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CORRECTING THE MISCONCEPTIONS OF 6th GRADE ELEMENTARY SCHOOL STUDENTS ABOUT PHOTOSYNTHETIC MATERIALS WITH THE HELP OF ANIMATED VIDEOS

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Abstract: *Science subject is one of the subjects that contains abstract concepts. These abstract concepts can cause students to have difficulty building knowledge resulting in misconceptions. This study describes how the use of animated videos can correct the misconceptions of 6th grade elementary school students on photosynthetic materials. The method of data collection is done by means of observation. Data analysis was carried out by comparing the misconceptions test results before and after using the animated video. The data obtained are presented naturally and then analyzed descriptively to get an overview of the facts. The use of photosynthetic animated videos in this study showed significant results in 6th grade students at SDN Tunge 2 Kediri for the 2022/2023 academic year. There was a drastic decrease in the percentage of misconceptions, namely 72%. It means that video animation can be used to increase students' understanding of photosynthesis material.*

INTRODUCTION

Science subjects are one of the subjects that contain abstract concepts. These abstract concepts also exist in science material in elementary schools which cause students to have difficulty building knowledge. Knowledge that is not confirmed correctly and validly by the teacher causes students to experience misconceptions.

Misconception is a situation in which the concepts that students have are not in accordance with the conceptions of scientists (scientific concepts) (Sutrisno et al., 2008: 3). Misconceptions are also a major problem in science learning. Misconceptions that are not immediately confirmed or corrected can interfere with the formation of scientific concepts. The correct scientific concept becomes the basis for studying the next science concept. Kose ini Keleş & Kefeli, (2010) said that this is in accordance with the goal of science education, which is to make students learn concepts meaningfully and make them use these concepts to meet their daily needs.

Science misconceptions can occur at all levels of education, especially at the elementary school level. One of the elementary schools whose students experience science misconceptions is 6th grade student at SDN Tunge 2 for the 2022/2023 academic year. This study identifies the misconceptions of science with photosynthesis material in the school. Preliminary results of the study showed misconceptions in students that occurred by 78%. Photosynthesis is an important material to be researched, as revealed by Selvi & Yakisan in Keleş & Kefeli, (2010)" the studies concerning student understanding in biology course, which has a rich potential in terms of concepts, revial that students have miss conceptions on; diffusion osmosis, photosynthesis, circulatory system, genetics and in general Biology topics.

Based on the problems above, it is necessary to improve learning to correct students' misconceptions on the material of photosynthesis. One way that can be used is the use of animated videos of photosynthetic material. Animated videos will facilitate the construction of students' knowledge of abstract concepts. This animated video contains photosynthetic material packaged in moving images and sound.

The use of animated videos in learning has proven successful in previous training studies to improve students' understanding of science concepts. One of the studies conducted using animated videos is the research of Arina Nuri Azmi. The results showed that there was an effect of using animated videos on learning outcomes of changing the appearance of the earth for fourth grade students at SDN Tamanan 2 Bondowoso with a relative effectiveness level of 88.16% compared to not using animated videos (Azmi, 2014). Therefore, Researchers are interested in using animated videos to correct misconceptions that occur in 6th grade students of SDN Tunge 2. The researcher takes the title "Improve Misconceptions of 6th grade Elementary School Students about Photosynthetic Materials with the Help of Animated Videos".

RESEARCH METHODS

This research uses the type of quantitative research. The research subjects were 20 students from 6th grade students of SDN Tunge 2 for the 2022/2023 academic year. The method used in collecting data in this study is observation, interviews, tests and documentation. The data obtained in this study were analyzed using quantitative data analysis methods. Quantitative data obtained from test results. The data in the form of numbers will be analyzed according to the pattern of student answers. The pattern of student answers is then categorized into the categories of understanding, misconception, and not understanding.

Table 1. Student Answers and Categories

No	Student Answers	Category
1	Correct answer choice, correct reason	Understood (P)
2	Correct answer choice, wrong reason	Misconception (M)
3	Wrong answer choice, correct reason	Misconception (M)
4	The correct answer choice, the reason is not filled	Misconception (M)
5	Wrong answer choice, wrong reason	Don't Understand (TP)
6	Wrong answer choice, reason not filled in	Don't Understand (TP)
7	Did not answer, reason not filled	Don't Understand (TP)

To determine the level of students' misconceptions, the number of categories of student understanding is calculated using the formula:

$$\text{Py} = \frac{Fy}{N} x100$$

Information :

Py = percentage number category y

Fy = Number of students who have a certain answer pattern (y category)

N = Total number of students

100 = Fixed number

The percentage of students who fall into the category of understanding, misconception and not understanding will be calculated. This percentage will be grouped into 3 criteria, namely low, medium, and high.

