

Student's Difficulty Analysis Through Realistic Mathematics Education Using Batak Toba Cultures

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ABSTRACT

This study aims to describe students' difficulties in solving numerical patterns in the context of the Toba Batak ethnic culture after the implementation of the Realistics Mathematic Education Approach in the context of the Toba Batak Tribe Culture. Subjects in this study were students of class VIII Junior High School (SMP) totaling 32 people. The data collection tool used in this study is a test that totals ten questions in the form of a description. This type of research is a qualitative descriptive study. Data collection techniques are carried out by tests, observation, interviews, and documentation. Data analysis techniques were carried out by data reduction, data presentation, and concluding. The results showed that students had difficulty determining the sequence of numbers, determining the configuration of a sequence of numbers, determining the arithmetic series, determining the number of n first arithmetic series terms, determining the first term n row geometry, and determine the number of n first terms of the geometry series. The causal factor is that students are not able to distinguish the general formula concept of a sequence and the concept of configuration patterns from a sequence of numbers, operating error calculations and not understanding integer ranks.

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1. INTRODUCTION

The mathematics is one of the subject that deals with abstract ideas and concepts, which are organized systematically, logically and hierarchically and deductive reasoning. According to Fonna (2018) mathematics is one component of basic education in the fields of teaching. This math subject is needed for the calculation process and thought the process that is needed by insiders solve various problems (Usmadi, 2018; Putriani, 2018; Thahir, 2018; Masitoh, 2018). McIntyre (2017) argues that "mathematics in addition to symbolic language is also a universal language that allows humans to think, record, communicate ideas about element and quantity As'ari (2016) also suggests that" mathematics is a symbolic language and its main characteristic is the use of deductive reasoning but also does not forget the inductive reasoning. "So, mathematics is a symbolic language as well as a universal language that allows humans to think both inductively and deductively.

According to Susanto (2013: 185), mathematics is one of the disciplines that can improve the ability to think and argue, contribute in solving everyday problems and in the world of work, as well as provide support in the development of scientific and technological knowledge. Therefore, mathematics as a basic science needs to be well mastered by students, especially since elementary school age. Learning is two-way communication, teaching is done by the teacher, while learning is done by students. Learning in it means learning and teaching, or learning activities teach. According to

Corey in Susanto (2013: 186) explains that learning is a process in which a person's environment is deliberately managed to enable him to participate in certain behaviors in special conditions or produce responses to certain situations.

Learning is an inseparable thing with the name of learning, where learning refers to all efforts made to help a person or group of people in such a way as to create a learning process. As according to Dimiyati (Susanto, 2013: 186), "learning is the activity of the teacher programmed in instructional design, to make students learn actively, which emphasizes the provision of learning resources".

Based on the above statement Susanto (2013: 186) explains that mathematics learning is a teaching and learning process that is built by the teacher to develop thinking creativity of students who can improve students' thinking skills, and can improve the ability to construct new knowledge as an effort to increase the good ruler of mathematical material. To learn mathematics, a child must understand the things that are in mathematics by understanding it. Understanding in mathematics relating to numbers, quantitative facts, and problems about space and form. By understanding a problem, the concepts in mathematics are easier to remember and the amount of information that must be memorized is less. With understanding facilitates transfer in learning. Transfer in learning is the main goal of teaching mathematics. Mathematics learning should pay attention to the unique diversity of student characteristics in choosing learning materials so that students can

understand the learning objectives to be achieved together. This is in accordance with the Spiritual opinion and Fonna (2018) states that every teacher who organizes teaching should always pay attention and understand and try to adjust the subject matter in terms of age, talent, ability, intelligence, physical differences, the character of each student.

In teaching, there are often difficulties experienced by students. Difficulties in understanding mathematics for example. In general, the difficulty is a disturbance in students one or more of the basic cyclic processes that include understanding and use of speech or writing. The disorder may manifest itself in the form of difficulty listening, thinking, speaking, reading, spelling, or counting.

According to Tieng (2015) student learning difficulties can be caused by two factors, internal and external. The main causes of learning disabilities are internal factors, namely the possibility of neurological dysfunction, while the main causes of learning problems are external factors, among others in the form of erroneous learning strategies, management of learning activities that do not encourage children's learning motivation.

