

Identification of Electrical Circuit Material Science Misconceptions in Class VI SD UMP Students

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ABSTRACT

A misconception is a wrong belief in a concept, idea, object, or event that is inconsistent with the scientific understanding accepted by experts in that field. The problem studied in this study is the impact of misconceptions that occur in the material for electrical circuits among UMP Elementary School students. This type of research is descriptive with a quantitative approach that is carried out in a definite way to help misconceive the material for electrical circuits using essay questions for SD UMP students. The data obtained in this study included the participation of sixth grade students at SD UMP in answering essay questions, the results of interviews with teachers, and documentation. The data analysis used is quantitative descriptive analysis. The results of the study showed that there were 11.33% misconceptions about electrical circuits in UMP Elementary School students, namely, 11.33% did not understand the concept of electrical circuits, 48% had misconceptions, and 40.67% understood concepts. Misconceptions with high categories that occur in the problem indicators determine how to read electrical circuits in illustrated images, namely 29%.

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1. INTRODUCTION

The concept is a group or group of facts or information that has meaning [1]. Conception comes from the verb "conceive," which means "to receive" [2]. So, conception is a way of accepting someone for something that has meaning. Meanwhile, a misconception is a wrong belief in a concept, idea, object, or event that is built based on one's experience [3]. Misconceptions are the notion of a concept that is not correct; it is wrong to use the concept of a name; it is wrong to classify examples of concepts; there are doubts about different concepts; it is not right to connect various kinds of concepts in a hierarchical arrangement; or to make an exaggerated generalization of a concept or make it less clear [4]. Misconceptions are also factors that influence classroom learning (Kose, 2008). If there is a misconception, it will hinder the further learning process [5]. Misconceptions can be triggered by factors such as students, teachers, teaching methods, contexts, and textbooks [6]. Misconceptions are also factors that influence classroom learning [7]. Students often believe in inappropriate concepts or misconceptions about science lessons [8]. Based on previous research in the field of science, several studies have been found, including misconceptions about the concept of electrical circuits [9]. The results of the study concluded that the causes of science misconceptions were teaching materials in the form of books and LKS, which were widely used in elementary schools [10]. Reinforced by other research, it obtained results indicating that 3.80% of students' misconceptions were caused by textbooks [11]. The problem studied in this

study is the identification of misconceptions that occur in the material for electrical circuits among UMP Elementary School students.

2. RESEARCH METHODS

The type of research used is descriptive research with a quantitative approach.

Tools that can be used by researchers and teachers to detect misconceptions are:

- a. Multiple choice tests with open reasoning: multiple choice tests with open questions require students to answer and write answers explaining why they have answers like that.
- b. Written essay tests: Researchers or teachers prepare an essay test that contains several concepts that are to be taught or have been taught. From this test, it can be seen the misconceptions brought by students.
- c. Diagnostic interviews, which are carried out by the teacher or researcher after selecting several concepts that are thought to be difficult for students to understand or some of the main concepts of the material to be taught. [12].

To find out the occurrence of misconceptions, it is necessary to know the degree of understanding of students' concepts. Classify the degree of understanding as explained in the table below [13].

Table 3.1. Conceptual Understanding Levels

No	Level of Understanding	Criteria and Assessment	Pattern Answer	
			True/False	Description
1	Do not understand the concept	No response, or an answer that is unrelated to the question	Wrong answer, wrong reason; correct answer, no reason; and wrong answer, no reason	<ol style="list-style-type: none"> a. Do not answer, answer "I don't know," or repeat questions. b. Responding but not directly to the question or answer is unclear
2	Misconceptions	The answers show that there are concepts that are mastered, but there are statements that show misconceptions.	Answers are wrong, reasons are correct, and answers are correct, reasons are wrong	answer, but the explanation is incorrect or illogical.
3	Understanding the concept	Shows the concept is mastered correctly	Answers are correct, The reasons are correct	Answers by showing the concept is mastered correctly

The categories of student understanding of concepts are divided into three: understanding scientific concepts, having misconceptions, and not understanding concepts. Researchers can analyze the possibility of misconceptions with reasoned multiple-choice test tools, descriptive tests, and diagnostic interviews. In this study, we used a description test tool to identify misconceptions about electrical circuit material. The test grids are explained in the following table.

