**Jurnal Biotik**. P-ISSN: 2337-9812, E-ISSN: 2549-1768
Vol. 10, No.1 Ed. April 2022, P. 36-45

# IDENTIFICATION OF BIOLOGICAL EDUCATION STUDENT MISCONCEPTIONS THROUGH STUDENT TEACHING VIDEO ANALYSIS

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**DOI: 10.22373/biotik.v10i1.10526**

## ABSTRACT

Knowing the existence of misconceptions in students is important, especially for prospective teacher students. The Covid-19 pandemic has limited learning activities, so educators' creativity is needed. This study aims to identify the existence of student misconceptions through the analysis of student teaching videos. The research subjects were 14 students of Biology Education Study Program at Syiah Kuala University Gayo Lues who programmed microteaching courses for the 2020/2021 academic year. Each student was asked to record his teaching activity, duration 20-30 minutes. The video was analyzed to identify the existence of misconceptions. The data obtained were analyzed quantitatively and qualitatively. The results showed that 36% of the total number of students experienced misconceptions, where cell material was the material with the highest number of misconceptions (60%). This study also shows that video recordings of teaching students can be used as an instrument to identify the existence of misconceptions in students.

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**Keywords**: Misconceptions, student teaching videos.

## INTRODUCTION

Covid-19 pandemic requires all parties to innovate in the midst of limitations. Distance learning or online learning also has a number of limitations when compared to face-to-face learning. These limitations have the opportunity to present conceptual misunderstandings (misconceptions) to students during learning.

Patil et al. (2019) and Ruiz-Gallardo (2019) mention that efforts to find out and correct conceptual misunderstandings among students are important, especially for prospective

teacher students, because they will transfer knowledge and understanding of these concepts to their students at school. [1];[2]. If their understanding of the concept is wrong, then the wrong concept will be accepted by their students later.

Under normal conditions, for example before the Covid-19 pandemic broke out, there are many ways that can be done to identify and analyze student misconceptions. Fadillah & Salirawati (2018) used a two-level test [3], Kaniawati (2019) use *Four-Tier Newtonian Test* [4], this method is reported to be more effective than the use of a two-level test.

Annisa et al. (2018), Sudihartinih (2018), and Suharto (2019) explain other methods that are more commonly used to identify students' misconceptions are interviews, simple multiple choice, tiered test, and opened test [5]; [6]; [7].

Gusmalini (2020) identified the existence of students' misconceptions on the concept of genetics using the Certainty Response Index (CRI) method [8]. Using 20 multiple choice items and a CRI sheet with four confidence scales. Found that more than 40% of students had misconceptions. However, in the current difficult conditions, Paek (2019) states that educators' creativity is needed to identify these misconceptions [9].

This study tries to use student teaching video to identify misconceptions that occur. This research is expected to be an alternative that educators can do to identify misconceptions in students, especially for prospective teacher students during the Covid 19 Pandemic.

## METHODS

The subjects of this study were fourteen students of Biology Education Study Program of Syiah Kuala University Gayo Lues District who programmed microteaching courses for the Academic Year 2020/2021. The object of research is student teaching video.

The study was conducted for two months. Starting from May to June 2021. As a final project, each student is asked to record his teaching activity

lasting 20-30 minutes. Then the video was analyzed by three lecturers to identify the presence of misconceptions.

Data was analyzed quantitatively and qualitatively. Every misconception that was found was tabulated to find out on what material the misconceptions occurred. The data also presented in percentages, examined the possibilities that cause misconceptions occur, and also presented a number of advantages and disadvantages of using student teaching video to identify misconceptions.

## RESULTS AND DISCUSSION

The findings of student misconceptions through the analysis of student teaching videos are presented in Table 1 below.

Table 1. Tabulation of Misconception Findings in Students

| No | Topics | Misconception Finding |
|---|---|---|
| 1 | Cell Concept | 1. The smallest organ in the body of living things is the cell.<br>2. Living things are called multicellular, non-living things are called unicellular.<br>3. Unicellular means a creature so small that it cannot be seen. |
| 2 | Cell Reproduction | 1. Mitosis increases the number of chromosomes in the daughter cells. |
| 3 | Animal Circulation System | 1. In an open circulatory system, blood does not flow through blood vessels. |
| 4 | Plant Cell | 1. Plant cells are prokaryotic.<br>2. Plant cells do not have a cell nucleus. |
| 5 | Fungus | 1. Fungus are plants that do not have chlorophyll. |

