

# CHAPTER I

## INTRODUCTION

### 1.1 Background of The Study

The rapid growth of new technologies in the 21<sup>st</sup> century influence worldwide citizen to acquire knowledge and skills. The world is transforming to digital era in all life aspects. In this era, we must work in society with online technology. Online technology is so very important for education field (Oktavian & Aldya, 2020).

Online learning is one of the ways to reduce the COVID-19 virus deployment in Indonesia, It is increasingly important in today's educational field, as stated in the policy of the Ministry of Education and Culture regarding the implementation of online learning through the issuance of Circular Number 3 of 2020 concerning Prevention Covid-19 in the Education Unit.

Online learning is learning that is carried out online at a distance that students can do wherever and whenever needed Online learning is active learning using the internet network that gives rise to various types of two-way interactions in the learning process (Sadikin & Hamidah, 2020).

Online learning is learning that is distributed and facilitated primarily through electronic gadget such as mobile phone and laptop. Some online learning medias that can be used to facilitate the learning process, namely WhatsApp, web-based e-learning such as Unimed E-Learning, Gmail, Google Classroom, Zoom, Webex, Kahoot, etc (Noviana & Solichin, 2021).

Online learning has its challenges for students in managing and analyzing information about a lesson they get from the internet. During online learning, several student's skills such as critical and creative thinking skills are also tested. Critical thinking, creative thinking, collaborative thinking, and communicative thinking skills are closely related to 4C skill as a central aspect in almost all educational programs in 21<sup>st</sup> century (Purniawan & Sumarni, 2020).

Critical thinking is one of important attributes in the online learning process, which is a must for professional learners and continuous learning; therefore, students can integrate and evaluate sources of knowledge together with social network learning (Carmichael & Farrell, 2012). It included into 10 key competencies that have been formulated into Assessment and Teaching of 21<sup>st</sup> Century Skills (ACT21S) (Griffin, McGaw, & Care, 2012). It is reasonable reflective thinking that focuses on deciding what to believe or do (Hidayati & Sinaga, 2019). It is a new way of thinking, but it should not astonish students with a sudden appeal look the world in new ways by new concept for analyzing the world, students remain obliged to see concrete data when trying to solve a problem wisely (Ennis, 2015).

The implementation of it in education in Indonesia is still has some difficulties. Learning should open the opportunity for all student to express their new novelty, ideas, and innovation and should mastering their learning activity with social and cultural activities. Unfortunately, this application still bad in Indonesia (Susetyarini & Fauzi, 2020).

Another important skill is creative thinking skill. It is the principal of science. Creative thinking skill is a form of expressing oneself in a different and unique way (Ermayanti & Santri, 2020). It is one of the basic competencies as part of life skills which is one of the goals of Indonesia national education system. It presented in the Law of the Republic of Indonesia Number 12 of 2012 concerning Higher Education (Alghafri & Ismail, 2014).

Based on the legal basis, it is written that the competence to think creatively is one of the powers that have to possess and improved by Bachelor's graduates. Previous research result showed that student's creative thinking skills by project-based learning in microbiology lectures, most of them are still classified as moderate (50%), some are in the low category (23.5%) and high (26.5%) (Fatmawati, 2011).

Microbiology as a university course discusses microbial diversity, biological conditions that affect diversity, to the relationship between microbes and human life (Ttorora, Funke, & Case, 2010). This relationship is closely related to students' daily lives and can be discussed in online learning to

encourage their skills because in online learning, student guided in arguing by exploring real issues to provide opportunities to respond as a form of action to deal with problems in issues and create a new innovation solution (Ülger, 2016).

The result of initial observation that have been made through questionnaires on Google forms in the Biology Education Study Program on online learning show that 62.2% of the total respondents as many as 78 students agree that they find the difficulties to learn microbiology material in online learning. The learning changes become a new challenge for students and lecturers to carry out lecture activities so that they run well. Based on filling out a questionnaire conducted by students of the biology education study program, 51.4% experienced problems when learning online. The obstacles faced were limited quota, signal, electricity, cellphones and laptops during online learning. Based on questionnaires conducted by students of biology education study program, 51.4% had difficulty doing microbiology practicum in online learning.

Therefore, it required to analyze their critical and creative thinking skill in online learning in the microbiology course at Universitas Negeri Medan. This research is presented with a thesis titled: **"Analysis of Students' Critical and Creative Thinking Skills in Online Learning of The Microbiology Course in The Biology Education Program at Universitas Negeri Medan"**.