Table 3.2. Misconception Diagnostic Test Grids

Basic competencies	Question Indicator	Grating items	Question Number
3.4. Identify electrical components and their functions in simple electrical circuits.	3.4.1 Determine how to read a simple electric circuit.	Presented with questions, students can mention the causes of electrical symptoms.	1
		Presented with questions, students can identify the differences between conductors and insulators.	2
		Presented with information about electrical circuits, students are able to identify the characteristics of series and	3, 4

Basic competencies	Question Indicator	Grating items	Question Number
		parallel circuits.	
		Presented with pictorial questions, students are able to identify the components of the lights that are on and not on.	9
		When presented with a picture of an electrical circuit, students are able to identify which switch components are connected and which are not connected.	10
4.4 Conduct simple electrical circuit experiments in series and parallel.	4.4.1 Analyzing the experimental results of simple electric circuits in parallel	Presented with questions about electrical circuits, students are able to compare the lights on a series or parallel circuit.	5
		Presented with questions about electrical circuits, students are able to compare the advantages and disadvantages of series and parallel circuits.	6
		Presented with questions about electrical circuits, students are able to compare the use of batteries in series and parallel circuits.	8

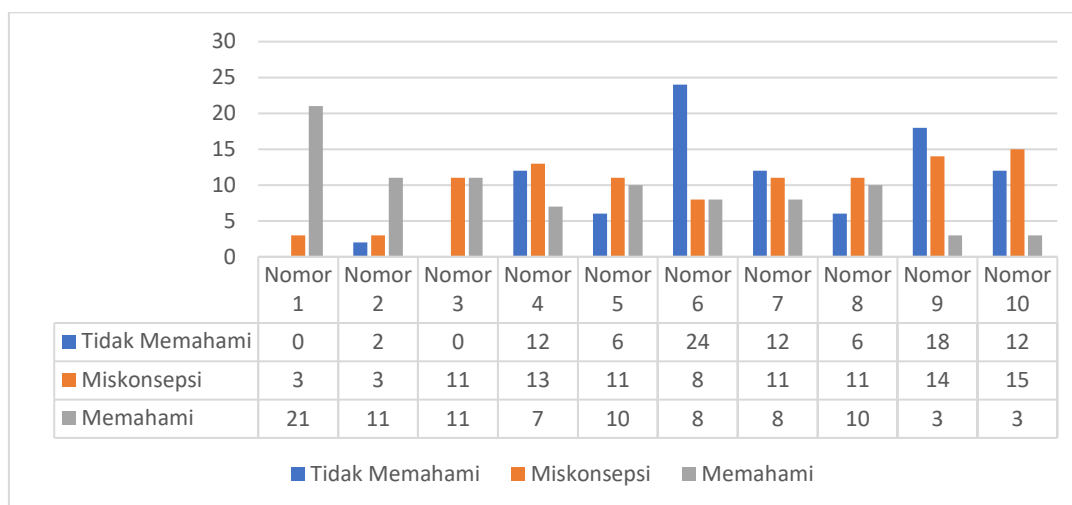
3. RESULT AND DISCUSSION

Misunderstandings of concepts that occur in students need to be detected from the start so that students do not experience misconceptions. The results showed that UMP Elementary School students had difficulty with several electrical circuit concepts, including determining how to read and understand electrical circuits in illustrated pictures, identifying lamp components that were on or not lit, and identifying connected and unconnected switch components. An initial analysis of the occurrence of misconceptions among 15 respondents obtained the following data: students did not understand the concept of electrical circuits by 11.33%, misconceptions by 48%, and understanding concepts by 40.67%. Misconceptions with a high category occur in the question indicators determining how to read electrical circuits in illustrated images, namely 29%. The following table shows the results of the Misconception Diagnostic Test on electrical circuits in UMP Elementary School students.

Table 3.3. Results of the Misconception Diagnostic Test

Number	Student's name	Question Number									
		1	2	3	4	5	6	7	8	9	10
1	A	M	M	MI	MI	M	TM	MI	M	MI	M
2	B	M	MI	MI	M	MI	MI	MI	MI	MI	MI
3	C	M	MI	M	M	MI	MI	M	MI	TM	MI
4	D	M	M	MI	MI	M	M	MI	M	MI	MI
5	E	M	M	MI	M	MI	TM	TM	M	M	MI
6	F	M	M	MI	M	M	M	MI	MI	MI	MI
7	G	M	M	M	MI	MI	M	TM	TM	TM	TM
8	H	M	TM	M	TM	MI	M	M	M	MI	MI
9	I	M	M	MI	MI	M	MI	MI	MI	MI	MI
10	J	M	TM	MI	MI	MI	MI	MI	MI	MI	MI
11	K	M	M	M	MI	MI	TM	M	MI	M	MI
12	L	MI	M	M	MI	MI	MI	M	M	MI	MI

13	M	MI	M	M	MI	M	MI	MI	MI	MI	MI
14	N	M	M	M	TM	M	M	TM	M	MI	TM
15	O	M	M	MI	MI	TM	TM	MI	MI	TM	M



4. CONCLUSIONS

The findings revealed that UMP Elementary School students struggled with several electrical circuit concepts, including determining how to read and understand electrical circuits in illustrated pictures, identifying components of lights that were on and off, and identifying connected and unconnected switch components. The difficulty of this concept leads to misconceptions in several electrical circuit sub-materials.

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