MISCONCEPTION IDENTIFICATION OF VII CLASS GRADE STUDENTS ON THE SUBJECTS OF MATERIAL AND CHANGE CLASSIFICATION

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Abstract

This research aims to identify understanding of concepts and the level of student misconception in learning about atoms, molecules, elements, compounds and mixtures. The sample in this study were 35 grade VII students at SMP N 17 Surabaya. The method used in this study is the provision of diagnostic tests based on the CRI (Certainty of Response Index) method. The diagnostic test results showed a misconception about identifying the molecular formula of a compound (11.5%), explaining the meaning of elements (50%), identifying examples of elements in daily life (25.7%), explaining the meaning of compounds (14.2%), identifying compound properties (48.6%), identifying compound samples in daily life (5.7%), identifying mixed properties (2.9%), identifying differences in homogeneous mixtures (2.9%) and heterogeneous, identify examples of homegene and heterogeneous mixtures (20%). The forms of misconceptions found in this study are theoretical and classification misconceptions.

Keyword : *Misconceptions, misconceptions theoretical and classification misconceptions.*

INTRODUCTION

One of the goals of science learning at the level of SMP / MTs is so that students have the ability to understand and understand various kinds of natural phenomena and phenomena, principles and concepts related to science. This capability can be applied in everyday life so that there is an increase in the concepts, knowledge and skills of science as a basis for continuing to the next level of education (BNSP, 2006). The concept becomes very important in assessment and learning at the junior high school level because at this level students will be introduced to various abstract concepts of science (Anggraeni et al., 2016).

The concept becomes the basis for thinking in solving problems related to the learning process. The concept also becomes very important because when students continue their education to the next level, students must already have a basic concept (Anggraeni et al., 2016). If the concepts possessed by students tend to deviate or even contradict real scientific concepts, this can create obstacles for students themselves in learning new concepts. The difference in understanding concepts accepted with existing scientific concepts is called misconception (Kose, 2008).

Misconceptions of science concepts can occur in elementary, junior high, high school and even college level students. This is because some students find it difficult to understand scientific concepts that are abstract (Anggraeni et al., 2013). At the junior high school level, the concept of science also has levels that range from easy, moderate and difficult. The level of difficulty of this concept also results in differences in responses and different understandings between one student and another student who will also cause differences in interpretation between students and can lead to misconceptions. Misconception greatly inhibits the process of accepting new concepts and knowledge given to students which will also result in the success of students in the learning process further (Prianindya, 2015). Misconception is characterized by the existence of a wrong concept that is not in accordance with the scientific understanding and thinking of experts. This form of misconception can be in the form of an initial concept, an incorrect link between concepts, errors, views that are too naive or intuitive ideas.

In theory, according to Suparno (2013) several causes of misconceptions can come from students, teachers, learning methods, books and contexts used. Misconceptions can occur because students are wrong in the process of associating a concept with everyday life. The teacher can be the cause of misconception if the teacher does not master the concept before being taught to students. The use of inappropriate learning methods can actually result in students experiencing misconceptions. The use of language in books that are too complex and difficult to understand can also lead to

misconceptions in students. The context of wrong concepts can also lead to misconceptions. While misconceptions in chemical concepts can be caused by a variety of factors, including basic knowledge possessed about a basic concept given, textbok used, and weak information received by students (Erman, 2012).

One way to overcome misconceptions is to differentiate first students who lack the concept and students who experience misconceptions because they both require different handling. Differentiating between students who experience misconceptions with students who do not know the concept can be done using the Certainty of Response Index (CRI) method. CRI can measure a person's level of confidence in choosing an answer that is considered correct. This belief is measured by the 0-5 scale vulnerable or can be modified according to taste. This method is very easy to use both at all levels of education. Honesty is the main key in the success of diagnosing a misconception by using this method.

Knowledge that is abstract in nature often leads to differences in the views of each individual. This is one of the factors, which also causes misconception. One that is needed in the abstract learning process is learning media. This is because the obscurity of a concept that is taught can be conveyed in the presence of learning media as intermediaries Media can represent what the teacher is less able to say through certain words or sentences. Even the abstractness of teaching materials or concepts taught can be concretized with the presence of the media, so that students are easier to digest a concept that is taught. The role of the use of learning media will not function optimally if its use is not in accordance with the learning objectives taught, so the learning objectives should be used as a reference for media use. Can be interpreted, media is a tool that can be used as a channel message to achieve teaching goals (Djamarah and Aswah, 2006). This learning media that can be used for example is teaching aids. In fact, not all teachers use teaching aids in the learning process. Depending on the learning objectives desired by the class teacher.