## **1.2 Problem Identification**

These are some problems found:

1. Students feel hard to learn microbiology material in online learning.
2. The critical and creative thinking skill of biology education students in online learning has not been maximized at Universitas Negeri Medan based on the result of an initial research questionnaire in the microbiology course.
3. During online learning, student activity in creating questions and answering questions from lecturers has not been maximized in microbiology course.
4. Students experience difficulties during online learning such as unstable internet network, frequent power outages, and limited internet quota.

### **1.3 Scope of Study**

This research will analyze student's critical and creative thinking skill in microbiology courses using an online learning model. Critical thinking skill indicators in this research are elementary clarification, basic support, inference, advanced clarification, and strategy and tactics (Ennis, 2013). Meanwhile, according to Guilford (Munandar, 2009) the important things of creative thinking skill in this research are fluency, flexibility, originality, and elaboration.

### **1.4 Scope of Problem**

The limitations of the problem in this research are:

1. The scope only includes critical and creative thinking skills, online learning, and microbiology course.
2. The information presented is: Elements that are criteria for critical and creative thinking skill, benefit and deficiency of online learning, some topics in microbiology, number of students of biology education study program, and data related to research.

### **1.5 Problem Formulation**

The problems in the research that can be formulated are:

1. How is the critical thinking skill of Biology Study Program students in online learning in microbiology course at Universitas Negeri Medan?
2. How is the creative thinking skill of Biology Study Program students in online learning in microbiology course at Universitas Negeri Medan?

### **1.6 Research Purposes**

The purposes of this research are:

1. To analyze the critical thinking skill in microbiology course in online learning for students of biology education study program at Universitas Negeri Medan.
2. To analyze the creative thinking skill in the microbiology course in online learning for students of the biology education study program at the Universitas Negeri Medan.

### **1.7 Research Benefits**

1. For students, this research expected to create meaningful, interesting, and fun learning as well as to develop students' critical and creative thinking skill.
2. For lecturers, this research expected to provide information about online learning that applied in microbiology learning so that it can improve students' critical and creative thinking skill.
3. For campuses, this research expected to provide information about students' critical and creative thinking skill in online learning that can be taken into consideration in improving the quality of microbiology learning at Universitas Negeri Medan.
4. For researchers, this research expected to be a direct means to gain direct experience in analyzing critical and creative thinking skill in microbiology course for friends in the biology education study program at Universitas Negeri Medan.

### **1.8 Operational Definition**

Some various operational definitions that will be used in this study are:

1. Critical thinking is a cognitive ability in obtaining information rationally, analyzing problems, developing and explaining arguments, admitting errors and biases, establishing a decision or conclusion based on logical reasons and accompanied by empirical evidence. Critical thinking indicator has some functions for synthesizing, evaluating arguments and evidence, clarifying, making considerations, making explanations, and identifying an assumption. The measurement of students' critical thinking skill in online learning for microbiology course at the Biology Education Study Program, Universitas Negeri Medan can be done with an essay test.
2. Creative thinking skill is a thought process that used by individuals to generate new ideas, or develop other people's ideas in solving a problem. The indicators of creative thinking used in this study include fluency, flexibility, originality and elaboration. The measurement of students' creative thinking skill in online learning for the microbiology course at the Biology Education Study Program, Universitas Negeri Medan can be done with an essay test.

3. Online learning is a learning that is not done face-to-face or directly, but uses platforms such as zoom, google meet, google classroom, and whatsapp that can help the teaching and learning process that is carried out even though it is far away. Online learning uses the internet as a method of delivery, interaction and facilities that are supported through various other learning services. Its purposes are to provide quality learning services in a massive and open network to reach higher enthusiasts of learning space.
4. Microbiology is the study of microorganisms, or microbes, a diverse group of generally small simple life forms that includes bacteria, archaea, algae, fungi, protozoa, and viruses. This field is concerned with the structure, function, and classification of these organisms, how to utilize and control their activities through various isolation techniques, as well as the role of microbiology in various fields. This course is delivered to Biology Education students class 2019 5<sup>th</sup> semester. Learning indicators in this material are students can explain the scope and history of microbiology, structure, morphology, physiology metabolism of microorganisms, bacterial staining techniques, and the role of microbiology in various fields of life, as well as being able to isolate pure cultures from mixed cultures of microorganisms.