

Misconception Analysis to Know the Understanding of Static Electrical Concept at SMK Bina Taruna Gorontalo by Using Certainty of Response Index (CRI)

Triman¹, Mursalin², and Abdul Haris Odja^{2,*}

¹*a student of master of physics education program, Universitas Negeri Gorontalo, Jend. Sudirman street, Number 06, Gorontalo 96128, Indonesia.*

²*a lecture of master of physics education program, Universitas Negeri Gorontalo, Jend. Sudirman street Number. 06, Gorontalo 96128, Indonesia*

**Email: abdul.haris.odja@gmail.com*

ABSTRACT

Analysis of the misconceptions on static electrical concepts has been conducted. The misconceptions are found in several indicators, such as in the concept of Atom, the concept of electrically charged concept, the concept of how to create electrically charged objects by rubbing, induction and conduction, electric charge properties, Coulomb Law and electric field. This research aims to determine the misconception of static electrical concept at SMK Bina Taruna Gorontalo. Analysis of these misconceptions by using objective questions that amounted to 20 items. sampling techniques in the analysis used only one class with a total of 22 students. Analysis of these misconceptions by using objective questions amounting to 20 items. The problem given to learners comes with the Certainty of Response Index (CRI) field to easily find out the level of misconceptions. in addition to CRI, researchers also used tree tier tests to determine the level of misconceptions. The results of the analysis came to the conclusion that some learners have misconceptions on each of the concept indicators. The indicator on the atomic concept of 54.5% which is subjected to misconception, electrically charged objects there are 63.6% who are experiencing misconceptions, the concept of how to create electrically charged objects by rubbing there are 54.5% who are experiencing misconceptions, induction there is a 54.5% which is subjected to a misconception and a conduction is 63.6%. The nature of the electric charge is 45.45% of the misconceptions, the Coulomb's law is 22.72% of the misconceptions and electric fields there are 18.18% of the misconceptions.

Keywords: *misconceptions, Certainty of Response Index (CRI) and static electricity.*

1. INTRODUCTION

The Government has always done various ways to improve the education in Indonesia, one of them always change the existing curriculum. But it is unfortunate that very few think about how to change learners' mindset to understand the concept of the

lesson as an important object of education. Learners always instruct what they know. A less understanding of learners is not an impossible thing to happen, because usually what they know is not in line with the scientific concept. This is what caused one of the occurrence of misconceptions. As Van den Berg (1991) said that the physical misconception is a

mistake of concept by the people so that the understanding is not the same as the concept of physicists [1]. While the Borwn (in Suparno, 2005), explains the misconceptions as a lack of understanding of the concept and describes it as an individual idea that does not conform to the scientific notion based on

is to have fun learning for learners. There are a few that can be done to find out the level of the student misconceptions, using the Certainty of Response Index (CRI). This CRI can make it easier to find the level of student misconception. The measure of confidence/certainty of the respondent in answering

Table 1. Assessment to identify the presence of a 3-tier multiple choices misconception

No	Tipe Respon	Kategori
1	Correct answer, reason right and sure	Full knowledge
2	<ul style="list-style-type: none"> - Correct answer, right reason and not sure - Answer wrong, reason right and not sure - Correct answer, reason wrong and not sure - Wrong answer, reason right and sure - Correct answers, wrong reasons and sure 	Partial understanding
3	Wrong answer, the wrong reason will but still relate to the cause of the wrong reason and sure	Misconceptions
4	<ul style="list-style-type: none"> - Wrong answer, wrong reason and not related to cause of reason is chosen and sure - Wrong answer, wrong reason and not related to cause of reason chosen and not sure 	No understanding

the current scientific concepts received [2]. There are some misconceptions that usually occur in learners, such as not in the concept of static electricity. Daniati Safitri, et al said that from 90 respondents as many as 27 (75%) Male students and 38 (70.37%) Female students experience misconceptions on static electrical concept, where the student still considers that two objects are being rubbed together, and the electrons and protons are shifted. Students should understand that the charge is just electron [3]. In addition, many as 45.8% there is a concept mistake in interpreting objects that have a positive charge, In determining the concept of an atomic compound that is said to have a positive charge that is subjected to a misconception as much as 10.8%; Other than that the misconception of the constituent of the so-called negatives there were some who experienced misconceptions of about 53.3%; As much as 82.1% there is a concept of error in interpreting objects that are not content or neutral, in determining the constituent of atoms that are called neutral or not having a charge of misconceptions as much as 33.3%. A total of 72.5% encountered a concept mistake in understanding an object that was said to be electrically charged [4].

Based on the supporting data above, it proves so many learners who are experiencing misconceptions on static electrical concept. Transforming learners from unconceptualized to understanding concepts according to experts is not easy. Moreover, the learning is still using a mediocre method. One way to change the mistake of the concept

each item of question (problem) given, wherein at the developed size can distinguish between students who are experiencing misconceptions or mistakes and do not know the concept [5]. It is referred to as the certainty of Response Index (CRI).

Based on the explanation above, it is conducted research to dig misconceptions on static electrical concept in SMK by using certainty of response index (CRI).

