



Analysis of Difficulties in Understanding Mathematical Concepts In Class VIII Students of SMP Negeri 2 Hiliduhu in the 2022/2023 Academic Year

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Abstract

This research is based on the results of a preliminary study conducted by researchers during the implementation of the Internship at SMP Negeri 2 Hiliduhu, a problem was found, namely the understanding of mathematical concepts of students in the poor category. The purpose of this study was to determine the difficulty of understanding mathematical concepts in class VIII students of SMP Negeri 2 Hiliduhu and to find out the factors that cause difficulties in understanding mathematical concepts. The instruments used are concept understanding tests, interviews and documentation. Data analysis techniques used are data reduction, data presentation and drawing conclusions. This research was conducted at SMP Negeri 2 Hiliduhu in the 2022/2023 Learning Year, totaling 57 people with qualitative descriptive research methods. The results of the study obtained difficulties in understanding the concepts experienced by students, namely: the inability to provide an interpretation of the concepts that have been written down, the inability to remember what a circle must have, the inability to reexpress concepts in other forms, difficulty in developing necessary or sufficient conditions of a concept. Factors causing difficulties in understanding concepts are the lack of use of teaching aids during the learning process, lack of mastery of previous material, and not practicing working on problems.

Keywords: *Difficulty in Understanding Mathematical Concepts, Qualitative*

Introduction

Education is a learning process that makes students able to develop their own personality potentials such as religious attitudes, self-control, personality, intelligence, morals and skills (Fajar, 2018; Kartika, 2018). This is in line with the National Education System which states that: "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality,

intelligence, noble character, and skills needed by themselves, society, nation and state".

The role of education is very important in shaping a quality human personality (Dakhi, 2022; Zagoto, 2018). Therefore, the role of education must be in accordance with the objectives of national education as stated in the law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System which aims to form students into human beings who are faithful and devoted to God Almighty, have noble character, are healthy, knowledgeable,

capable, creative, independent, and become democratic and responsible citizens (Setiwan, 2017; Zagoto, 2022). Formally, education aims to prepare students to be able to face life that is always developing through logical, rational, critical, careful, honest, efficient and effective thinking and competent in the world of education, and able to create reliable and professional human resources (HR). Therefore, education must be carried out as well as possible in order to obtain good results so that human resources increase and develop. Given the importance of education, there are various efforts that have been made by the government and one of them is curriculum improvement. The current curriculum is the 2013 Curriculum (K-13).

Curriculum 2013 is one of the changes in the learning paradigm from conventional learning to one that activates students and trains students' creative thinking skills. In essence, Curriculum 2013 is a competency-based curriculum, in which it is formulated in an integrated manner covering the competencies of attitudes, knowledge, and skills that students must have (Laoli, Dakhi & Zagoto, 2022; Yusmar, 2019). Curriculum 2013 integrates several subjects studied at the primary and secondary education levels, one of which is mathematics.

Mathematics is one of the subjects that has a very large role in everyday life and in the development of knowledge, especially the world of technology. Mathematics lessons are independent of other sciences, even mathematics is a source used to develop other sciences. This is in line with Hardani, et al (2020) state that mathematics is a universal science that is useful for human life and also underlies the development of modern technology, and has an important role in various disciplines and advances human thinking. Mathematics subjects are hierarchical or graded which means that these subjects must be based from the lowest level to the highest level of each level of education and are mutually sustainable (Lestari, 2017). Based on

Permendiknas No. 22 of 2006 states that one of the objectives of mathematics in schools is for students to be able to understand mathematical concepts that explain the relationship between concepts and apply concepts.

From the objectives of learning mathematics, it appears that mathematics is not just taught to students to see and hear, but to train students to hone their ability to understand the concepts of each material taught. One way to train students' understanding of concepts in mathematics is to continuously practice working on problems with mastery of the concepts of each material students will find it easy to learn mathematics. In mathematics learning, more emphasis is placed on mastering concepts so that students have the provision to achieve other basic abilities such as reasoning aspects, communication aspects, and problem solving aspects. This is in accordance with the opinion of Fadzillah dan Wibowo (2016) which says that:

In every lesson, especially in mathematics in class, of course, the teacher's reference is to emphasize mastery of concepts so that students have an intact basic provision to achieve other basic abilities such as the process of mathematical conjecturing, mathematical communication and problem solving.

When viewed from the 2018 PISA (Program Internationale for Student Assessment) results, Indonesia's ranking is still very low when compared to other countries. Indonesia's mathematics achievement is ranked 72nd out of 78 countries with a score of 379. This achievement is even lower than the previous score in 2015 with a score of 386. The results of this study test prove that Indonesia occupies a position below the average, which is the ability of Indonesian students to learn mathematics.

Research Methods

This research uses a qualitative approach. The type of research used is descriptive research. Descriptive research in

this study aims to describe the results of researchers' analysis of students' mathematical concept understanding abilities and the factors that cause difficulties in understanding students' mathematical concepts from the data collected by researchers. The location of this research is SMP Negeri 2 Hiliduho in the 2022/2023 academic year. This school is located at Jalan Arah Hiliduho, Dima Village, Hiliduho District, Nias Regency. the research instruments used are test instruments, interviews and documentation.

