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Process Skills Mathematics Learning in Elementary School

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Abstract

There are still many students who have difficulty learning mathematics. It is because mathematics contains symbols, calculations and abstract concepts that students find it difficult to understand mathematical material. In addition, the process skills of students at the elementary school level are deficient. This study aimed to analyze the differences and the relationship between students' process skills between elementary school students in mathematics with speed and discharge material. This study uses quantitative methods with associative and comparative types. The population in this study amounted to 216 students. The research sample amounted to 72 using the simple random sampling technique. The methods used to collect data are observation, questionnaires, and tests. The instruments used to collect data are questionnaires and test questions. The techniques used to analyze the data are qualitative descriptive analysis, quantitative, and inferential statistics. The study results were that there were significant differences in student process skills between elementary school (SD) and MIS (Masrasah Ibtidaiyah) students in learning mathematics with speed and discharge material. From the correlation test results, it is known that there is a relationship between the variable process skills of elementary school students and Madrasah Ibtidaiyah in mathematics with speed and discharge. Public schools have the same portion for all subjects, while madrasah Ibtidaiyah has a more significant portion for religious subjects.

Keywords: Education, Process Skills, Mathematics

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1. INTRODUCTION

Education is very important in developing attitudes, achievements and quality of human resources in order to create progress in the nation (Awidi et al., 2019; Tseng et al., 2019). The success of education in a country automatically also shows the progress of a country. Ideally, education is very important in developing attitudes and skills (Devetak et al., 2010; Sahin & Yilmaz, 2020). Education has a level process to grow potential resources, with the substance of national education goals in terms of social attitudes, knowledge, and skills so that they can form good student characters (Chai & Kong, 2017; Devi et al., 2020). Education can be interpreted as offering one approach to improving the quality of evidence in education has focused on methods and also concerned about teaching and learning (Abdulrahaman et al., 2020; Butler & Shibaz, 2014). Learning is an important factor in the world of education. Learning is basically not only learning about concepts, theories and facts, but is more concerned with applications in everyday life (Lukitasari et al., 2019; Wang & Tahir, 2020). Learning activities show progress. Students in learning have their own style that increases student learning motivation, increases creativity, so that the learning process can explore development (Costa et al., 2020; Dantas & Cunha, 2020; Satyawan et al., 2021). Performance and strategy are very important learning activities to evaluate self-competence (Arsy et al., 2020; Cho et al., 2021; Fu et al., 2012). One of the subjects that requires the right strategy in learning is mathematics.

Mathematics learning needs to be given to all students in elementary schools. Mathematical learning can provide students with the ability to think logically, analytically, systematically and others (Arsaythamby & Zubainur, 2014; Öztürk et al., 2020). Mathematical learning is given at the elementary school level from grade 1 to grade 6 SD. The mathematics subject itself contains

symbols, calculations and abstract concepts (Nurlaily et al., 2019; Triwahyuningtyas et al., 2020). Therefore, many of the students say that mathematics is a difficult subject. The findings of previous research also stated that there were still many students who had difficulties in learning mathematics (Magrifah, 2015; Nugraheni, 2017; Nur & Palabo, 2018). In the competence of learning mathematics in order to achieve the objectives of learning if students have an increase in skills. By learning mathematics, students are able to be skilled in using various concepts in everyday life (Arsaythamby & Zubainur, 2014; Öztürk et al., 2020). It is not uncommon for students to have difficulty in understanding mathematics lessons (Fathollahzadeh et al., 2021; Li et al., 2021). This is because there are still students who are confused with the concepts of mathematics subjects (Ambussaidi & Yang, 2019; Bicer et al., 2021). Thus, in these conditions students who have difficulty learning mathematics will tend to have behaviors that sometimes deviate at school (Herreras, 2017; Tsui & Mazzocco, 2006). One of the mathematics lessons taught at the elementary school level is speed and discharge material. Speed is the distance traveled in a certain time interval. While the discharge is the velocity associated with the liquid and time.

