

Mathematical Disposition in Algebraic Thinking Skills

Muhammad Riskon
Universitas Negeri Semarang,
Indonesia
muhammadriskon17@gmail.com

Rochmad
Universitas Negeri Semarang,
Indonesia
Rachmad_maden@mail.unnes.ac.id

Nuriana Rachmani Dewi'
Universitas Negeri Semarang,
Indonesia
nurianaramadan@mail.unnes.ac.id

Abstract---This study aims to describe the algebraic thinking skills of grade 11th students based on mathematical dispositions. This study used a qualitative method with 6 students as the subject. The results showed that students with high mathematical disposition categories can complete 3 levels of algebra well, students with moderate mathematical disposition categories can complete 2 levels of algebra well and students with low disposition categories can complete 1 level of algebra well. **Keywords:** Algebraic Thinking, Mathematic Disposition

I. INTRODUCTION

The ability to think algebra is the ability to use unknown variables and things that are associated with broader ideas (Choudhury & Kumar, 2012). Can functionally recognize the relationship between variables, and present concepts in different ways is the definition of algebraic thinking skills according to Panasuk and Beynevand (2010).

Representing a quantitative form by connecting variables into one of the algebraic thinking abilities (Driscoll, 1999). Forms of reasoning involving variables, generalizations, representations of various forms of relationships, and abstraction of various forms of computation become indicators in understanding algebra. So algebraic ability can be interpreted as a person's ability to explain algebraic understanding as a form of relationship, abstraction, and various forms of calculation. Students with the level of algebraic thinking skills in extracting information by analyzing the relationship between numbers through information exploration in the form of images on the given problem or images made by students. So algebraic ability can be interpreted as a person's ability to explain algebraic understanding as a form of relationship, abstraction, and various forms of calculation. Students with a level of algebraic thinking skills in extracting information by analyzing the relationship between numbers through information exploration in the form of images on the given problem or images made by students.

Indicators of algebraic thinking in this research use Kieran's Indicators, (1) generalization, (2) transformation and (3) meta global level.

Getting used to using mathematics in solving daily life problems can make the role of mathematics appreciated by students in everyday life (Setiawan, FT, 2017). Success in solving algebra can be influenced by students' mathematical dispositions (Rakhmi, 2018). Mathematical disposition plays a very important role in making decisions and responsibility in solving problems. Mathematical dispositions are formed from a person's individual experiences (Feldhaus, 2014). The development and activities and learning outcomes of students are influenced by their mathematical dispositions (Anku, 1996) (Beyers, 2011). In addition to learning outcomes, students' perspectives on the environment affect student learning styles and have an impact on students' mathematical dispositions (Nijhuis et al., 2005) (Pampaka & Williams, 2016). Role Student disposition can be carried out through student activities in choosing an approach to completing tasks which includes self-confidence, responsibility, curiosity to find alternatives, persevering and being challenged, never giving up, and the tendency of students to reflect on the way they think they do. Indicators of mathematical disposition in this research by NCTM

Madrasah Aliyah Salafiyah (MAS) Simbang Kulon is one of the private schools in Pekalongan Regency, which has three class, namely religion, natural sciences and social sciences. The school is separated between male and female students and their buildings are differentiated. Teaching and learning activities use the 2013 curriculum. Algebraic material in mathematics is given from class X to class XII.

The aim research to describe the algebraic thinking skills of grade 11th students based on mathematical dispositions

II. METHODS

The study was qualitative research with subject consisting of six students. The subject in this research

consist of 11th grade students in MAS Simbang Kulon Kab. Pekalongan.

Algebraic thinking ability based on mathematics dispositions is analyzed descriptively based test result and interview with the student representative. The validity of the data using the source triangulation technique is the student representative interview. (Sugiyono, 2012)

III. RESULT AND DISCUSSION

The mathematics dispositions questionnaire respondents consisted of 40 students. The detail questionare is presented in Table 1.

Table 1. Distribution of mathematics Disposition Categories.