Result And Discussion

Before the researcher gave the math concept understanding difficulty test to students, the researcher had made observations first. The purpose of this observation is to find out to what extent the material that students have received before, especially for material about the Circle. So that the objectives of this study can be achieved with maximum results. After the observation process was completed, there were students who became subjects for data sources in this study. From the subjects obtained, researchers provide research questions to obtain data in the form of the results of the subject's answers in knowing the understanding of concepts, difficulties in understanding concepts and in knowing the factors that cause difficulties in understanding the mathematical concepts experienced by students. The questions given by researchers are non-routine questions that include indicators of student learning difficulties in mathematical concept understanding difficulties. After giving a test consisting of 2 VIII classes with a total of 57 students in solving the questions, it was found that some people were in the high, medium, and low categories.

1. Data from concept understanding test results

Based on the results of the concept understanding test given to class VIII by solving questions as many as 5 numbers, it

was found that people were in the high, medium, and low categories.

To find out the difficulties experienced by students on the concept understanding test, a description of the score obtained by students for each indicator of the concept understanding test will be described.

a. Description of the acquisition of students on the indicator of restating the concept

On the indicator of restating a concept, a problem is given to determine the difference between the central and perimeter angles on a level. In this case students are expected to restate the concept of the central and perimeter angles.

Table 1. The acquisition of students on the indicator of restating a concept

Criteria	Score	Number of Learners	Percentage (%)
Cannot restate a concept	0	0	0%
Can restate a concept but still has many errors	5	14	25%
Can restate a concept but still not precise	10	21	37%
Can restate a concept correctly	15	22	38%

Based on the table above, it can be seen that 38% of students who can restate a concept correctly. Learners who can restate a concept but are still not precise as much as 37%, in this case students cannot determine to provide an explanation. Learners who can restate a concept but still have many mistakes as much as 25%, in this case students only provide one answer. However, in this indicator there are no learners who cannot restate a concept.

b. Description of the acquisition of students on indicators of classifying objects according to certain properties in accordance with the concept

On the indicator of classifying objects according to certain properties in

accordance with the concept, a problem is given in the form of a circle image containing parts of an abbreviation. Furthermore, students classify images according to certain properties, such as images of radius, tembereng, diameter, bowstring, and others.

Table 2. The acquisition of students on the indicator of classifying objects according to certain properties in accordance with the concept

Criteria	Score	Number of Learners	%
Unable to classify objects according to certain properties	0	2	4%
Can classify objects according to certain properties but still many mistakes	5	10	17%
Can classify objects according to certain properties but still not precise	$5 < x \leq 15$	34	60%
Can classify objects according to certain properties correctly.	20	11	19%

2. Difficulties in Understanding Students' Mathematical Concepts

Based on the results of tests and interviews conducted with VIII grade students of SMP Negeri 2 Hiliduh, it can be seen that students' concept understanding difficulties in solving math problems. Students on the indicator of restating a concept still have difficulty in distinguishing the central angle and the circumference angle of the circle. Learners on the indicator of classifying objects in the circle image have difficulty in distinguishing the parts of the circle. Learners on the indicator of giving examples and non-examples are able to provide examples but have difficulty distinguishing if they see other forms of examples. Learners on the indicator of presenting concepts to various forms of mathematical representation have difficulty in connecting concepts with other forms, it is difficult to determine the steps used to

solve the problem. Learners on the indicator of understanding and applying mathematical ideas have difficulty remembering previous material, connecting formulas that use conversion to roots.

3. Factors causing difficulties in understanding the concept of students

Based on the results of interviews obtained from 9 students, it can be seen the factors that cause students to have difficulty in understanding mathematical concepts in solving math problems. The causes of these difficulties include matters related to the intellectual abilities of students and the way students process or digest mathematical material. The causes include students' lack of understanding of prerequisite material, both properties, formulas and working procedures; forgetting the formula to be used in solving problems; lack of interest in mathematics lessons or students' lack of seriousness in participating in mathematics learning (Lestari, 2017; Zagoto, Yarni & Dakhi, 2019).

As for other factors that cause difficulties in understanding the concepts of students, namely: lack of use of teaching aids that should help students understand the material being taught, students do not repeat learning at home, students are embarrassed to ask the teacher when there is still something that is not understood, and the few learning resources that students encounter. In addition, students' habits only learn when there are only assignments and before exams (Mudhiah & Shodikin, 2019; Sardiyannah, 2018).

Based on data reduction and data presentation, it can be concluded that the difficulties experienced by participants in understanding mathematical concepts, namely students still have difficulty solving problems, where the problems given are different from the problems given by the teacher, difficulty remembering previous material, difficulty determining the formula used, students have difficulty calculating, difficulty applying the correct use of

formulas. These difficulties occur when students let material that has not been understood not be studied again, when the concept of the previous material has not been understood, it will affect the next material which requires a requirement to connect with other material.

Conclusion

Based on the results of data analysis from the research that has been done, it is concluded that,

1. The difficulty of understanding the concept of students is the inability to provide an interpretation of the concepts that have been written down, the inability to remember what a circle must have, inability to reexpress concepts in other forms, difficulty in developing necessary or sufficient conditions of a concept.
2. Factors causing difficulties in understanding the concept are the lack of use of teaching aids during the learning process, lack of mastery of the previous material, and not practicing working on problems.

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