Analysis of Student Learning Difficulties Viewed from Mathematical Connection on Linear Equation System of Three Variables

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Abstract. Learning outcome is the ability data of learners that can be measured from the value of students by using various models after working on the questions given by the teacher at the time, evaluation is implemented. This is because in the process of teaching and learning conducted by the teacher on the subject of Linear Equation System Three Variables that are theoretical in which the curriculum 2013. When the learning took place, students are less active in following the learning of mathematics. Students are less likely to master the material so that students' learning outcomes are low, and students are less motivated and inactive in learning. This study aims to determine that students 'difficulties in the chapter Linear Equation System Three Variables using mathematical connections and learning model, Problem Based Learning with scientific approach so as to increase students' understanding of Linear Equation System Three Variables.

1. Introduction

Learning outcome is the ability data of learners that can be measured from the value of students by using various models after doing the questions given by the teacher at the time, evaluation is implemented but not all students have high learning outcomes. Mathematics is one of the subjects that have an important role in education. The subjects of mathematics are taught almost at every level of education and become the determinant of graduation requirements at elementary, junior high and high school level. This is because mathematics is one of the most useful knowledge in life. Almost every part of our life contains mathematics because mathematics is an everyday human activity that is essential for life today and the future [1]. Based on the interview on Tuesday 17 December 2016 to one of the Mathematics Teachers at SMKN 1 Sukoharjo said in particular class X, stated that the average value of absorption on the topic of the system of equations of three variables of the gas semester in the 2016/2017 academic year is: 62 is still low of the expected standard of 75 (KKM standard) so that 32% of the students have standard KKM and 58% of the students have not standard KKM so the absorption of students on the subject of the system of equations of three variables is still less system equation of three variables. It shows that the ability of mathematical connection in the system of equation of three student variables need to be improved by giving the problems that explores the students' concept of understanding the three-variable equation system. NCTM [2] suggests that mathematical connections help students to develop their perspectives, view mathematics as an integrated part rather than as a set of topics, and recognize the relevance and application both in the classroom and outside the 2nd class.

The problem formulation is how the analysis of students' learning difficulties reviewed from mathematical connections on linear equations of three variables and the research objectives is to describe and analyze student learning on linear equation system three variables. Research benefits are to diagnose material difficulties in terms of mathematical connection system equations of three variables are given so that teachers can determine the appropriate learning model, and understanding the problems in mathematics learning, especially difficulty in understanding the concept of three-variable equation system.

2. Method

This research is a descriptive research. In descriptive research, the researcher wants to describe and analyze the difficulties on the linear inequality system material of three student variables of class X. Subjects in this study were students of SMK class X as many as 25 Students. The assessment Procedure:

a. The researcher prepares a multiple choice instrument that measures the ability of difficulty on the linear inequality system of the three student variables of class 10 and selected 5 indicators adapted to the curriculum in Indonesia
b. Researcher gives problem to student.
c. Researchers make scoring of student answers
d. Researchers analyze the results of student answers.

The instrument made by the researcher is a matter of multiple choices which contains 5 indicators in difficulties on linear equations system of three variables. Grid lattice problem can be seen in table below.

Table 1. Grid lattice problem

Indicator mathematical connection on linear equations system material three variable	No
a. Determine problems or problems in other fields related to the concept mathematics.	1,2,3,4,5,6,7,8
b. Recognizing interconnections concepts or ideas in mathematics	9,10,11,12,13,14
c. Apply mathematics in context beyond mathematics (life matter daily).	15,16,17,18
d. Deciding on a mathematical concept underlying the settlement procedure problems or problems.	19,20,21,22
e. Understand how the concept in mathematics is interconnected.	23,24,25

Researchers do data analysis by calculating the acquisition of score about system difficulty linear equation of three variables based on true provision get value 1 if one get the value o. after that the researchers analyzed the results of student answers each indicator system difficulty linear equations three variables.

3. Result and Discussion

The explanation of the material difficulties ability of the system of linear equations of three variables is as follows.

Table 2. Determine issues or problems in other areas related to mathematical concepts.

Material on the ability of the indicator	No	Number of students who answered correctly	Percentage
Compile the numbers into the three variable equations	1	3	12 %
	2	2	8 %
	3	5	20 %
Converting the story into equation model	4	6	24 %
	5	2	8 %
Construct coefficients of story problem into model equation	6	3	12 %
	7	2	8 %
	8	3	12 %

Based on the results of the above study found the ability of a masterful child Composing numbers into the equation of three variables is 12%, Convert the story into the model equation is 24% and Compile the coefficients of the story into the model equation is 12%.

Table 3. Recognizing relationships between concepts or ideas in mathematics.

Material on the ability of the indicator	No	Number of students who answered correctly	Percentage
Develop equations linear two variables from contextual issues.	9	12	48 %
	1 0	8	32%
Completed the linear equation of two variables with the elimination-distribution method	11	9	36 %
	12	6	24 %
Looking for one of the missing variables	13	9	36 %
	14	9	36 %

Based on the results of the above research found the ability of children who master Completed linear equation two variables is 48%, Finishing the linear equation of two variables with the elimination-distribution method is 36% and Looking for one variable missing is 36%.

Table 4. Applying mathematics in an outside mathematical context (life matter daily).

Material on the ability of the indicator	No		Number of students who answered correctly	Percentage
Create a mathematical of the problem.	1	5	10	40 %
	1	6	9	36 %
Looking for one of the missing variables	17		9	36 %
	18		9	36 %

Based on the results of the above research found found the ability of children who master Finding one variable missing is 36% and Make a mathematical model of the problem is 40%

Table 5. Applying mathematics in an outside mathematical context (life matter daily).

Material on the ability of the indicator	No		Number of students who answered correctly	Percentage
Develop equations linear three variables from ontextual issues.	1	9	10	40 %
	2	0	8	32 %
Finishing the linear equation of three variables	21		8	32 %
	22		9	36 %

Based on the results of the above research found found the ability of children who master Composing linear equations three variables of the contextual problem is 40% and Completing linear equations three variables is 36%.

Table 6. Understand how concepts in mathematics are related.

Material on the ability of the indicator	No		Number of students who answered correctly	Percentage
Develop equations linear three variables from contextual issues	2	3	8	32 %
	2	4	9	36 %
	2	5		

Based on the results of the above research found the ability of children who master compile linear equations three variables of contextual problems is 36%.

4. Conclusion

Based on the results of research on 25 students of SMK about the difficulties in the material system of linear equations of three variables it is obtained that from the first indicator to the fifth indicator students less than 50%. It is our duty as an educator to solve this problem. Students have difficulty in material system of linear equation of three variables so that when given direct material about algebra hence students have difficulty. Difficulties in this material is the initial diagnosis of teachers to students so as to know the students' early ability to material the system of linear equations

of three variables so that teachers can form the right model in learning one of them Problem Based Learning.

Suggestions that can be given by researchers that teachers should know the difficulty in the material system of linear equations of three variables that will be detected early difficulties in the material requirements system of linear equations three variable.

5. Reference

[1] Fatimah S 2009 *Mathematics is engrossed with modeling methods* Bandung: Mizan Media Utama

[2] NCTM 2003 Program for Initial Preperation of Mathematics Specialists *Available on* http: //www.ncate.org/ProgramStandars/NCTM/NCTMELEM Standars.pdf