Applying the scientific method and developing it are part of the process skills that are very important for students (Faize et al., 2018; Wulandari, 2020). Skills are very important to generate new knowledge through learning activities that refer to behaviors that reveal their understanding of the world (Öztürk et al., 2020; Tseng et al., 2019). Students are able to build concepts about mixing theory and observations (Argaheni, 2020; Enteria & Casumpang, 2019). In this learning, students are required to experience for themselves, seek, try and draw conclusions from the process of the skills they do (Cloonan et al., 2020; Wilde & Hsu, 2019). So that the process skills that students learn are not only familiar with theory but can also be applied or realized. This research is in line with previous research on research process skills. In previous studies measuring the process skills of students at the high school and junior high school levels (Arantika et al., 2019; Furner & Kumar, 2007). So that in previous studies it was not known the difference in student process skills between elementary schools to determine the extent to which elementary school students had good skill levels among other school levels (Stender et al., 2018; Vartiainen & Kumpulainen, 2020). While in this study more focused on process skills in elementary school students on the speed and discharge of mathematics subjects. This test is very important to do because students' skills in mathematics are still low, especially for students at the elementary school level. Based on this research, Based on this research, it was conducted with the aim of analyzing the results of the process skills indicators regarding: Compiling Tables, Observing, Classifying, and Obtaining and Processing Data, being able to find out the difference between the process skills of students from SD and MI with speed and discharge material, being able to find out the relationship between process skills students from SD and MI with speed and discharge material.

2. METHOD

This study uses quantitative methods with associative and comparative types. The data obtained using numerical data with a Likers scale 4. This study gains an understanding of a phenomenon from basic logic, usually including the perspective of the research population The instrument used in this study was an observation sheet distributed to four schools, namely: SD Negeri 156/I Bulian Baru, SD Negeri 63/I Simpang Karmio, MIS Nurul Jadid, MIS Darul Aufa. Instructive questionnaires were used to measure knowledge that had not been systematically validated. The grid used in the instrument of observing students' process skills in mathematics subjects.

Table 1. Grid of Student Process Skills Observation Instruments in Mathematics Subjects

Variabel	Indicator	Number Statement Items
Process skills of students in mathematics	Observation	1,2,3
	Communication	4,5,6,7
	Classification	8,9,10,11,12
	Measure	13,14,15
	Conclusion	16,17,18,19
	Prediction	20,21,22,23,24
	Arrange tables	25,26,27
	Obtain and process data	28,29,30,31
	Trial analysis	32,33,34,35
	Creating a hypothesis	36,37,38,39
	Designing experiments	40,41,42,43
	Doing Experiments	44,45,46,47
Number of Statements		**47**

Because the observation of students' process skills in mathematics subjects uses a linkers scale consisting of 5 categories and the observation of students' process skills consists of 4 categories, then there is an interval in each category. The Likert scale used in this study were: 1 (very bad), 2 (not good), 3 (fairly good), 4 (good), 5 (very good) with 47 questions regarding student process skills. In this study, there were 2 samples, namely class V A and V B samples with each class having 36 students. The sample consisted of two groups, namely the experimental group and the control group. The total of the eight classes in the respondents were 216 students. The sampling technique used in this study used simple random sampling. Using random sampling can reduce the potential for bias in the selection of cases to be included in the sample. With the condition that random sampling is done because of the homogeneous population, the sampling frame is clear and general in nature.

The results of the student's observations regarding the student's process skills were analyzed using descriptive statistics. By using this type of associative research to determine the relationship or type of the variables used. Therefore, differential statistics are used with assumption tests consisting of normality, linearity and hypothesis testing, namely T test and correlation test. The nomarality test aims to determine whether a data can be said to be normal or not, while the homogeneous test aims to determine whether the data of the two samples is homogeneous or not. The first step in this research is to determine the normality of a data using the normality test. Normality test if the result data in the population is normally distributed, the condition is that the sig value is greater than 0.05. The data obtained in this research is qualitative data. Then this data will be analyzed using assumption tests starting from normality and linearity tests. If the data being tested is normal and linear data, it ends with a hypothesis test to see whether there is a significant relationship and comparison between classes in the same school using the T test and correlation test.

3. RESULTS AND DISCUSSION

Results

The following describes the results of descriptive statistics on students' process skills variables in mathematics. With indicators on student process skills: Observation, Classification, compiling tables, obtaining and processing data. Where the results obtained from the spread of observations of the four schools are: SD (State Elementary School) 156/I Bulian Baru, SD (State

