Analysis of Junior High School Student’ Mathematics Learning Difficulties on the Material of “Relation and Function”

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ABSTRACT
This research tries to analyze the mathematics learning difficulties of Junior High school students on the material of “relation and function”. This research was conducted on the grade VIII students in one of Junior High School 1st semester in Surakarta city in the academic year 2016. Mastery of students to the concept of mathematics which is the basic science of all sciences is still lacking. The results of the national exam of junior high school students of Surakarta are still low, one of which can be seen from the absorption of material relations and functions. This is because the results of National Examination for the city of Surakarta, can be seen from the absorption of UN value in 2015 with indicators to solve problems related to the function of 57.23%, while the year 2016 with indicators determine the value of the function if the formula of the known function of 52.70%. This study uses test methods and interviews to find out the learning difficulties and their causes. Based on the test and interview on 3 Junior high school students who have high, medium and low learning achievements, it is found that students got difficulties in determining the value of function and value of x, if the image of x is known. Students get difficulty in solving problems related to the function and determine the value of the function and determine the value of x if the image of x is given. By knowing the difficulties faced by students expected teachers can find ways to overcome difficulties faced by students so that will be able to improve students' understanding of the material relations and functions.

INTRODUCTION
Mathematics is a basic science that continues to experience develop in terms of theory and application. As a basic science, mathematics is widely used in all areas of human
life. Thus mathematics is a universal science that develops the human mind power in solving problems. It takes an effort in teaching mathematics, so learning can be done optimally, and the learners can understand math well. Therefore in the world of education, mathematics is studied by all learners ranging from primary school to college level.

Learners are human beings who experience the potential to learn and grow, so they must be active in the search and development of knowledge they have. Many learners think that mathematics lessons are hard and difficult, this fact is a negative perception of math lesson. In studying a new topic of mathematics, past learning experiences of a person will affect the occurrence of the process of learning mathematics. The reality about some mathematical learning result are relatively still not in accordance with the expectation. It can be found in the daily test score, the value of learning result, or the National Exam Score (UN). This is because the results of National Examination for the city of Surakarta, can be seen from the absorption of UN value in 2015 with indicators to solve problems related to the function of 57.23%, while the year 2016 with indicators determine the value of the function if the formula of the known function of 52.70%. Lack of critical and systematic thinking skills, allegedly often be a barrier in the understanding of learners to the subject matter that should be mastered.

In Regina Pacis Junior High School Surakarta, the grade VIII Mathematics core for Relation and Function material is still relatively low. This is obtained from the results of daily replication analysis of Relation and Functional materials, where each class consisting of 32 learners, found between 10 to 13 learners who have not been completed when compared with the criteria, can be seen in table 1 below.

<table>
<thead>
<tr>
<th>class</th>
<th>Value 70 and above</th>
<th>The value is less than 70</th>
<th>Percentage of unfinished children</th>
</tr>
</thead>
<tbody>
<tr>
<td>8A</td>
<td>20</td>
<td>12</td>
<td>37.50 %</td>
</tr>
<tr>
<td>8B</td>
<td>22</td>
<td>10</td>
<td>31.25 %</td>
</tr>
<tr>
<td>8C</td>
<td>20</td>
<td>12</td>
<td>37.50 %</td>
</tr>
<tr>
<td>8D</td>
<td>19</td>
<td>13</td>
<td>40.63 %</td>
</tr>
<tr>
<td>8E</td>
<td>21</td>
<td>11</td>
<td>34.38 %</td>
</tr>
<tr>
<td>8F</td>
<td>20</td>
<td>12</td>
<td>37.50 %</td>
</tr>
</tbody>
</table>

This happens because there is a mistake in the work of the questions given during the daily test with the material Relation system and Function. The errors include errors in understanding the meaning of relations and functions, so that students have difficulty in distinguishing two sets that include relationships or functions, errors in formulating a function, errors in calculating the value of the function, errors in determining the form of functions, and errors in determine the function graph. The number of mistakes made learners in working on the problem can be a clue on how far the mastery of learners to the material being studied. From mistakes made by learners, it can be researched and studied more about the source of error.

