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Analysis of Concept Understanding in Solving the Number Pattern Query

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ABSTRACT
This study aims to determine the understanding of concepts in solving number pattern problems of class VIII students of Guppi Samata Islamic Junior High School, Gowa Regency. This type of research is descriptive qualitative research. There are several reasons why some students do not fully understand the concept of mathematics; namely, students still consider the material before and before it is given using the same method, and students still lack practice questions. The collection technique in this study was in the form of written tests and interviews. The research subjects were 23 people consisting of 6 students of class VIII who were selected based on the results of the mathematics ability test for interviews. The sheet test used three understanding concepts, and one student was selected to be interviewed to deepen students' conceptual understanding further. The results of this study indicate that students with conceptual understanding skills are still very lacking, using the information in the form of numbers contained in the questions but cannot use certain procedures or operations in problem-solving.

Keywords: *Concept Understanding, Concept Understanding Ability.*

1. INTRODUCTION

In education, one of the knowledge that is able to develop human thinking is mathematics. Mathematics is a fundamental science and the queen of other sciences. Therefore, mathematics has an important role in science and technology. Mathematics also becomes a person's initial capital when trying to get into society because rational and logical thinking that has been obtained after learning mathematics can be used in dealing with social situations. In addition, mathematics is universal, meaning that everyone needs mathematics. Hence, teaching mathematics in schools is very important.

Mathematics is one of the subjects related to abstract ideas or concepts. This makes most students think that mathematics is difficult. Students still have a low understanding of mathematical concepts material. This can be seen when students get a problem; they always solve the problem in the same way as the way or steps the teacher has given. Students do not understand the steps or concepts of solving a problem but memorize the steps for solving it. Therefore, if the problem changes but the core of the problem is still the same, students are less able to solve the problem.

In learning mathematics, it should be adjusted to the concept of subject matter and the development of students' thinking. There must be a link between previous student learning experiences and the concept to be taught. One concept is a precondition for another concept, specifically in mathematics which contains many ideas, structures, relations, shapes, arrangements, quantities, and concepts [4]. Principles of problem-solving skills and problem-solving, "In learning concept B, which is based on concept A, it is necessary to firstly understand concept A, because without understanding concept A, it is hard to understand the concept B" [2].

Conceptual understanding can also help the process of remembering and make it easier for students to work on math problems that require a lot of formulas. Understanding is formed by listening to teacher explanations, memorizing mathematical formulas, memorizing the steps for solving problems,

and understanding the meaning of the concepts being studied. Mathematical, conceptual understanding can help students remember the subject matter given so that students will not easily forget the material. Moreover, the concepts in mathematics are interrelated, so understanding is needed in learning mathematical concepts [1].

Several material studies must be mastered by students in learning mathematics that one of which is the number pattern. Teaching students to understand the pattern in mathematics is essential since it has a practical impact on academic achievement [7]. However, in this condition, the student's understanding of concepts in the number pattern material is still not optimal because the ability to understand conceptual knowledge is also not optimal, which is only limited in the stage of remembering. This has an impact on student achievement.

Some students can explain the concepts being taught but have difficulties using operations or formulas to answer the queries. Besides, some students can use the operations or formulas but still have difficulty explaining and providing examples of the material being taught [3]. Therefore, students need to understand mathematical concepts completely, especially in solving mathematical queries on number pattern material.

Based on the explanation above, understanding the concept of number pattern material is very important for students to have. Therefore, it is necessary to investigate, find out, and provide an overview of students' conceptual understanding. As a result, it becomes the basis to carry out an effort in improving students' mathematical skills. This problem underlies the researcher's research to determine the understanding of concepts in solving number pattern problems of class VIII students of Guppi Samata Islamic Junior High School, Gowa Regency.

2. RESEARCH METHOD

This type of research is qualitative research. Qualitative research is descriptive and explanatory [5]. This research was conducted at the Guppi Islamic Boarding Middle School in Samata, Gowa, in the odd semester of the 2019/2020 school year. The subjects selected in this study were class VIII B students consisting of 26 students. From these subjects, 6 students consisting of 2 students in the very high category, the medium category, and the very low category were selected for interview. In this study, the instruments used were a concept understanding test and interview guidelines. The method of collecting data in this study was by collecting the concept understanding test sheets and in-depth interview guidelines with informants or research subjects. The data analysis techniques were quantitative and qualitative data analysis.

3. RESULT AND DISCUSSION

From the results of student work, the data of students' conceptual understanding in solving number pattern queries are given in Table 1.

Table 1. Results of Concept Understanding Ability Test in Eight Grade Students of Guppi Islamic Boarding Middle School in Samata, Gowa

Concept Understanding Ability					**Total**
Very high ($90 \leq x \leq 100$)	High ($80 \leq x \leq 89$)	Medium ($70 \leq x \leq 79$)	Low ($60 \leq x \leq 69$)	Very low ($0 \leq x \leq 59$)	23 students
3 students	2 students	5 students	8 students	5 students	

The following are the differences between the three categories of students having very high, medium, and very low concept understanding in solving number pattern queries on seven indicators. The description can be seen in Table 2.