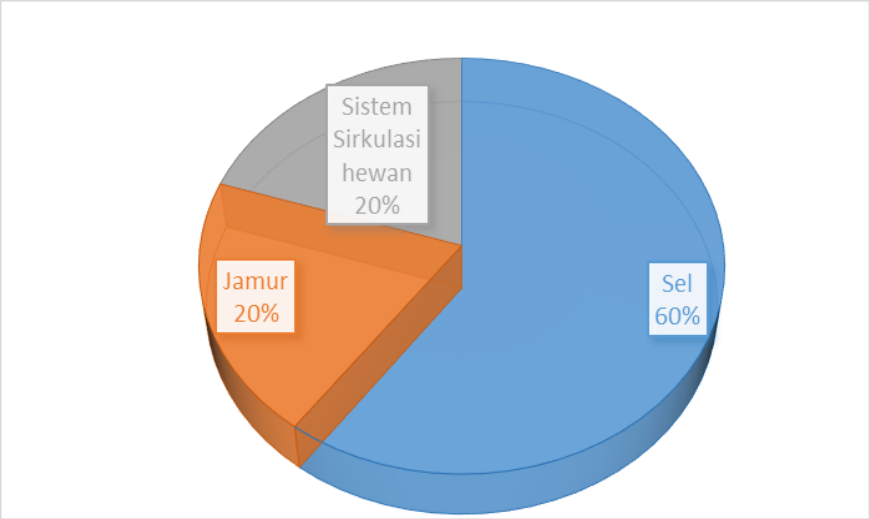


Figure 1. Pie Diagram of the Percentage of Biological Material that Misconceptions Occur.

From the analysis of the students' teaching videos, it was found that the students' highest misconceptions were in the cell concept material (60%). This is in accordance with the findings of Hala et al. (2018) and Suhel & Rusyati (2021) [10]; [11]. Hala et al. (2018) found that biology teachers in Makassar city had misconceptions about the six basic competencies of the cell concept, where the basic competencies were 3.2. associated with the ability to distinguish various transport mechanisms in cells was the finding of misconception with the highest percentage (55.68%) [10]. While Suhel & Rusyati (2021) found that 51% of students' understanding of cell types and characteristics had misconceptions [11].

These findings indicate that the material about cells is still a material that quite often presents misconceptions to students. So that improvements are needed both in terms of the selection of methods, approaches, and media used so that the possibility of student misconceptions in this material can be reduced. The material around cells presents material in the form of facts, concepts, and procedures that are quite complex. Most of the material is also abstract, so modeling is needed so that the abstract material can be seen by students.

Student misconceptions also occur in the material around circulatory system in humans and animals (20%).

A student explained that in an open circulatory system, blood does not flow through blood vessels. Actually this is not the case, in an open circulatory system, blood is not always in the blood vessels, but also enters the body's tissues. Related to this material, students are also often mistaken about what type of blood vessels carry blood from the heart, and conversely what type of blood vessels carry blood to the heart. Ainiyah et al. (2018) explained that the location of the misconceptions of each student is different from one another, this is because each student has unique characteristics [12].

Furthermore, students' misconceptions were found on the fungus material (20%). A student explicitly stated that fungus are plants that do not have chlorophyll. This statement is clearly wrong. Fungus are not plants. Fungus and plants have their respective kingdoms. They are grouped into different kingdoms because they have a number of very different characteristics and traits.

The results of the study found that 5 out of 14 students had misconceptions, and 9 students did not. The percentage of the number of students who had misconceptions based on the results of the analysis of teaching videos for each student can be seen in Figure 2 below.

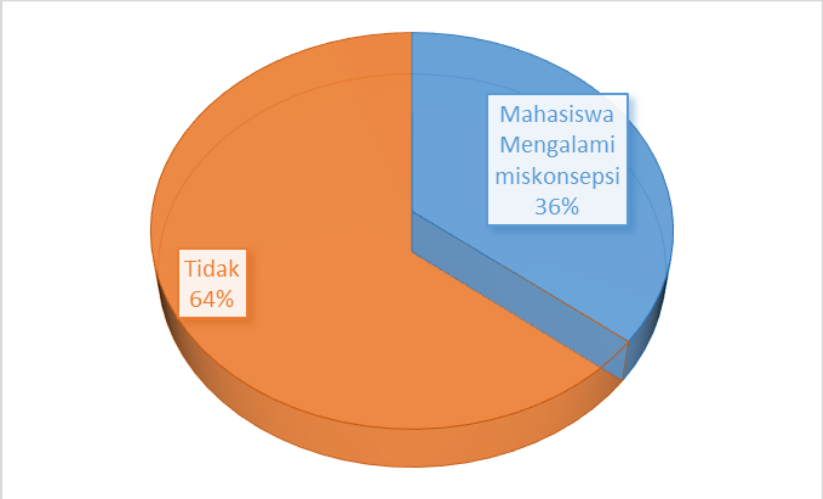


Figure 2. Pie Diagram of the Percentage of Students have Misconception.

