CHAPTER I
INTRODUCTION

1.1 Problem Background

The 21st century is where technology develops so rapidly by bringing changes, namely the rapid development of Science and Technology which results in a change in the learning paradigm characterized by changes in curriculum, media, and technology. Because basically 21st century learning is the implication of the development of society from time to time. As it is known that society develops from primitive society to agrarian society, then to industrial society, and now shifts towards an informative society. (Rahayu et al., 2022).

Education is something that must be fulfilled by every human being to be able to develop in this century. Education in the 21st century is an education that combines literacy, skills, behavior and mastery of a technology. That is why the competencies that must be possessed in the 21st century are referred to Creativity, Collaboration, Communication and Critical Thinking (4C). (Redhana, 2019)

The curriculum that is still being used in the 21st century is the 2013 curriculum. This curriculum covers the competencies of attitude, knowledge and skills in an integrated manner. In learning the 2013 curriculum, students are encouraged to find their own and transform complex information, check new information with existing ones in their memory, and be able to develop and be able to apply it in their environment. In implementing the 2013 curriculum, learners become subjects who have the ability to actively seek, process, construct, and use knowledge. Hasruddin et al., (2016) state that the life quality of a person depends on their higher thinking abilities. So that in learning, teachers are expected to facilitate students so that the abilities of students can really be able to appear. (Rahma Wahyu, 2016). In accordance with the attempt to maximize the ability of students, various learning models are used in learning activities. The learning model is a framework of activities that can provide a systematic description in carrying out learning and help students and educators to achieve the desired learning objectives. (Ardianti et al., 2022).

One of the learning models that requires students to have higher-level thinking skills and supports 4C competencies is the Problem Based Learning (PBLlearning model. Problem Based Learning is a learning model that presents a problem with students faced with a problem that can challenge students to learn and work hard in groups to solve a problem so that there is a process of interaction between stimulus and response (Ardianti et al., 2021). However, the PBL learning model has a weakness. One of the weaknesses of the Problem Based Learning learning model is the use of a long time in applying the model. Besides, in a class that has a high level of student diversity, there will be difficulties in dividing tasks and requires teacher abilities that are able to encourage effective student cooperation in groups (Masrinah, 2019).

The shortcomings and weaknesses of the learning model can be overcome by integrating a value and aspects of cultural aspects and those adhered to by local communities. One of the learning models as a form of integration between models and cultural aspects was developed by Arwita et al., (2017), namely the Problem Based Learning *Dalihan Na Tolu* learning model. PBL DNT Learning Model is a problem-based learning developed based on batak culture, namely *Dalihan Na Tolu* which is a philosophy of customs of the Batak tribe that regulates the entire kinship system, culture and life system. The use of DNT in this problem-based learning model is used as a basis so that students are able to explore their duties as a social community and work together in solving everyday problems related to Biology. The application of Problem Based Learning *Dalihan Na Tolu* Model has been proven effective in learning (Arwita et al., 2017a). This is in accordance with the results of research which states that by applying the Problem Based Learning *Dalihan Na Tolu* learning model can improve social attitudes, politeness, cooperation, tolerance and a sense of responsibility in students. The integration of PBL DNT in the Biology learning process is by forming sub-groups consisting of *Hula-hula*, *Dongan tubu* and *Boru*.` The formation of these subgroups can improve the collaboration skills of students in solving a problem.(Arwita et al., 2017a).

Collaboration ability is a discussion activity between learners by proposing opinions, listening and listening to discussions, and respecting differences in opinion during discussions. Collaboration skills have the benefit of making learners

able to provide energy for others in order to form a common goal in solving a problem. Collaboration skills can uphold learner achievement by involving students in the learning process and can develop critical thinking skills and higher order thinking skills of students (Octaviana et al., 2022). However, the level of collaboration skills of students is still low, this is evidenced by research conducted by (Marita et al., 2023) which shows that the relationship between collaboration skills and biology learning outcomes of high school students in Mataram City includes a low correlation. The low collaboration skills possessed by students are also supported by previous research conducted by Julita (2016: 60) on the attitude of cooperation and social interaction possessed by students. The results show that both attitudes are still relatively low, so students need to be trained on the attitude of collaboration skills.

Critical thinking is one of the higher order thinking skills needed in the development of 21st century skills. Critical thinking skills are needed by every learner to be able to solve problems in difficult situations in everyday life. This is because every individual needs to analyze and evaluate their living conditions to make an important decision. (Rahardhian, 2022). Critical thinking skills are needed in learning Biology material. This is because Biology is a science that continues to evolve with the times, as new research and discoveries related to the development of technology and science exist in the world. In addition, students' critical thinking skills are still relatively low. The low critical thinking skills of students are still relatively low supported by research conducted by (Muharni et al., 2019). Showing that students' critical thinking skills are in the low category, this is because students are not accustomed to participating in learning with activities that can train and improve their critical thinking skills. Siburian et al., (2023) also said that students' critical thinking skills were still relatively low. This is indicated by not all students being able to determine the focus of the problem in the problem, as evidenced by student answers whose contents are not related to the question.