Student's category	The number of students	Percentage (%)
High	14	35
Medium	15	37,5
Low	11	27,5
Total Number	40	100

There are 14 students in high category, 15 students in medium category, and 11 students in low category from 40 students who have filled out the mathematics disposition quitionare in XI P1 class. Each mathematics disposition category is selected 2 students to analyze their algebraic thinking abilities in dept.

Low category student selection was obtained from 2 students with the lowest mathematics disposition score. Medium category student selection was obtained from 2 students with the middle mathematics disposition score. And high category student selection was obtained from 2 students with the highest mathematics disposition score. This is done in order to make a significant difference between students from all three categories in solving algebraic problems.

The questions consisted of 10 questions, where each question represented an indicator of algebraic thinking including generational ability indicators consisting of 4 questions with codes G1, G2, G3, G4, transformational ability consisting of 3 questions with codes T1, T2, T3 and ability level- global meta consists of 3 questions with the code M1, M2, M3.

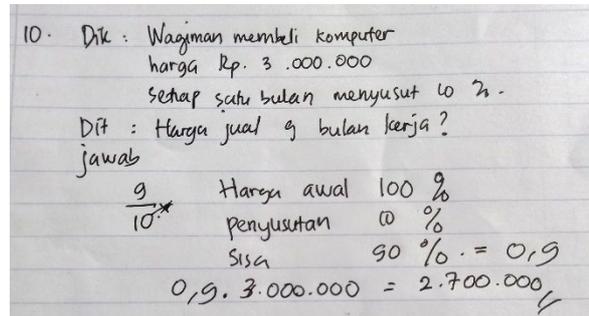


Figure 1. students with high mathematical disposition

First, Students with high mathematical disposition can solve questions of generational ability to global meta-level abilities correctly, even though there are slight deficiencies in problem solving. These deficiencies are found in M3, which is related to the transformational ability of using algebra to solve problems related to other fields of science. Students with this category have difficulty identifying problems that are good and still have difficulty in determining the next step, thus making some missing steps and causing incorrect results in solving M3 level transformational ability questions.

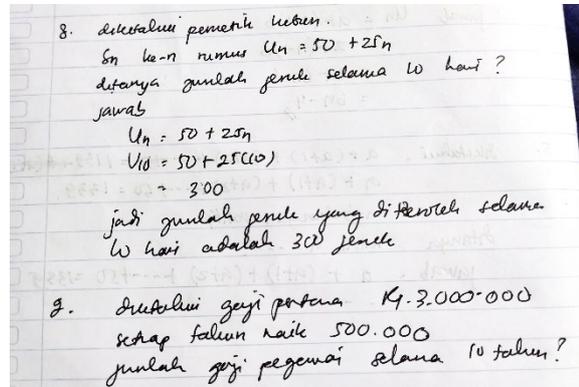


Figure 2. students with medium mathematical disposition abilities

Second, students with medium mathematical disposition abilities can solve problems up to the transformational level correctly. Students in this category are only able to identify problems on the questions that test their global meta-level abilities. Students with this category are able to identify the problems given and have not been able to solve the desired problems, namely questions with code M1, M2, M3.

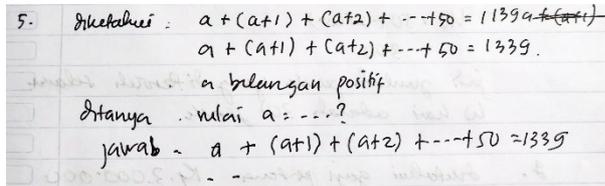


Figure 3. students with low mathematical disposition abilitie

Third, students with low mathematical disposition abilities can only solve generational ability questions correctly. Students with this category are only able to identify problems in questions that test transformational abilities. Students with this category are able to identify the problems given and can solve the desired problems without using the concepts given. students with this category are not sure whether what is done is correct or not. While about global meta-level abilities, students with this category can identify problems given but not completely and are not confident in identifying global meta-level abilities

IV. CONCLUSION

The result of this research show that Students in the high mathematical disposition category were able to solve the algebraic problem from the generalization level, the transformational level until the meta-global level. Students in the medium mathematical disposition category were able to solve the algebraic problem from the generalization level and the transformational level. And students in the low mathematical disposition category were able to solve the algebraic problem only at the generalization level

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