Likewise, with the difficulty of learning mathematics, there are several factors that cause it, namely (a) Difficulties in using the concept in this case in the view that participants students have received the teaching of a concept, but have not mastered it perhaps because of forgetting part or all of it. Maybe the concepts that are mastered are less accurate. (b) Difficulties in learning and using the principle if the difficulties of students in using our principles of analysis, it appears that in general, the causes of difficulties are: (1) Students do not have a concept that can be used to develop principles as necessary knowledge items. (2) Poor conceptual basis is potentially the cause of learning difficulties. (3) Students are not clear about the principles that have been taught.

Based on the difficulties above, a teacher is obliged to provide a fun and creative learning environment for children's learning activities within the class. So that understanding of mathematical concepts can be understood by students more fundamentally, then there must be a learning approach in teaching (Mulyadi, 2010), among others: (a) Students/students who learn mathematics must use concrete objects and make their abstractions from the concepts. (b) The subject matter to be taught must be related or related to what has been learned. (c) So that students get something from learning mathematics must change the abstract atmosphere by using symbols. (d) Mathematics is the science of creative arts because it must be studied and taught as an art. So, the difficulty of children in learning mathematics is because students do not know about mathematical concepts. Which causes errors in learning mathematics such as lack of understanding of mathematical symbols, lack of understanding of values, and lack of understanding in doing computations such as addition, subtraction, multiplication, and division.

Every teaching and learning process in mathematics learning that is carried out is always directed to achieve the predetermined teaching goals (Mursalin, 2018; Tyaningsih, 2016; Syahbana, 2012). If the teacher has tried optimally to create conditions for students to learn, but the mathematics learning results obtained are still not maximal, it is caused by the process itself which is influenced by many factors that automatically influence the learning activities of participants student. Learning difficulties of students are usually evident from the decline in academic performance or learning achievement (Trisnawati, 2018; Afandi, 2018, Mursalin, 2016). But learning difficulties can also be proven by the emergence of student behavioral abnormalities such as shouting in class, disturbing

friends, fighting, often not going to school, and often skipping school. There are causes that affect learning difficulties such as interest, motivation, family, school, community, etc. so that students who are less able to receive lessons or less successful in receiving lessons are no exception in mathematics. In learning mathematics, grouping the causes of learning difficulties into 5 factors, namely "physiological factors, social factors, emotional factors, intellectual factors, and pedagogical factors" (Pribadi, 2017; Hadi, 2017; Imswatama, 2018).

Teaching mathematics in schools is not only intended to achieve the goals of material mathematics education, namely to equip students to master mathematics and apply it to everyday life (Ennis, 1987). But more than that, mathematics is also intended to achieve the goals of formal mathematics education, namely to organize students' reasoning and shape their personalities. This can be done using a variety of learning media or appropriate teaching aids. Besides that, the teacher also needs to make the learning more interesting.

The learning difficulties of students in mathematics can be influenced by various causes. Many theories that classify the causes of learning difficulties, which are used by researchers in this study, classification of learning difficulties factors are divided into two, namely factors from within the learner and from the outside. By knowing the factors of learning difficulties of each participant students will make it easier to take further action to overcome the problems experienced by students. Based on this, to make it easier for students to understand Mathematics as an abstract study, a realistic mathematical approach is learned so that the material presented is things that are close or easily understood by students because it is by the daily lives of students.

Number patterns are one of the most important material in Mathematics at the Middle School level because numbers are a Mathematical concept used butfor enumeration and measurement. However, in reality, students still have difficulties in solving number pattern problems. According to Mulyadi (2010: 74), student learning difficulties are also called discalkulia. The term dyscalculia has a medical condition that views the association with central nervous system disorders. Mathematical Disorders is an inability in mathematical skills that are expected for one's intellectual and educational capacity. There are still many students who experience difficulties in working on Mathematics questions.

According to Wigati Tri Utami (2012: 5) the types of mathematics learning difficulties include: 1) the difficulty of using concepts with indicators students can mark, express with words and identify concepts and express models; 2) difficulty in using principles with indicators that students can provide reasons for the steps to use principles, generalize the correct principles and modify a principle, 3) difficulties in disclosing information, 4) difficulty in counting.