The learning material discussed in this study is the excretory system. This material was chosen because it contains concepts that are closely related to everyday life and are important to convey so that students are able to understand how the process of removing substances that are not needed by the body involves

excretory organs and how the excretory system can also regulate the concentration of salt and water in the body. This excretory system material is material that is closely related to everyday life because it discusses one of the organ systems in the body but is an example of an abstract part of the body, so many students think that excretory system material is material that is less preferred and difficult to understand. In general, the difficulties that occur in excretory system material are understanding the structure and function of excretory organs in humans, the process of urine formation, the process of sweat excretion, and disorders or diseases of the excretory system (Simorangkir & Napitupulu, 2020).

Based on the results of observations and interviews conducted with biology subject teachers at SMA Negeri 1 Panombean Panei, that the teacher has used several learning models in the learning process, including the Problem Based Learning (PBL) and Project Based Learning learning models as well as several conventional methods, namely the lecture method and the question and answer method but the teacher is more dominant in using the lecture method. The lecture method causes students to be lazy to ask questions and not focus on the subjects presented because there is no teacher variation in delivering lessons. While the obstacles faced by teachers when applying the Problem Based Learning model are the lack of class conduciveness when forming groups, some students do not want to be active in the group and do not want to work together, the lack of active students in digging up information when solving a problem and the time limitations that make the learning process not take place until completion in the allotted time. In addition, the results of cognitive scores obtained by students are an average of 75 with standard of minimum completeness 75. The lowest score is 60 and the highest is 82 on the material of the excretory system.

Based on the description above, the authors are interested in conducting a study entitled "The Effect of *Dalihan Na Tolu* Problem Based Learning Model on Collaboration and Critical Thinking Skills of High School Students of Negeri 1 Panombean Panei on Excretory System Material". The hope is that this PBL DNT learning model can be an alternative solution to improve learning outcomes such as collaboration skills and critical thinking for students in excretory system material.

1.2 Problem Identification

Based on the background that has been described, the following problems can be identified:

1. The ability of students in critical thinking or higher-level thinking is still relatively low.
2. Lack of collaboration skills between students in the learning process.
3. The Problem Based Learning learning model is still rarely applied in learning activities due to time constraints.

1.3 Scope of Problem

The scope of this research is as follows:

1. The research was conducted at SMA Negeri 1 Panombean Panei
2. The material is only on the subject matter of the excretory system of class XI SMA even semester.
3. The learning model used in this research is Problem Based Learning *Dalihan Na Tolu* learning model in experimental class and direct learning model with Conventional method in control class.

1.4 Problem Limitation

The problem limitations in this study are as follows:

1. The learning model used in this research is Problem Based Learning *Dalihan Na Tolu* learning model.
2. The research subjects were students of class XI IPA SMA Negeri 1 Panombean Panei academic year 2023/2024.
3. The object of research is the Effect of Problem Base Learning Model *Dalihan Na Tolu* on Collaboration and Critical Thinking Ability of Students on Excretory System Material.

1.5 Problem Formulation

Based on the background and problem boundaries above, the problem formulations in this study are:

1. How is the implementation of the syntax of the *dalihan na Tolu* problem-based learning model on the material of the excretory system in class XI SMA Negeri 1 Panombean Panei?
2. Is there an effect of using the Problem Based Learning *Dalihan Na Tolu* learning model on the collaboration ability of students on the material of the excretory system of class XI SMA Negeri 1 Panombean Panei?
3. Is there an effect of using the Problem Based Learning *Dalihan Na Tolu* learning model on the critical thinking skills of students on the material of the excretory system of class XI SMA Negeri 1 Panombean Panei?

1.6 Research Objectives

The objectives of this research are:

1. To determine the ability to collaborate students on the material of the excretory system of class XI students taught using the Problem Based Learning *Dalihan* Na *Tolu* learning model in SMA Negeri 1 Panombean Panei.
2. To determine the ability to think critically on the material of the excretory system of students in class XI who are taught by using the Problem Based Learning *Dalihan Na Tolu* learning model in SMA Negeri 1 Panombean Panei.

1.7 Research Benefit

1.7.1 Theoretical Benefit

1. The results of this study are expected to increase the knowledge of writers and readers regarding the use of the *Dalihan Na Tolu* Problem Based Learning model on the Collaborative Ability and Critical Thinking of Students on Excretory System Material.
2. The results of this study are expected to be a reference for further researchers

1.7.2 Practical Benefit

1.7.2.1 For Teachers

The results of this study can be used as an alternative learning model to improve learning outcomes, collaboration skills and critical thinking of grade XI students by using the *Dalihan Na Tolu* Problem Based Learning model.

1.7.2.2 For Learners

Learning becomes more interesting so that students can more easily understand and master the material provided and by using the *Dalihan Na Tolu* Problem Base Learning model is expected to improve collaboration skills, critical thinking and student learning outcomes.

1.7.2.3 For School

The results of this study are expected to be able to introduce a variety of learning models to students in carrying out the biology learning process in the classroom and can be taken into consideration for the school.

1.7.2.4 For Readers

This research is expected to be a reference for other researchers who raise the same issue.