The initial research was carried out at VII Surabaya State Junior High School 17 through interviews with science teachers, the teacher said that learning about atoms, elemental molecules and compounds had used teaching aids in the form of plasticine which was shaped like a atom, elements, compounds and molecules. Using a teaching aid like this according to him is easier for students to understand. But mastery of concepts and learning outcomes still depends on each individual student. Meanwhile, as a result of interviews with other teachers who did not use teaching aids, learning was more focused by giving explanations or lectures directly in the classroom. Learning outcomes with a learning model without props according to him also depends on each individual.

The results of interviews with one of the eighth grade students, information was obtained that when in class 7, learning about atoms, elements and compounds and mixtures, the teacher did not use teaching aids. The student admitted that it was more difficult to understand the concept and explanation of the teacher and admitted that he had forgotten the material about atoms, elements, compounds and mixtures. Learning that tends to lead to the teacher center according to students tends to be boring and uninteresting. It needs to be practiced in a real way so that the concepts taught by the teacher are easy to remember so that learning like this will be according to students less meaningful because the concept is not deeply embedded in the minds of students. The expectation in this study is to identify misconceptions that occur in class VII students of SMP Negeri 17 Surabaya on elements, compounds and mixtures and can be considered by the teacher to reduce, reduce or remedial learning which still lead to misconceptions Based on the background above, in order to map misconceptions in class VII students of SMP Negeri 17 Surabaya in the material classification and changes chapter, researchers will conduct a study entitled: *Identification of Class VII Misconceptions on the Subjects of Material and Change Classification*

METHOD

This research uses quantitative descriptive type using a direct data collection design using diagnostic tests related to the chapter "Classification of Materials and Changes" relating to elements, compounds and mixtures accompanied by the level of confidence of students in choosing answers and reasons for choosing these answers. Tests are given after students receive material about the elements and compounds from the teacher assisted with molymod props made from the night and toothpicks at the first meeting while the mixed material uses a water slide mixed with sand and water mixed with salt at the second meeting. These diagnostic test results were then identified using the CRI method and grouped the types of misconceptions that occurred in students.

The data analysis technique used in this study uses quantitative analysis with the CRI method. This calculation is based on the level of confidence of students in choosing the answers given (Hasan, 1999). The level scale includes; 0 = only guessing answers, 1 = almost guessing, 2 = unsure, 3 = sure, 4 = almost sure,

5 = very sure. In addition, this question sheet is also completed by the reason students choose the answer. At the level of confidence 0 indicates students do not know the concept at all and the answer chosen is a guess, whereas number 5 shows the confidence in mastering concepts and good material laws if the answer is correct. The questions are arranged in 3 questions in each learning goal that will be achieved in the design of learning implementation to see the consistency of students in choosing answers (Saleem, et al. 1999).

Table 1. Understanding Criteria for Students' Concepts Using CRI

	LOW CRI (< 2,5)	HIGH CRI (> 2,5)
Correct answer	Correct answer and low CRI Know the concept but not sure	Correct answer and high CRI Understanding concepts
Wrong Answer	Wrong answer and low CRI Don't understand the concept	Correct answer and high CRI Misconception

(Saleem, dkk., 1999).

By answering diagnostic tests accompanied by CRI, the possible answers to be given by respondents include: a. The right answer, and high CRI value b. Right answer and low CRI value c. Wrong answer and high CRI value d. Wrong answer and low CRI value A value of 2.5 is used as a threshold because at that value there is a zone that cannot be identified between the limits of confidence and guessing the answer (Saleem, et al., 1999). To make it easier to analyze and classify data, a conversion table can be made as a result of student answers as follows:

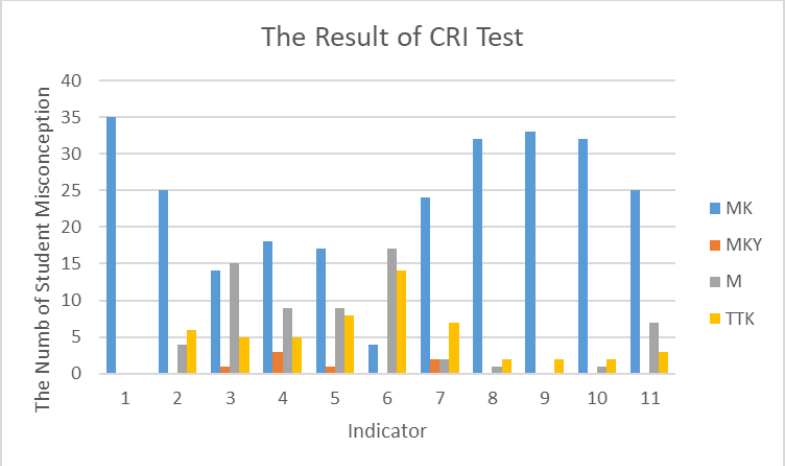
Table .2. The Convertion of The Anwers Basic CRI Method