Elementary School) 63/I Simpang Karmio, MIS (Private Ibtidaiyah Masrasah) Nurul Jadid, MIS (Private Ibtidaiyah Masrasah) Darul Aufa. Each school has 2 classes. So that the total number of classes taken is 8 classes with a 5th grade level in elementary school. Based on the results of data analysis, it can be seen that the most dominant category in the Observation indicator is at SDN 156 class VA and VB with very good and poor categories with percentages of 35% and 33.3% respectively. Then at SDN 63, classes VA and VB were categorized as good and not good with the percentages of 38.9% and 33.3%, respectively. Meanwhile, in MIS Nurul Jadid, classes VA and V B are in good and bad categories with the percentages of 38.9% and 33.3%, respectively. Then in MIS Darul Aufa class VA and V B good and bad categories with percentages of 38.9% and 33.3%, respectively. So it can be concluded that the SDN (State Elementary School) and MIS (Private Ibtidaiyah Masrasah) have the same process skills on the observation indicators. It is known that the most dominant category in the classification indicator is at SDN 156 class VA and VB in the good category with a percentage of 55.6% and 50%, respectively. Then at SDN 63 classes VA and V B were in good category with 55.6% and 52.8%, respectively. Meanwhile, in MIS Nurul Jadid, classes VA and V B are in the good category with a percentage of 55.6% each. Then in MIS Darul Aufa, class VA and VB are in good category with a percentage of 55.6% and 61.1%, respectively. So it can be concluded that MIS (Masrasah Ibtidaiyah Private) has advantages in process skills on the classification indicator.

The preparation of tables at SDN 156 class VA and V B categories is very good and good with the percentages of 30.6% and 61.1%, respectively. Then at SDN 63, class VA and VB B were in good category, respectively, 33.3% and 50%. Meanwhile in MIS Nurul Jadid, classes VA and V B are in the good category, respectively 33.3% and 61.1%. Then at MIS Darul Aufa, class VA and VB were in good category with 33.3% % and 44.4% respectively. So it can be concluded that SDN (State Elementary School) has advantages in process skills in the indicator preparation table. Furthermore, the most dominant category in data acquisition and processing indicators is at SDN 156 class VA and VB B with good categories with percentages of 61.1% and 47.2%, respectively. Then at SDN 63 classes VA and V B were in good category with 44.4% and 38.9%, respectively. Meanwhile, in MIS Nurul Jadid, class VA and VB are in good category with 41.7% and 38.9% respectively. Then in MIS Darul Aufa, class VA and VB are in good category with a percentage of 38.9% each. So it can be concluded that SDN (State Elementary School) has advantages in processing skills on indicators of obtaining and processing data.

The data is normally distributed as seen from the significance value, if the significance value is > 0.05. Based on the results of data analysis, data on the process skills of students in SD Negeri 156/I Bulian Baru and SD Negeri 63/I Simpang Karmio, with classes V A and VB, respectively. Normal distribution, with the normality test results obtained Kolmogorov-Sminov test significance value of 0.200> 0.05. It can be concluded that the data on the process skills of students in SD Negeri 156/I Bulian Baru and SD Negeri 63/I Simpang Karmio, with classes V A and VB, respectively. Normal distribution, with the normality test results obtained Kolmogorov-Sminov test significance value of 0.200> 0.05. This test is carried out in order to see the linear relationship between two or more variables. The requirements for this test, if the significance value is > 0.05. Based on the results of data analysis, there is a linear relationship between students' process skills at SD Negeri 156/I Bulian Baru and SD Negeri 63/I Simpang Karmio. This is evidenced by the obtained, the results of the linearity test obtained are the significance value of the deviation from the linearity of 0.996 which has met the requirements > 0.05. In addition, it can be concluded that there is a linear relationship between students' process skills at MIS Durul Jadid and MIS Darul Aufa. This is evidenced by what is obtained, the results of the linearity test obtained are the value of 0.996 has met the requirements> 0.05. The significance of the deviation from the linearity of 0.129 has met the requirements > 0.05.

This test is carried out in order to find out whether the x and y data are homohen or not. The requirement in this test is that if the significance value is > 0.05, it can be said that the x and y data

are homogeneous (same). If the significance value is < 0.05 then the data is not homogeneous (not the same). Based on the results of data analysis, the variance of the two variables between the student's process skills at SDN (State Elementary School) and at MIS (Private Islamic Primary School) is the same or homogeneous with the results obtained from the homogeneity obtained is a significance value based on the mean of 0.584 has qualify > 0.05. In this test, it is carried out in order to be able to find out the differences in variables on mathematics subjects. The condition in this test is if the significance value is > 0.05, it can be said that the variable has no difference. If the significance value is <0.05, then the variable has a significant difference. Based on the results of data analysis, there are differences in students' process skills between SD (Elementary School) and MIS (Masrasah Ibtidaiyah Private) on mathematics subjects. This is evidenced by the value of sig (2-tailed) 0.000 < 0.05. In this test, it is carried out in order to determine the relationship of variables to mathematics subjects. The conditions in this test if the significance value is > 0.05, it can be said that the variable has no relationship. If the significance value is <0.05, then the variable has a significant relationship. Based on the results of data analysis, there is a relationship between students' process skills between SD (Elementary School) and MIS (Masrasah Ibtidaiyah Swasta) on mathematics subjects with speed and discharge material. This is proven by the value of sig (2-failed) in accordance with the conditions that have been set.