The source of the error must be solved soon. This solution is taken by analyzing the root of the problem that causes the mistake made by the learner, so looked for alternative solution is needed, so that in the future learners will not repeat the same mistake. In order to help learners who have difficulty in learning mathematics, teachers need to recognize the common mistakes made by learners in completing the mathematics tasks.

According to Sutisna (2010) the difficulty of learning mathematics is a situation where students get barriers, disturbances, or obstacles in receiving and absorbing their lessons and their efforts to acquire knowledge or skills in math lessons. Those difficulties tend to be related to the abstract of mathematical object itself, so some of students find it difficult to
understand, it. Narulita (2016) he difficulties of students of class VIII E SMP Negeri 1 Surakarta in solving algebra problem especially the function of the subject matter determine the function and function graphic there are three aspects of difficulty, namely: 1) Difficulties students in counting include the difficulties students complete the calculation operations with the answer is less precise. 2) Student difficulties interpreting symbols include students’ difficulties in understanding the symbols and students are less concerned about what is being asked in the question. 3) Difficulties students understand the material include the lack of understanding of students on the material functions, especially the subject of function graphs. From the description above, it is expected that there are still many students who have difficulty in determining the completion of Relations and Functions, and who have not achieved the expected results. By paying attention to these facts, the researcher wants to do research in order to reveal more about student's difficulties and the factors causing student's difficulties in determining the completion of relation and function. Teachers should not only blame learners when the are not able to solve problems without first seeking and analyzing the problems that exist in the learners.

At the junior level, the Relation and Function materials given to learners include: [1] Understanding relations, functions and one-to-one correspondence; [2] how to express relations and functions; [3] specifies the value of the function; and [4] determine the function form. Although the material on Relation and Function has been submitted by the teacher, but in fact many learners still do not understand how to solve it, because the material of Relation and Function in the sub-subject determines the value of function and determine the form of function into one of the material that is considered difficult by most learners. This is often the case because students are suspected of lack of understanding of the solution steps. To be able to determine the value of function and form of function, learners are required to understand the completion steps.

The instrument used in this research is the test in the form of multiple choice. According to Nitko (1996) in Anwar (2009: 36 - 37) the advantages of multiple choice tests are: able to assess many learning targets so as to be more representative to assess all the material studied, the quality of the problem is easier to analyze (difficulty level, differentiation, validity empirical, and foolish functioning). The expected standard of competence is that learners understand the algebraic forms, relationships, functions, and equations of straight lines, while the basic competencies are understanding the material and functions, and determining the value of the function. The subject matter chosen is Relation and Function.

METHODS
This research is a qualitative research with case study strategy that aims to find students' learning difficulties on material relations and functions so that teachers can do something useful so that the material learned can be understood well and last longer. According to Nawawi (2005: 74) explain the intended case study research is research that puts an object under investigation as a case. Case study in this research is researching intensively about the difficulties experienced by students in understanding the material relations and functions through the results of achievement test and interview.

The subject of this research is three students of class VIII who have different learning ability in Junior high school Regina Pacis Surakarta. Sampling in this research is using purposive sampling technique. Researchers choose three students who have the ability to learn with three different levels of study high learning ability, moderate learning ability, and low learning ability and each student who has good communication skills.

Data collection techniques in this study through tests and interviews. The test results using indicators:

a. Determine the type of relation,
b. Determine the function, domain and number of mappings
c. Determine the value of the function and determine the value of x if f(x) is known, as well
d. Determine the function form.

RESULTS AND DISCUSSION

Based on the results of student tests in working on relation and functions, and interviews then obtained the difficulties students do and to determine the factors that cause student difficulties as follows:

From the analysis of test and interview answers obtained that the subject who belongs to the category of high learning ability, can answer all questions well and do not feel difficult when they have to do all the problems with some appropriate variety of indicators. Subjects with high learning ability get maximum score for this materia. The also have a target to achieve their learning achievement and what they earn will be in accordance with the target.

Subject has difficulty while doing question no. 5, because she have difficulty in determining the members of each set. Actually the subject can understand the sense of one-to-one correspondence, this can be seen from the interview and the results of the answer to the subject matter no. 6. Difficulties experienced by the subject especially when determining factor member from 8 and determine the letters forming the word "nama". This results in the wrong subject when it comes to determine the answer.