2. RESEARCH METHODS

The research design used in this study is qualitative descriptive. Qualitative research is a study aimed at describing and analyzing the phenomena, events, social activities, attitudes, beliefs, perceptions, thoughts of individuals (Cresswell, 2012). While the nature of the research to be carried out is descriptive. Descriptive research objectives to investigate the conditions, or other things that have been mentioned that the results are presented in the form of a research report (Sugiyono, 2014).

The source of the data in this study were eighth-grade students of SMP Budhi Dharma Balige who later became respondents and

also the informant. The preliminary data needed in this study is the name data of the eighth-grade students of Junior High School (SMP) of Budhi Dharma Balige. The data will be used to find out how many students will be used when learning observations, conducting tests and interviews. The data that will be analyzed in this study is the data of learning observations of VIII grade of SMP Budhi Dharma Balige conducted by researchers. This observation aims to look at the conditions at the time of learning, see the character of students, and find out the factors that cause students to have difficulty learning mathematics.

The next data is the result of the students' test answers in solving the number pattern problems with the context of the Toba Batak ethnic culture. The data is in the form of student description answers which include the steps of students in solving number pattern problems. The data will then be analyzed to determine the location of the student's difficulties. Next is the data from interviews, interviews are conducted with the results of the students' answers have been analyzed. The aim is to confirm and sharpen the results of the test answers that students do. The next goal is to get information about the factors that cause students to make mistakes in solving problems that can indicate students have difficulty in solving the problem of the number pattern.

In this study, the instrument test used was the instrument test used, while the instrument tested in this study was a test item that was used to determine the extent of the difficulties experienced by students in solving number patterns. Instrument testing was conducted to obtain information about the quality of the instrument used. For test items tested in this study include item validity test, item reliability test, power difference, and level of difficulty of test items.

Data collection techniques in this study are (1) observation techniques; observation technique is a method of data collection where researchers collect research subjects. (2) Written tests, used to determine the level of difficulty in using concepts, difficulty in using principles, difficulties in disclosing information and numerical difficulties that are experienced by students in solving number pattern problems. (3) interview technique, the purpose of this interview is to confirm and sharpen the results of the test answers that students do and to get information about the factors that cause students to make mistakes in solving numerical patterns (4) documentation techniques, documentation in this study strengthen the data obtained in observation.

3. RESULTS AND DISCUSSION

Results of data analysis test:

3.1 Question of No. 1

Based on the analysis that has been conducted on all student answers obtained results that three students still experience difficulties in the use of concepts, four students have difficulty in the use of principles, five students have difficulty in disclosing information and 0 students have difficulty in counting.

3.2 Question of No. 2

Based on the analysis that has been carried out on all student answers obtained results that one student still experiences difficulties in the use of concepts, two students have difficulty in the use of principles, one student has difficulty in disclosing information and one student has difficulty in counting.

3.3 Question of No. 3

Based on the analysis that has been conducted on all student answers obtained results that 15 students still experience difficulties in the use of concepts, ten students have difficulty in the use of principles, eight students have difficulty in disclosing information and two students have difficulty in counting.

3.4 Question of No. 4

Based on the analysis that has been carried out on all student answers obtained results that three students still experience difficulties in the use of concepts, one student has difficulty in the use of principles, 0 students have difficulty in disclosing information and 0 students have difficulty in counting.

3.5 Question of No. 5

Based on the analysis that has been carried out on all student answers obtained results that three students still experience difficulties in the use of concepts, one student has difficulty in the use of principles, 0 students have difficulty in disclosing information and 0 students have difficulty in counting.

3.6 Question of No. 6

Based on the analysis that has been conducted on all student answers obtained results that of two students still experience difficulties in the use of concepts, two students have difficulty in the use of principles, two students have difficulty in disclosing information and six students have difficulty counting.

3.7 Question of No. 7

Based on the analysis that has been conducted on all student answers obtained results that ten students still experience difficulty in using the concept, seven students have difficulty using the principle, 0 students have difficulty expressing the ability of information and four students have difficulty counting.