In descriptive statistical testing, the variable used is the student's process skills variable by paying attention to 4 question indicators. From the results of the table that has been presented, it can be concluded that the indicators of observation of students' process skills are superior at SDN 156 with very good and good categories in each class, while at SDN 63 the categories obtained are dominantly good and not good in each class. In the indicators of the classification of process skills students are superior at SDN 63 with good categories for all classes, similarly at SDN156 there is only a percentage dispute that makes SDN 63 students superior in process skills. In the indicator of compiling a table of students' process skills, the superior is at SDN 156 with very good and good categories in each class, while at SDN 63 the categories obtained are good in each class. In the indicator of obtaining and processing data, the student's process skills are more dominant in SDN 156 with a good category in each class, the same as SDN63 only there is a difference in the percentage obtained. Of the total number of SDN 156, three times higher than the 4 indicators tested. So that in this test SDN 156 has better process skills than SDN 63.

From the results of the data obtained using descriptive statistics with the variable process skills, it is found that MIS Nurul Jadid is a Private Islamic School which is superior to MIS Darul Aufa. This is evidenced by the student's process skills from the distribution of observations that the MIS Nurul Jadid observation indicators are categorized as good and not good. even so, MIS Darul Aufa with the same category has a difference in the percentage obtained. In the MIS Nurul Jadid classification indicator, there is a good category as well as MIS Darul Aufa, only there is a difference in the percentage obtained. In the indicators of compiling tables, obtaining and processing categorical data, the results obtained are both for MIS Nurul Jadid and MIS Darul Aufa, only the percentages obtained are different. So that in this test students at Madrasah Ibtidaiyah Private Nurul Jadid have more process skills in students than MIS Darul Aufa with speed and discharge materials.

Discussion

This research is in line with previous research on students' process skills. However, previous research has variables regarding student process skills at the high school and junior high school levels. From the results of previous research on learning by doing an authentic which is influential in the model of process skills in secondary schools, and improving skills by practicing geometry (Solé-Llussà et al., 2019; Stender Solihatin, 2017). So that in previous studies it was not known the difference in student process skills between elementary schools to determine the extent to which elementary school students had good skills among other school levels. The skills carried out by other studies have not yet entered the speed and discharge material stage that elementary school

students learn. Many of the previous researchers carried out skills that were limited to science, there were no researchers regarding process skills through speed and discharge material in elementary schools.

This study is in line with previous research on students' process skills. However, previous studies have shortcomings in the variables tested. In the journal Evaluation of student process skills seen through reflective worksheets in inquiry-based learning environments, Assessing science inquiry skills, Learning by doing process learning models in secondary schools (Labouta et al., 2018; Mutlu, 2020; Stylinski et al., 2020). That way the previous journal only showed how the process skills of students in secondary schools using the learning model and process skills were measured in bringing a great influence on students through the learning model (Pane et al., 2020; Pratono et al., 2018; Yusuf & Widyaningsih, 2020). So it has not been found how the influence in Madrasah Ibtidaiyah schools on student process skills. It is known that Madrasah Ibtidaiyah is a religious school which prioritizes religious lessons. Many of the skills carried out by other studies have not yet entered the speed and discharge material stage that Madrasah Ibtidaiyah students learn.

The essence of this study discusses the differences and relationships in students' skills towards elementary schools and Madrasah Ibtidaiyah. In other words, these differences and relationships describe students' skills in mathematics. If you look at the comparison between schools. Ibtidaiyah Madrasah schools still have shortcomings in students' processing skills for mathematics subjects with speed and discharge material. This happens because there are still behaviors of students who have not mastered the material and subjects. There are shortcomings in this research, this study only measures student skills and has not been tested with other variables such as interest, motivation and others. And the students tested were from grade 5 of elementary school and had not tested from other classes regarding the speed of the material and the discharge.

4. CONCLUSION

The student's process skills are superior to students in elementary schools than students in Madrasah Ibtidaiyah with descriptive statistical values that have been tested and presented. The impact of this is that there are differences in student achievement results so that public schools and religious schools have their respective advantages and disadvantages. Public schools have the same portion for all subjects while madrasah Ibtidaiyah have more portions for religious subjects.

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