The subject also has difficulty in doing question no. 10, ie in determining the form of function. The subject has difficulty when it comes to determine the values of a and b in the function formula. Which one must compile first into the equation and then eliminated. Subject has difficulties at the time of completion $2a = 12$ which should be $a = 6$ but is written $a = -6$ so it is wrong in determining the value of b, that resulted in wrong in choosing the
Subject with medium learning ability, although basically can understand all the indicators but there are several things that have not been mastered, that is mentioning members of the set factors of 8 and letters forming the word "nama", and has not understood the intent of $2a = 12$ (number operations).

From the analysis of answers to tests and interviews, subjects with low learning ability can answer 5 questions from 10 given questions. Problems answered correctly are questions with numbers 1, 2, 6, 7, 9, whereas the wrong answered problem is about number 3 on function definition, 4 about many possible mappings, 5 on one-to-one correspondence, 8 about the value of $x$ if $f(x)$ is given and number 10 is about the function form.

Subject has difficulty while doing question on no. 3 because she is still confused to understand the meaning of the function, so when the image is presented, the subject is confused to choose which one, and this results in the problem no. 4 to mention as many as possible mappings. For question no. 5, she has difficulty in determining the members of each set, subject forget to specify the factor of 8, suppose only 2, 4, 8 and the member of the letters forming the word "nama" which he thinks 4, so the answer choice on B is i and ii. Actually subject can understand the sense of one-to-one correspondence, this can be seen from the interview and the results of the answer to the subject matter no. 6. Difficulties experienced by the subject especially when determining factor member from 8 and determine the letters forming the word "nama". It makes the wrong result, when subject has to determine the answer.

The subject also had difficulty in doing question no. 8 is to determine the value of $x$ if the value of $f(x)$ is known. With the function $f(x) = -2x + 5$. The value of $f(p) = 11$, which means for the function $f(x) = -2x + 5$ and the image of $x = 11$, then how many $x$ values, experiencing the confusion of the intent of the matter, then the value 11 is entered into the formula which means the subject seeks the shadow of 11. This resulted in a wrong answer the question. The subject also had difficulty in doing question no. 10, ie in determining the form of function. The subject has difficulty when it comes to determining the values of a and b in the function formula. Which one must compile first into the equation and then eliminated. Subject has difficulty when compiling equations and finally she that can not answer the question.

Subjects with low learning ability do not understand most of the indicators although there are several things that have been understood. Uncontrolled indicators, such as understand the function, determine the many possible mapping of two sets, mention the members of the set of factors of 8 and the letters forming the word "nama", have not been able to determine the value of the area of origin if the shadow is known and can not determine the flip of the function because she does not know how finish. From the student's answer about the learning achievement test of relation material and function, and from the interview result, it can be seen that the students have difficulty in terms of:

![Figure 3. The answer](image-url)
1. Understanding the concept of function
2. Understanding the member's definition of a set
3. Understand the operation of integers
4. Understanding the meaning of the value of the function
5. Understand how to determine the value of the origin if the shadow is known

CONCLUSION

The number of mistakes made by learners in doing the problem can be a clue on how far the mastery of learners toward the material. From the mistakes made by learners, it can be researched and studied more about the source of error. The source of the error must be solved soon. This solution is taken by analyzing the root of the problem that causes the mistake made by the learner, so looked for alternative solution, is needed that in the future, learners will not repeat the same mistake. In order to help learners who have difficulty in learning mathematics, teachers need to recognize the common mistakes made by learners in completing the mathematics tasks.

The level of difficulty of students in learning the material Relation and Function in Regina Pacis Junior High School Surakarta is as follows.

a. Students with high learning ability can master all the indicators given, so they get the maximum score.

b. Students with medium learning ability are having difficulties in mastering the prerequisite material that is determining members of a set, and in counting operations.

c. Students with low learning ability have difficulties in understanding the material functions, mastering the prerequisite of determining members of the set, counting operations, understanding the intentions asked, and how to determine the form of function.

REFERENCES


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