2. EXPERIMENTAL METHOD

The study wanted to describe the misconception of static electrical concept. The method is used with the presence of descriptions in order to easily describe directly the misconceptions of the learners. The method of description used can be interpreted as a procedure in solving the problem that is investigated, which is done by depicting or describing the state of a subject or research object at present time taking into consideration some of the facts that can seem as they are [6]. This research is a form of research survey, which by looking at the picture directly in one class unit. So the research is taken in one population simultaneously. The population of this research is the students of class X SMK Bina Taruna Gorontalo. The sample from this study is part of the population of SMK Bina Taruna Gorontalo which is Class X with the number of one class 22 students. The samples were part of the population form which became some of the actual data

sources in a study [6]. The sample is as part of an object that can be used to represent the population [7].

Data collection techniques used in this study using measurements with the form of essay questions amounting to 20 numbers that have been measured the level of validity through misconception experts. Using a test essay because using a student essay test can directly express what is known broadly, so that it can be known to the extent of the student's understanding of the concept. The essay test can provide several

n : Number of Misconceptions
N : Number of learners

3. RESULT AND DISCUSSION

Analysis results are displayed in the form of a percentage table of the misconception of each indicator of the problem that has been averaged. The Percentage table of the misconceptions is as follows:

Table 2. Percentage Of Average Static Electrical Material Misconceptions

No	Problem indicator	Average percentage of misconceptions
1	Atomic concept	54.5%
2	Concept of electrically charged concept	63.6%
3	Concept of how to create electrically charged objects by rubbing	54.5%
4	Concept of how to create electrically charged objects by induction	54.5%
5	Concept of how to create electrically charged objects by conduction	63.6%
6	Concept of electric charge nature	45.45%
7	Coulomb's legal concept	22.72%
8	Electric field Concept	18.18%

opportunities for learners to submit their opinions or thoughts so that it can be known to the extent that learners can master or deepen a problem that will be dealt with [8]. After the study was given to the students, researchers calculated the percentage of the misconceptions of each problem item that was given using the 3-tier multiple choices method.

In addition to using 3-tier multiple choices, researchers use the certainty of Response Index (CRI) to make it easier to detect the level of understanding and confidence of learners in answering questions. According to Didik and Aulia (2019:3) learners can be expressed as an error in concept or misconception when giving answers or reasons wronged, but has a high level of confidence in providing answers [9]. A percentage of the misconception used can be calculated by the following equation:

$$MS = \frac{n}{N} \times 100\%$$

Where:
MS : Percentage of misconceptions

Based on table 2 above, there are several percentage of misconceptions that have the same misconception number, as in the indicator of atomic concept, concept of how to create electrically charged object by induction way and concept of how to make electrically charged objects by rubbing there are 54.5% of learners misconceptions, On the indicator of the concept of electrically charged objects and the concept of how to create electrically charged objects with a conduction of 63.6% misconceptions in learners. In addition, on the concept of electrical charge properties There are 45.45% misconceptions in learners. Misconception of the Coulomb's legal concept is 22.72%. Finally, there is a 18.18 % on the indicator of electric field concept.

The first question indicator on the concept of atoms, many of the students in the misconception, one of the learners suffered a misconception in the atomic structure, many learners answered that the structure of atoms consisted of protons, neutrons, and electron. Whereas learners should be able to distinguish the contents of atomic particles and atomic structures. The question indicator of both learners considers that Benda is said to be positively charged if the object undergoes a proton reduction, but the learner should know that it is said to be positively charged when

experiencing electron deficiency. The third, fourth and fifth indicators of the concept of how to create electrically charged objects by rubbing, induction and conduction, some learners have not understood the concept of how to create electrically charged objects.

On the sixth question indicator there are 45.45% of the learners experiencing misconceptions, learners have not understood the concept of electrical charge outlined in three objects that are charged with each other in charge of each other. On the seventh question indicator there are 22.72% of learners misconceptions, in which the concept of the Coulomb of law learners have not understood well the concept of determining the content of objects on the Coulomb's law, if there is some charge.

The last problem indicator is a magnetic field concept that has a misconception of 18.18%. Many learners have a misconception in the indicator, because learners have a mistake in determining the source of the magnetic field. On the concept of magnetic field has a low level of misconception because some learners have not understood about the magnetic field concept itself, so that at the data analysis level of understanding learners do not understand greater with the level of misconceptions.

Based on the above data, there are still many learners who have a misconception of static electrical concepts, which include several indicators. There are a number of factors that cause learners to experience misconceptions, one of which occurs in their own learners, where learners answer correctly but are incomplete. Misconceptions will continue to occur, when self-improvement from the misconceptions themselves. Where as a teacher should be able to provide understanding of concepts in accordance with scientific concepts.

4. CONCLUSION

Based on the results and the above research discussion, concluded that the misconception analysis of students using CRI and tree tier test was at 18.18% to 63.6%. These misconceptions are not low numbers, but they are in high category numbers. Therefore, it is necessary to provide understanding of students about static electrical concept by providing understanding of concepts in accordance with the understanding of scientific concepts.

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