Table 2. Differences of concept understanding in solving number pattern queries based on indicators of concept understanding

Concept Understanding Indicator	Students with Very High Concept Understanding Ability	Students with Medium Concept Understanding Ability	Students with Very Low Concept Understanding Ability
Restate a concept	Both S_1T and S_2T subjects could restate a concept in the number pattern material for query number one.	Subject S_1S was able to restate a concept in the number pattern material for query number one. Subject S_2S was able to restate the concept but could not answer the query in the right way.	Subject S_1R was able to restate a concept in the number pattern material for query number one. Subject S_2R was unable to answer the query.
Classify objects based on specific characteristics of the concept	Subject S_1T was able to classify objects based on specific characteristics of the concept in the number pattern material for query number three, but the answer was less right. Subject S_2T was able to classify objects based on certain characteristics of the concept.	Subject S_1S was able to classify objects based on specific characteristics of the concept in the number pattern material for query number three. Subject S_2S was able to classify objects based on certain characteristics of the concept but still less right.	Both S_1R and S_2R subjects could not classify objects based on certain characteristics of the concept in the number pattern material for query number three.
Give examples but not examples from the concept.	Both S_1T and S_2T subjects were able to give examples from the concept in the number pattern material for query number three.	Both S_1S and S_2S subjects were able to give examples from the concept in the number pattern material for query number three.	Both S_1R and S_2R subjects were able to give examples from the concept in the number pattern material for query number three.
Present concepts in various forms of mathematical representation	Both S_1T and S_2T subjects presented concepts in various forms of mathematical representation in the number pattern material for query number one.	Subject S_1S presented concepts in various forms of mathematical representation in the number pattern material for query number one, but the answer was less correct. Subject S_2S was able to present concepts in various forms of mathematical representation.	Both S_1R and S_2R subjects presented concepts in various forms of mathematical representation in the number pattern material for query number one.

Apply, utilize and choose certain procedure or operation	Both S_1T and S_2T subjects could apply, utilize and choose certain procedures or operations in the number pattern material for query number two.	Both S_1S and S_2S subjects were able to apply, utilize and choose specific procedures or operations in the number pattern material for query number two, but the answer was less right.	Subject S_1R could not apply, utilize and choose certain procedures or operations in the number pattern material for query number two. Subject S_2R could use, utilize and select a certain procedure or operation, but less correct.
Apply problem solving concept or algorithm	Subject S_1T applied the problem solving concept or algorithm in the number pattern material for query number two. Subject S_2T was able to use problem solving concepts or algorithms but less right.	Both S_1S and S_2T subjects were able to apply problem solving concepts or algorithms in the number pattern material for query number two, but the answer was less right.	Subject S_1R could not apply problem solving concepts or algorithms in the number pattern material for query number two. Subject S_2R was able to apply problem solving concepts or algorithms but less right.
Develop necessary and sufficient requirements of a concept	Both S_1T and S_2T subjects were able to develop necessary and sufficient requirements of a concept in the number pattern material for query number two.	Subject S_1S was able to develop necessary and sufficient requirements of a concept in the number pattern material for query number two, but the answer was less right. Subject S_2S was able to develop the necessary and sufficient requirements of a concept.	Subject S_1R was unable to develop necessary and sufficient requirements of a concept in the number pattern material for query number two. Subject S_2R was able to develop the necessary and sufficient requirements of a concept.

Based on table 2, students with very high concept understanding ability can convey the concept in the number pattern, can classify objects based on the pattern characteristics, can give some examples related to the number pattern, can express ideas in various ways, can apply, utilize, and choose certain procedure or operation in the number pattern, can build an algorithm to solve the problem, and can develop the necessary and sufficient requirements of concepts of number pattern. Subjects with medium concept understanding ability can also restate the concept even though they cannot answer appropriately. In addition, they can classify objects based on the characteristics of the concept of number pattern even though not fully correct, can give examples but not for number pattern query, can present concepts in various representations, can apply, utilize, and choose certain procedures and operations can use the algorithm in problem solving. They can develop necessary and sufficient requirements of a concept of a number pattern. However, they cannot give the fully correct answer. Some subjects with very low concept understanding ability can restate the number pattern concept, and some cannot. In addition, they can present concepts in different expressions, apply, utilize, and choose certain procedures or operations in number pattern concepts, use algorithms in solving problems and develop necessary and sufficient. However, they cannot classify objects

based on certain characteristics of number pattern concepts, and one of them gives an incorrect answer.

These findings are in line with the research finding research by Pasnak et al. One of the mechanisms by which sequence comprehension can affect a child's mathematical comprehension is that sequence comprehension may reflect fluid thinking. Fluid thinking is associated with mathematical concepts [6]. That is. Fluid Intelligence is the ability to think abstractly and solve new problems with little reliance on past instructions or knowledge. Liquidity intelligence includes flexibility in applying general principles to understand events and ideas encountered in new contexts and is therefore relatively independent of specific instructions [3].

4. CONCLUSION

The most mastered indicator by students is restating a concept, while the least mastered by students is the ability to apply, utilize and choose procedures for a concept. Only five students are eligible for high and very high categories; two of them have a very good conceptual understanding. Meanwhile, the other 13 students with a poor ability in understanding concepts were included in the low and very low categories. The remaining five students are in the medium category with less ability to understand concepts.

As a finding in this research, students with the ability to understand concepts are still very lacking with only using the given numbers in the queries, but unable to utilize certain procedures or operations in problem-solving algorithms.

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