

# CHAPTER I

## INTRODUCTION

### 1.1. Background of the Study

Knowledge of biology is very important for students in particular and humans in general. Biology contains knowledge about body organs and their functions in living things: humans, animals, and plants. Therefore, biology learning material at school is the result of human research or investigation of the three kinds of living things. The learning can foster scientific attitudes and other positive attitudes in students (Reflina, 2020: 43).

Myanda *et al.* (2020: 44) stated that one of the objectives of learning biology is for students to be able to understand interrelated biological concepts. With a wider scope, Siregar *et al.* (2017: 497) stated that students who have experienced biology learning activities are expected to be able to demonstrate abilities in the cognitive, affective, and psychomotor domains that are better than before in that field.

In the Biology Subject Syllabus Class XI MIA SMA Even Semester it is stated that one of the basic competencies that students must have is KD 3.8, which is to analyze the relationship between the structure of the tissues making up the organs in the respiratory system in relation to bioprocesses and functional disorders that can occur in the human respiratory system. The subject matter is the human respiratory system (the Ministry of Education and Culture, 2021). This means that learning the human respiratory system aims for students to master knowledge about the human respiratory system in accordance with the basic competencies that must be achieved. Mastery of knowledge about the human respiratory system is one of the main basic skills and must be possessed by students of class XI MIA SMA.

To achieve the goal of mastering knowledge of the human respiratory system as one of the basic competencies in Biology subjects in high school, the learning must be carried out with learning models relevant. The relevant learning model, in this case, is a fun and effective learning model to achieve that goal with

a strong retention power. Its success should be judged well. This is in line with the information conveyed by Brata and Arsila (2020: 2), namely "The success of science learning in high school (SMA) is generally measured by students' understanding of the concepts being taught. The retention factor or the stickiness of concepts in memory has received less attention even though it can be used as an indicator of learning quality or learning outcomes".

However, reality shows that students' mastery of knowledge about the human respiratory system is still relatively low. Mulyana and Sumarmin (2019: 1) stated that student learning outcomes at SMA Negeri 7 Padang on the material of the human respiratory system are still relatively low. In line with this, Romaisyah *et al.* (2018: 96) stated that only 50% of class XI students at SMA Negeri 3 Binjai can achieve the KKM (minimum criteria for completeness) Biology 75 on the daily test of the human respiratory system material. Then, based on observations made in class XI SMA Negeri 12 Padang, Purnamasari *et al.* (2018: 348) stated that students' biology learning outcomes were still low. One of the factors causing low student learning outcomes is the selection of an inappropriate learning model.

Based on the results of the UN (national exam) Biology as quoted by Myanda *et al.* (2020: 45) from Puspendik (Center for Educational Assessment) in 2019 it can be seen that the high school level UN scores in Biology are still below the KKM. This means that the percentage of students who answered correctly is still below 55%. The results of the Biology UN in 2015 showed that the percentage of students who answered correctly on the respiratory system material was 46.92%, in 2017 it was 38.62%, and in 2019 it was 36.86%.

This problem can be caused by various things. Panjaitan *et al.* (2020: 142) state as follows.

The respiratory system material is one of the biological materials considered difficult by students, this is because in studying it students cannot see directly the organs that make up the respiratory system contained in the body cavity and the processes that occur in the respiratory system.

In line with this, Romaisyah *et al.* (2018: 97) stated that based on the results of interviews with class XI students of SMA Negeri 3 Binjai, students considered that learning material for the human respiratory system was difficult to understand

because of abstract concepts such as processes or breathing mechanisms that could not be observed directly.

The low learning outcomes of Biology students can be caused by the use of learning models that are less relevant and less attractive. This is supported by the fact that the researchers observed that in the implementation of Biology learning at SMA Negeri 10 Medan, the learning model used by the teacher tends to be less varied. In line with that, through his observations, Orin *et al.* (2019: 73) found that the low biology learning outcomes of students were due to the influence of teacher-centered, where teachers still use conventional learning models, such as delivering material using the lecture method and discussion without reinforcement at the end of the lesson, lack of interaction between teachers and students and interaction between students with students, as well as the use of learning models that are less varied so that students are passive and do not participate in the learning process. This means that in the implementation of Biology learning tends to use conventional learning models with the lecture method, which causes learning to be monotonous and students are passive in learning. In his research, Wuwungan *et al.* (2021: 95) stated that students who were in the control class, and who were taught by the lecture method, showed that most tended to be passive in the learning process. In this case, collaborative activities, both in the form of group work and group discussions, are lacking in biology learning activities.

The Covid-19 pandemic has become a major obstacle in the implementation of development in all areas of the life of the Indonesian people, including in the field of education. The pandemic event becomes a big obstacle, both in the implementation of education and in efforts to improve the quality of education in Indonesia. The Covid-19 Pandemic event requires students to study from home (BDR) or study with an online model (in a network). Students can no longer meet or meet face to face in learning activities. Teachers, including Biology teachers in senior high schools, tend to use conventional learning models with the lecture method. Teachers tend to be the center and transmitter of information or learning materials and students as recipients. Collaborative activities both in the form of group work and direct group discussions cannot be

carried out anymore. For teachers who are proficient at using online systems, apart from giving lectures, they can also deliver or use learning media, such as videos, power points, and so on. In this case, what is often a problem is that there are still many students who are less or less proficient in using this online system and many are not prepared for it.