Table 2. Criteria for Assessment of the Percentage of Misconceptions

No	Percentage of Misconceptions	Category
1	0 – 45%	Low
2	46 – 79%	Medium
3	80 – 100%	High

RESULTS

This study aims to detect the misconceptions of sixth grade elementary school students about photosynthesis. The data obtained were interpreted using quantitative and qualitative data analysis methods. The data are grouped into 2, namely data before and data after the use of animated video media.

Table 3. Data from Test Results before Using Animated Video

Question	Draft	Understand	Mis-conception	Do not understand
Question 1	Definition of photosynthesis	15%	80%	5%
Question 2	Light and Photosynthesis	15%	85%	0%
Question 3	Photosynthesis Site	15%	75%	10%
Question 4	Photosynthetic Material	20%	80%	0%
Question 5	Photosynthesis Reaction	15%	75%	10%
Question 6	The Role of Chlorophyll	20%	80%	0%
Question 7	Photosynthesis Results	5%	90%	5%

Question 8	Application of the Concept of Photosynthesis	15%	80%	5%
Average		15%	81%	4%

The data above shows the percentage level of understanding, misconceptions that occur and the percentage of students who do not understand. The results of the test with photosynthetic material showed that the students' understanding level was 15%, the level of misconception was 81%, and they did not understand at 4%. Students who experience misconceptions reach 81%, much larger than the percentage of students who understand, which is 15%, and students who do not understand, which is 4%.

The sequence of concepts that experienced the highest level of misconceptions were: 1) the results of photosynthesis, 2) light and photosynthesis, 3) the role of chlorophyll, 4) photosynthetic materials, 5) the application of the concept of photosynthesis, 6) the meaning of photosynthesis, 7) the site of photosynthesis, and 8) photosynthetic reactions. The test results showed that the students experienced the most misconceptions on the results of photosynthesis with a percentage of 85%. Students who answered correctly as much as 10%, the rest experienced misconceptions by answering that carbon dioxide is the result of photosynthesis. The same is true for the concepts of light and photosynthesis. Only 15 percent of students answered correctly, the rest experienced misconceptions. Students with misconceptions answered that at night plants cannot carry out photosynthesis because there is no sunlight.

The misconceptions that occur in 6th grade students of SDN Tunge 2 for the 2022/2023 academic year are high. The percentage of misconceptions of 81% indicates a high category. The example of the description of student answers above shows that the level of misconception also shows a high level of misconception.

Data from Test Results after Use of Animated Video

Tests in the form of photosynthetic questions were conducted to test the level of students' understanding and misconceptions about this material after using animated videos. There is a significant difference to the results. The results of the test to test the level of understanding and misconceptions of students after the use of animated videos are presented in the table below.

Table 4. Data from Test Results after Using Animated Videos

Question	Draft	Understand	Misconseptions	Do not understand
Question 1	Definition of photosynthesis	100%	0%	0%
Question 2	Light and Photosynthesis	85%	15%	0%
Question 3	Photosynthesis Site	90%	5%	5%
Question 4	Photosynthetic Material	100%	0%	0%
Question 5	Photosynthesis Reaction	90%	5%	5%

Question 6	The Role of Chlorophyll	85%	15%	0%
Question 7	Photosynthesis Results	80%	15%	5%
Question 8	Application of the Concept of Photosynthesis	85%	15%	0%
Average		89%	9%	2%

The data above shows the percentage level of understanding, misconceptions that occur, and the percentage of students who do not understand. The results of the test with photosynthetic material showed that the students' understanding level was 89%, the level of misconception was 9%, and they did not understand at 2%. Students who understand the material reach 89%, much greater than the percentage of students who experience misconceptions, which is only 9%, and students who do not understand, which is 2%. The misconceptions that occur in grade VI students of SDN Tunge 2 for the 2022/2023 academic year with a percentage of 9% indicate the low category.

Table 5. Students' misconceptions before and after the use of animated videos

Question	Draft	Pre-Video Animated	Post Animated Video	Difference
Question 1	Definition of photosynthesis	80%	0%	80%
Question 2	Light and Photosynthesis	85%	15%	70%
Question 3	Photosynthesis Site	75%	5%	70%
Question 4	Photosynthetic Material	80%	0%	80%
Question 5	Photosynthesis Reaction	75%	5%	70%
Question 6	The Role of Chlorophyll	80%	15%	65%
Question 7	Photosynthesis Results	90%	15%	75%
Question 8	Application of the Concept of Photosynthesis	80%	15%	65%
Average		81%	9%	72%