3.8 Question of No. 8

Based on the analysis that has been conducted on all student answers obtained results that 0 students still experience difficulties in the use of concepts, 0 students have difficulty in the use of principles, three students have difficulty in disclosing information and 0 students have difficulty in counting.

3.9 Question of No. 9

Based on the analysis that has been conducted on all student answers obtained results that two students still experience difficulties in the use of concepts, one student has difficulty in the use of principles, three students have difficulty in disclosing information and twelve students have difficulty in counting.

3.10 Question of No. 10

Based on the analysis that has been conducted on all student answers obtained results that five students still experience difficulties in the use of concepts, one student has difficulty in the use of principles, two students have difficulty in disclosing information, and 20 students have difficulty in counting.

Before the test is carried out, the researcher first creates a grid of test questions that will be tested so that the problem covers all the material that has been studied. The test questions in this study are 10 description questions, which include the material of odd,

even, triangular, square, rectangular and Pascal Triangles which are related to the contextual problems of the Toba Batak culture, the first number of n tribes arithmetic sequence and series with tribal cultural context Toba Batak, determines the first tribe n geometric sequence and series in the contextual problem of the Toba Batak culture, resolves problems related to patterns in the sequence of numbers and lines of configuration of objects related to the contextual problems of the Toba Batak culture. The test is carried out during lesson hours for 2 x 45 minutes.

After the test is completed, the results of the students' work in this test are as an analytical material for the researcher. First, the researcher corrects students' answers to find out the difficulties experienced by students by checking each step of the students' answers and giving a score on each answer. From a mistake made by the student in working on the problem, it can indicate that the student is having difficulties.

Then from the results of the analysis, there is a discontinuation of students who will be taken as the subject of the interview. From the data obtained the students' difficulty data from the answers to the students' test results, which later will be confirmed through interviews and synchronized with the observations. In correcting the student answers the researcher is guided by the key scoring answers/guidelines that have been made by the researcher.

Learning material number patterns are taught by realistic mathematical approaches using the cultural context of the Toba Batak tribe. This approach is given so that the material of close number patterns and even very familiar with the lives of students in SMP Budhi Dharma Balige where the majority of students are the Toba Batak tribe. Learning is designed so that students can easily understand the material of number patterns. At the time of learning, based on observations it can be concluded that students are very enthusiastic in learning number patterns using the Realistic Mathematical Approach. However, in working on the problem of number patterns, there are still student errors. These errors indicate that there are difficulties in solving numerical patterns in learning realistic mathematical approaches with the context of the Toba Batak ethnic culture.

Table 1. Percentage of the Difficulty of Test Results

Error Type	Question Item										Su m	%
	1	2	3	4	5	6	7	8	9	10		
I	3	1	15	3	3	2	10	0	2	5	42	30%
II	4	2	10	1	1	2	7	0	1	1	29	20.71%
III	5	1	8	0	0	2	0	3	3	2	24	17.14%
Total	0	1	2	0	0	6	4	0	1 2	20	45	32.14%

4. CONCLUSIONS

Based on the discussion that researchers did on the data obtained from the results of the study, the researchers concluded that students had difficulty when solving the problem of number patterns. The fact is that students have difficulties in solving number pattern problems, namely the use of concepts, the use of principles, the ability to express information, and numeracy. By the formulation of the problem in this study is to determine the extent of the difficulty in solving the problem of number patterns experienced by students and which type of difficulty is most dominant. Following are the conclusions of the results of research carried out by researchers:

1. Difficulty in using concepts experienced by students in solving number pattern problems is 30%. It is because students have not understood some number of pattern material, such as the configuration of each row.
2. Difficulties in the use of principles experienced by students in solving numerical patterns are 20.71%. It is because students who already understand the concept of number patterns, but students cannot develop the principle of number patterns.
3. Difficulty revealing information experienced by students in solving number pattern problems is 17.14%. It is because some students know the information contained in the problem but are not written in answer.
4. The numerical difficulties experienced by students in solving numerical patterns are 32.14%. It is because students already know how to count correctly but students rarely practice counting, so when working on a problem there is an error in calculating.
5. Of the four types of difficulties above, the most dominant difficulty is difficulty in counting, which is 32, 14%.

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