Based on observations and interviews conducted by the researcher in class XI MIA SMA Negeri 10 Medan, the following information can be obtained. During the Covid-19 pandemic, collaborative activities, both in the form of group work and group discussions, cannot be carried out in Biology learning. Teachers tend to use the lecture method and assignment. Online learning has also had its challenges. It is difficult for students to be invited to take lessons using Zoom (a similar application) due to student problems in the network and limited internet quota. In connection with this problem, the Biology teacher for class XI MIA SMA Negeri 10 Medan makes it easy for students to do learning through videos on Youtube. After starting face-to-face learning activities today, the Biology teacher has started to activate her students in learning. When the teacher delivers the learning material in class, the students are assigned to listen and record the main points of the learning material. After the delivery of the material has been completed, students are asked to restate the learning material in their own words with the help of their notes in front of the class.

Regarding this online system, Permana *et al.* (2021: 517) gave an example of a case that occurred to a student with the initials PR. Some of the facts obtained from this student is quite unique. He is a student who tends to be quiet and introverted. Even when the researcher interviewed him, not much information could be extracted from the student. The student said that during almost a year of studying during the Covid-19 Pandemic, he did not communicate with his friends. He will communicate with his friends if his friends contact him first. He tends to be a passive student in communicating with his friends because he feels he is not good at stringing words together in starting a conversation. The student tends to choose to be a passive reader in WhatsApp Groups in his class. Based on the information provided, it can be seen that the motive for the interaction needs of

students with the initials PR is included in the category of inclusion needs with the type under social.

Furthermore, Kuntarto (2017: 109) stated that students think that the online learning model has provided a new experience that is more challenging than the face-to-face learning model. Safitri and Panjaitan (2021: 11) stated that the use or application of Google Classroom as an online media in online learning on Biology subjects is appropriate. However, its application is still not quite right. In its application, collaboration or good reciprocal relationships should be realized between students and students and between students and teachers. This means that in the learning process students and teachers are required to be active.

During the Covid-19 Pandemic, it has been almost two years that students have been studying from home in participating in online learning. As stated above, in online learning, teachers tend to use conventional learning models, namely learning models with the lecture method that emphasize one-way relationships or communication. While students tend to act as listeners.

Therefore, it is feared that students' collaboration skills are already weak in learning activities. This is because, during the two years of online learning, students no longer interact or relate directly to their friends and teachers in the learning process. This is in accordance with Thorndike's connectionism theory, namely the law of exercise. In this regard, Shah (2010: 104) gives the following explanation.

The *Law of exercise* (the law of training) is a generalization of the *law of use* and the *law of disuse*. According to Hilgard & Bower (1975) as quoted by Syah, if the behavior is often trained or used, the existence of the behavior will be stronger (*law of use*). On the other hand, if the behavior is not often trained or not used, the behavior will be forgotten or at least will decrease (*law of disuse*).

Based on the problems that arise above, it is deemed necessary to apply a relevant learning model. To overcome the problems above, researcher is interested in the use of the group investigation learning model, hereinafter referred to as the GI learning model. The GI learning model is based on John Dewey's learning philosophy, namely Learning by Doing. This view means that learning should be through doing or working. It is through work that people gain experience,

knowledge. To realize the reality of that view, social and intellectual activities are needed. Likewise in the use of this GI learning model. Students with their cooperation and intelligence and good interaction between them must act or work following the learning objectives that must be achieved. In this case, doing is interpreted by investigating, discovering, analyzing, and concluding.

Thus, the use of the GI learning model can familiarize students with independent learning. With this model, students are trained to learn by finding and devoting information relevant to a particular topic to be analyzed and draw conclusions responsibly. This is in line with the opinion of Geng S., Law, Niu, Brata, Suriani, and Simatupang in Brata *et al.* (2021: 3) which stated that learning independence is one of the factors that determine student success in learning, which has an impact on the growth of optimal learning independence that supports good learning outcomes.

The use of the GI learning model to develop students' collaboration skills and provide students with mastery of the concept of the human respiratory system is a new nuance in the learning approach. Thus, the learning approach used has prioritized student activity in learning. This approach makes students work together, take responsibility, and commit to working on common tasks, from investigating to finding information, analyzing data, and making conclusions.

The reflection of the thoughts above motivated researchers to conduct research on collaboration skills and mastery of the concept of the human respiratory system using the group investigation learning model and conventional learning models in class XI MIA SMA Negeri 10 Medan.

## **1.2. Problem Identification**

Based on the background of the problem above, the problems that can be identified are as follows.

- (1) Students still have difficulty in learning the concept of the human respiratory system.
- (2) The learning model used in biology learning is less varied, tends to use conventional learning models.

(3) Students' mastery of the concept of the human respiratory system is still low.