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Figure 2 above, it can be seen that there are 36% of students have misconceptions. Misconceptions occur in several different biological material. Novitasari et al. (2019) explained that misconceptions in students can be caused by many things, for example the textbooks used have a number of misconceptions in certain chapters [13]. Misconceptions can also be caused by the students themselves, namely related to the stage of students' cognitive development. In addition, the results of Halim & Lestari's research (2019) stated that students' feelings of pleasure and displeasure in a certain subject matter could also be the cause [14]. In addition to the above, the research results of Hala et al. (2018) and Sari et al. (2019) explain that misconceptions can also be caused by the low reasoning ability and retention of students, lack of learning resources, the existence of a number of terms that are not understood and low student interest in certain biological material [10]; [15].

Mufit (2018) and Sirovina (2019) explain that many efforts can be made to prevent or reduce the chances of misconceptions in students. One of them is the proper use of visuals. It is important for teachers and students to improve their visual literacy. The combination of video visualization and graphic analysis can improve concept understanding and is also expected to improve students' misconceptions [16]; [17].

Another method that has been reported to be successful in reducing students' misconceptions is to apply the POE (Predict-Observe-Explain) strategy in learning (Lestari et al., 2018) [18]. Subahi (2019) recommends the use of cognitive conflict strategies in learning to reduce student misconceptions [19].

Besides being able to be used as an instrument to identify and analyze students' misconceptions, Widarta et al. (2021) state that student teaching videos can also be used to measure and view the profile of basic teaching skills of prospective teacher students [20]. Basic steaching skills that has been mastered by students will be seen in the video. On the other hand, basic teaching skills that are not yet known to students will not be displayed or demonstrated by students.

From the results of the analysis of

student teaching videos, teachers can immediately identify which basic teaching skills have been mastered and which have not, so that they need to be retrained at the next meeting.

The use of student teaching videos to identify students' misconceptions has a number of advantages and disadvantages. The advantages and disadvantages can be seen in Table 2 below.

Table 2. Advantages and Disadvantages of Utilizing Student Teaching Videos to Identify Students' Misconceptions

| No | Advantages | Disadvantages |
|---|---|---|
| 1 | Saving time. Quickly identify any material that has misconceptions. | Can only find out the misconceptions of what students convey in the video. |
| 2 | Become an alternative method to identify the existence of misconceptions in students during online class. | The study of misconceptions on a biological material is less in-depth. |
| 3 | It can be seen the level of students' confidence in mastering a biological concept | Fear/anxiety in some students when their teaching activities are recorded has the opportunity to make them make mistakes. |

From Table 2 above, it is known that the advantage is that students' misconceptions are quickly found on certain biology materials. In addition, from the way students deliver the material, it can also be seen the level of students' confidence in a biological concept. The researcher found a number of students who were hesitant when conveying a concept which turned out to be a misconception in it, on the other hand, there were also students who were very confident in conveying or explaining a concept, but unfortunately they had misconceptions about the concept. The use of student teaching videos to identify the existence of misconceptions can be an alternative way to be used during distance learning (onine class).

The drawback of using student teaching videos to identify the existence of students' misconceptions is that we can only find misconceptions from what is conveyed by students. The study of

misconceptions cannot be carried out in depth, for example to find out more specifically what things are related to a biological material that has misconceptions. Identification of students' misconceptions using student teaching videos can only see the surface of a biological material. The anxiety factor in some students when their teaching activities are recorded can also make them make mistakes during teaching (Ainiyah et al., 2018) [12].

The use of teaching video recordings combined with other methods or instruments is highly recommended to identify and analyze misconceptions that occur in students (Mufit, 2018); (Sirovina, 2019) [16]; [17].

## CONCLUSION

The results showed that student teaching videos could be used as an alternative instrument to identify the existence of misconceptions in students. This study found that as many as 36% of students had misconceptions. Where the concept of the cell is the most misconceived (60%).

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