The Answer	Reason	CRI Score	Description
Correct	Correct	>2,5	Understand concepts
Correct	Correct	<2,5	Know the concept but not sure
Correct	Wrong	>2,5	Misconception
Wrong	Wrong	<2,5	Don't understand the concept
Wrong	Wrong	>2,5	Misconception
Wrong	Wrong	<2,5	Don't understand the concept
Wrong	Wrong	>2,5	Misconception
Wrong	Wrong	<2,5	Don't understand the concept

(Anggraeni, 2016)

RESULT AND DISCUSION

Grapich 1. The Result of CRI Test



Notes
MK : Understand concept
MKY : Know but not sure
M : Misconconception
TTK : Don't know the concept

In the indicator 1, explain the meaning of atoms there is not found a misconception. In the indicator 2, identify the molecular formula of a compound, there are theoretical misconceptions 11,5%. In the indicator 3, explain the meaning of elements, there are theoretical misconceptions about 50%. In the indicator 4, identify examples of elements in everyday life, there are clsificational misconception about 22,5%. In the indicator 5, explain the meaning of compounds there, there are theoretical misconceptions about 14,2%. In the indicator 6, identify the nature of the compound, there are theoretical misconceptions about 48,6%. In the indicator 7, identify examples of compounds in everyday life, there clasificational misconception about 5,7%. In the indicator 8, identify mixed properties there are theoritical misconception about 2,9%. In the indicator 9, identify mixed examples in everyday life atoms there is not found a misconception. In the indicator 10, identify differences in homogeneous and heterogeneous mixtures, there are theoretical misconceptions about 2,9%. In the indicator 11, identify examples of homegene and heterogeneous mixtures, there are classification misconceptions about 20%.

Based on the table above, it is known that on each indicator students experience misconceptions, except for indicators explaining the meaning of atoms and identifying mixed examples that exist in everyday life. These results are not in line with the research of Hamdil Mukhlisin (2011) which states that the biggest misconception of students on atomic material at SMK Al Madani class X is on the indicator explaining the meaning of atoms, which is equal to 70%.

In the indicator identifying the molecular formula of a compound obtained a misconception of 11.5% and the indicator mentions an example of a misconception compound molecule of 5.7%. This is in line with the results of the study of Vanny Anggraeni, et al. (2016) which states that the misconception in the indicator identifies a molecular type of 8.1% and the indicator mentions an example of a compound misconception of 5.4%.

The biggest misconception on the results of this study is that the indicators explain the meaning of elements with a misconception value of 50%. This is not in line with the research of Hamdil Mukhlisin and Vanny Anggraeni, et al. (2016) which states that the biggest misconception is to explain the meaning of atoms.

The forms of misconceptions that occur in this study include theoretical and classification misconceptions. This form of misconception depends on the selection of indicators used in the diagnostic test. Theoretical misconception is a form of misconception based on errors in learning facts or events in an organized system, for example regarding the understanding of compounds, classification Miskonsepsi, is a form of misconception based on the misclassification of facts into organized charts. Examples of types of mixture (Anggraeni et al., 2015)

Misconception alone can be caused by many factors, including teacher errors in delivering material, teaching material books that can lead to multiple interpretations, methods and inappropriate learning contexts, and the role of students themselves in constructing new knowledge. This is in line with the opinion of Annisa et al. (2017), several causes of misconception in students, among others;

a. Student.

Misconceptions in students can be caused by mistakes in the process of associating a concept with everyday life.

b. Teacher

The teacher can be the cause of misconception if the teacher does not master the concept before being taught to students.

c. Learning methods

The use of inappropriate learning methods can actually result in students experiencing misconceptions.

d. Book

The use of language in books that are too complex and difficult to understand can also lead to misconceptions in students.

e. Context

The context of wrong concepts can also lead to misconceptions.

CONCLUSION

There was a misconception in class VII students of SMP 17 Surabaya, namely a misconception about identifying the molecular formula of a compound (11.5%), explaining the meaning of elements (50%), identifying examples of elements in daily life (25.7%), explaining the meaning compounds (14.2%), identified the properties of compounds (48.6%), identified compound samples in daily life (5.7%), identified mixed properties (2.9%), identified differences in homogeneous mixtures (2, 9%) and heterogeneous, identifying examples of homegene and heterogeneous mixtures (20%). The forms of misconceptions found in this study are theoretical and classification misconceptions

Suggestions

Based on the research that has been done, it is necessary to suggest several things as follows:

1. Teachers need to provide material reinforcement especially on learning indicators that still have high rates of misconception.

2. Learning should adjust between the weight of material delivered and the allocation of learning time. It is intended that the material can be conveyed in depth and thoroughly so that it will improve students' understanding.

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