(4) Students' collaboration skills in biology learning activities are low.

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

This research includes (1) an analysis of the differences between the collaboration skills of students who were taught using the GI learning model and the collaboration skills of students who are taught using the conventional learning model; and (2) analysis of the differences between the mastery of the concept of the human respiratory system by students who were taught by the GI learning model and the mastery of the concept of the human respiratory system by students who were taught by the conventional learning model. In this case, the aspects of collaboration skills are (1) cooperation, (2) flexibility, (3) responsibility, (4) compromise, and (5) communication. Then, the concept of the human respiratory system includes the following main topics: (1) the structure and function of the respiratory organs in humans, (2) the mechanism of respiration in humans, and (3) disorders and diseases related to the respiratory system.

### **1.4. Scope of Problems**

The identification of the problems that have been stated above, shows that many problems need to be discussed in connection with learning the concept of the human respiratory system. For the research to be more focused and in-depth, the problems that will be studied in this research need to be limited.

This research is limited to only examining problems related to the influence of learning models on students' collaboration skills and mastery of the concept of the human respiratory system by students, which are as follows.

- (1) Student collaboration skills which include student collaboration skills after participating in learning the concept of the human respiratory system with the GI learning model and student collaboration skills after participating in learning the concept of the human respiratory system using the conventional learning model.

- (2) Mastery of the concept of the human respiratory system includes mastery of the concept of the human respiratory system by students after participating in learning the concept of the human respiratory system with the GI learning model and mastering the concept of the human respiratory system by students after participating in learning the concept of the human respiratory system with the conventional learning model.
- (3) The learning model includes the GI learning model and the conventional learning model. These two learning models were investigated to find out which learning model is better for providing collaboration skills and mastery of the concept of the human respiratory system.

The subjects of this study were limited to students of class XI MIA SMA Negeri 10 Medan in the 2021/2022 academic year.

### **1.5. Research Questions**

Based on the scope and limitations of the problems stated above, this research problem can be formulated as follows.

- (1) Are there differences in student collaboration skills that were taught with the GI learning model and conventional learning models in learning the concept of the human respiratory system?
- (2) Are there differences in the mastery of the concept of the human respiratory system of students who were taught with the GI learning model and conventional learning models in learning the concept of the human respiratory system?

### **1.6. Study Objectives**

Based on the formulation of the research problem, this study aims to determine:

- (1) the differences in collaboration skills of students who were taught with the GI learning model and students who were taught using conventional learning models in learning the concept of the human respiratory system, and

- (2) the differences in the mastery of the concept of the human respiratory system of students who were taught with the GI learning model and students who were taught by conventional learning models in learning the concept of the human respiratory system.

### **1.7. Research Benefits**

The results of this study will have benefits, both theoretically and practically. Theoretically, the results of this study are useful: (1) to enrich the repertoire of knowledge in the field of biology learning in general and the learning of the concept of the human respiratory system in particular, and (2) to stimulate ideas that are useful as references and comparisons for further research that examines the problem of improving students' collaboration skills and mastering the concept of the human respiratory system by students.

Practically, the benefits of this research can be stated as follows.

#### **(1) For Teachers**

The results of this study can be used as material for consideration in planning efforts to improve student collaboration skills and increase mastery of the concept of the human respiratory system. In addition, the results of this study can be used as material for consideration in planning a program for learning the concept of the human respiratory system.

#### **(2) For Students**

The results of this study can add insight for students about their collaboration skills and mastery of the concept of the human respiratory system, either through learning with the GI learning model or with the conventional learning model.

#### **(3) For Researcher**

This research can provide researcher with experience on how to conduct research in the field of education and provide opportunities to apply the knowledge gained in college, to the educational institution (school) where the research is conducted. Bagi Peneliti Berikutnya

#### (4) For Next Researchers

The results of this study can be used as a reference or reference for conducting relevant research or those related to the problem of this research, especially to show its novelty.

### 1.8. Operational Definitions

Based on the research to be carried out, several operational definitions of the terms used can be described, namely as follows.

- (a) The Partnership for 21<sup>st</sup> Century Skills in Germaine *et al.* (2016: 23) defined collaboration as the ability to “work effectively in diverse teams, make compromises to reach a common goal, and value each individual’s contribution.” In line with this, Sunbanu *et al.* (2019: 2038) stated that collaboration skills are the ability to do something together with one goal. Based on the two pieces information, it can be stated that collaboration skills are skills that include cooperation, responsibility, communication, compromise, and flexibility.
- (b) Mastery of concepts is the ability of students to understand the meaning scientifically, both in theory and in its application in daily life (Dahar in Astuti, 2017: 42).
- (c) The group investigation (GI) learning model is a form of cooperative learning model that emphasizes the participation and activities of students to find their own subject matter (information) to be studied through available materials, for example from textbooks or the internet (Narudin in Shoimin, 2014: 80). In addition, these investigative activities can also be carried out through experiments and case studies.
- (d) The human respiratory system is an organ system used to inhale oxygen from the air and expel carbon dioxide and water vapor (Munawir in the Ministry of Education and Culture, 2020: 9).