development. Moreover, students are not well-trained in answering questions that emphasize science literacy skills. These findings highlight the importance of developing teaching materials that not only focus on information accuracy but also consider interactive learning approaches, with the goal of helping students develop their science literacy skills more effectively. This effort is essential to improve students' understanding of scientific concepts and their ability to apply knowledge in real-world contexts. Based on this background, there is a need for further research on the **“Development of Teaching Materials on the Human Coordination System Based on Science Literacy at Class XI IPA.”**

1.2. Problem Identification

Based on the above background, several problems can be identified:

1. Referring to PISA research, literacy in Indonesia is still relatively low.
2. The textbooks used do not present a balanced science literacy.
3. Students experience difficulties in understanding biology materials, particularly in the coordination system.

4. There is a need to develop a product in the form of teaching materials that are expected to enhance students' understanding of science based on the criteria of content eligibility, presentation, language, and graphics.

1.3. Problem Scope

The scope of the problem in this research is as follows:

1. The research is limited to how the author explains the material and concepts using the 4-D model up to the development stage.
2. The developed material focuses on the coordination system, specifically on the nervous and endocrine systems.
3. The development of science literacy-based teaching materials will be validated by content experts, learning design experts, layout design experts, and biology teachers to assess the feasibility of the developed teaching materials.
4. The teaching material will be tested on a limited group for evaluation.

1.4. Problem Formulation

Based on the identification and scope of the issues mentioned above, this research will be focused on formulating the research questions as follows:

1. How is the assessment of the feasibility of teaching materials based on science literacy developed according to learning material experts?
2. How is the assessment of the feasibility of teaching materials based on science literacy developed according to instructional design experts?
3. How is the assessment of the feasibility of teaching materials based on science literacy developed according to instructional layout experts?
4. What is the response of biology teachers at SMAN 3 Tarutung to the developed teaching materials?
5. What is the response of biology students at SMAN 3 Tarutung to the developed teaching materials?
6. What is the effectiveness of the developed teaching materials?

1.5. Research Objectives

Based on the previously provided problem formulation, the objectives of this research are as follows:

1. To assess the feasibility of teaching materials based on science literacy developed according to learning material experts.
2. To assess the feasibility of teaching materials based on science literacy developed according to instructional design experts.
3. To assess the feasibility of teaching materials based on science literacy developed according to instructional layout experts.
4. To understand the response of biology teachers at SMAN 3 Tarutung to the developed teaching materials.
5. To understand the response of biology students at SMAN 3 Tarutung to the developed teaching materials.
6. To determine the effectiveness of the developed teaching materials.

1.6. Research Benefit

1. Overall, the development of these teaching materials aims to provide exposure and enhance knowledge about the coordination system in humans, intending to supplement teaching resources to improve the quality of education.
2. For researchers, it adds knowledge and experience in creating teaching materials as preparation for fulfilling their duties as prospective educators.
3. For teachers, it serves as a consideration or additional resource in teaching the coordination system, with the goal of enhancing the quality of instruction.
4. For students, additional textbooks are available to complement school learning, facilitating a better understanding of concepts to achieve competency in the subject.