The data above shows the percentage of misconceptions experienced by students before and after using the application. The average students' misconceptions before the use of the video was 81%. After the use of animated videos, students' misconceptions fell 72% to 9%. The percentage of misconceptions on 8 questions about the concept of photosynthesis can be lowered entirely. Questions 1 and 4 experienced the highest decline of 80%. Question 1 regarding the concept of photosynthesis decreased from 80% to 0%. Previously, 80% of students answered that photosynthesis means that the results of photosynthesis are used by other living things because plants are the only producers or providers of food. After using the animated video, students have answered that the results of photosynthesis, apart from being used by other living things, are also used by the plants themselves to grow and stored in the form of food reserves in stems, leaves, fruit, tubers, and other parts of the plant body. This also happened to questions about photosynthetic materials. Previously 80% of students answered that the material for photosynthesis is

oxygen. After using animated videos, students have answered that photosynthesis uses carbon dioxide.

Questions 6 and 8 experienced the lowest decline of 65%. Question 6 regarding the concept of the role of chlorophyll decreased from 80% to 15%. Previously 80% of students answered that chlorophyll is only found in leaves. After using the animated video, students have answered that chlorophyll is found in all green parts of the plant body. This also applies to the question of the concept of photosynthesis. Previously, 80% of students answered that excessive amounts of carbon dioxide were harmful to plants. After using the animated video, students have answered that photosynthesis, the more the amount of carbon dioxide, the better for plants because it accelerates the rate of photosynthesis.

DISCUSSION

The results of tests related to photosynthesis for 6th grade students of SDN Tunge 2 for the 2022/2023 academic year showed a high level of misconception. This is related to the results of interviews, questionnaires, and observations regarding student learning readiness and teacher teaching readiness. The test results or the results of concept construction obtained by students are the impact of learning provided by the teacher and the readiness of students themselves in receiving lessons.

In terms of student learning readiness, it was obtained data that students did not study at home before participating in science learning at school and the preconceptions possessed by students before receiving material from the teacher. Preparing students by assigning them to study the material that will be given will help facilitate understanding. This is in accordance with the opinion of Mulyani, (2013) that if students have mature learning readiness, then students will find it easy to deepen the subject matter and concentrate in the learning process. The second cause is preconceptions that have been previously owned by students. According to Suparno (2013: 34) the initial concept or preconception of students before attending formal lessons by the teacher often contains misconceptions. This is because the child's mind from birth is not silent,

In terms of teacher readiness, data obtained that teachers do not use learning media in teaching photosynthesis material. Abstract concepts in photosynthetic material need to be clearly taught to students. Previously, teachers only used one method, namely lectures. This method is not appropriate, because it has the potential to increase misconceptions in elementary school students who are at the stage of concrete operational thinking. The lecture method without real visualization makes it difficult for students to construct concepts. This method makes students think that photosynthesis material is only rote material that is heard and written. This is in accordance with Ausubel's opinion in (Dahar, 2011: 97). which states that rote learning is learning that does not carry out the process of assimilation of concepts, so students do not understand what the real concept is.

The use of animated videos used in this study showed significant results in reducing the level of students' misconceptions on photosynthetic material. There was a drastic decrease in the percentage of misconceptions by 72%. Animated videos help students concretize something abstract in grade VI students. 6th grade students aged 10-12 years. Piaget's cognitive theory states that at this age, it is called concrete operational thinking

(Desmita, 2015: 251). Students can use their minds to think logically about something that is concrete or real. Intuitive thinking (instinct) is replaced by logical thinking on the condition that the thinking can be applied to concrete or specific examples. The disadvantage of this phase is that when children are faced with problems that are abstract (verbally) without a real object, then they will have difficulty and even not be able to solve them properly (Santrock, 2007: 251). In addition, the use of animated videos is certainly more interesting than just listening to textbooks while listening to the material delivered by the lecture method. This can increase students' motivation to take part in learning.

CONLUSSION

Based on the presentation of the results of the analysis and the previous discussion, it was found that there was a significant reduction in the level of misconceptions in photosynthetic material. 72% reduction in misconceptions occurred after using animated videos. Misconceptions on photosynthetic material often occur in the concept of photosynthetic materials, photosynthetic products, the time of photosynthesis, and the application of the concept of photosynthesis. Teachers need to correct these misconceptions so that students can learn the next science concepts and not take these misconceptions to a higher level of education.

Teachers need to prepare learning activities so that learning activities at school can help students, especially at the concrete operational age to be able to build valid scientific concepts. Animated videos can be used to teach topics that are abstract and difficult to present in real life. For this reason, the creative competence of teachers is needed to create innovative learning activities like this.

Teachers also need to be trained to be able to use technology in learning. Training can be done collectively or independently. In addition, similar research needs to be done on other science materials to determine the effectiveness of animated videos. Further studies on the use of science animation videos in various topics will be useful for the development of animated videos to overcome the misconceptions that occur.

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