**Jurnal Pendidikan Indonesia**
Volume 11, Number 2, 2022 pp. 228-239
P-ISSN: 2303-288X E-ISSN : 2541-7207
Open Access: https://doi.org/10.23887/jpiundiksha.v11i2.37158

# Scientific Learning and Process Skills Mathematics: Comparison and Relationship

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**ARTICLE INFO**

**Article history:**
Received July 14, 2021
Revised July 16, 2021
Accepted March 23, 2022
Available online June 25, 2022

***Kata Kunci:***
*Pemecahan Masalah, Keterampilan Proses, Pembelajaran Matematika*

**Keywords:**
Problem Solving, Process Skills, Math Learning



***ABSTRAK***

*Keterampilan proses memiliki peranan penting dalam dunia pendidikan, oleh karena itu keterampilan proses setiap siswa perlu ditingkatkan. Penelitian ini bertujuan untuk menganalisis perbandingan keterampilan proses, model pemecahan masalah dengan matematika, dan untuk menganalisis hubungan antara model pemecahan masalah dengan keterampilan matematika siswa. Penelitian ini menggunakan jenis penelitian kuasi eksperimen kuantitatif. Sampel dalam penelitian ini adalah 288 siswa. Teknik pengambilan sampel yang digunakan adalah purvosive sampling. Instrumen dalam penelitian ini ada dua, yaitu keterampilan proses dan model pemecahan masalah. Uji asumsi yang dilakukan dalam penelitian ini adalah uji normalitas dan uji linieritas, kemudian dilanjutkan dengan uji hipotesis yaitu uji T dan uji korelasi. Dari hasil uji T keterampilan proses terdapat perbedaan keterampilan proses siswa pada mata pelajaran matematika. Begitu juga dengan uji-t model problem solving terdapat perbedaan dari model respon belajar problem solving siswa pada mata pelajaran matematika. Adapun hasil uji korelasi antara keterampilan proses dan model pembelajaran pemecahan masalah, terdapat hubungan antara keterampilan proses dan model pembelajaran pemecahan masalah pada mata pelajaran matematika.*

**ABSTRACT**

Process skills have an important role in the world of education, therefore the process skills of each student need to be improved. This study aims to analyze the comparison of process skills, problem solving models to mathematics, and to analyze the relationship between problem solving models and students' skills in mathematics. This research uses a quasi-experimental quantitative research type. The sample in this study was 288 students. The sampling technique used is purvosive sampling. There are two instruments in this study, namely process skills and problem solving models. The assumption tests carried out in this study were the normality test and linearity test, than continued to test the hypothesis, namely the T test and correlation test. From the results of the process skills T test, there are differences in students' process skills on mathematics subjects. Likewise with the T-test of the problem solving model, there are differences from the model of the student's problem solving learning response to mathematics subjects. As for the results of the correlation test between process skills and problem solving learning models, there is a relationship between process skills and problem solving learning models on mathematics subjects.

## 1. INTRODUCTION

Process skills have an important role in the world of education, therefore the process skills of each student need to be improved. Education is an increase in the ability to think and behave well (Mukhamad Auliya Rahman & Istikomah, 2020; Rosmani & Halim, 2017; Tesi Muskania & Wilujeng, 2017). Therefore, education is one of the important roles in fostering good behavior, including implementing tolerance behavior (Azhari & Wicaksono, 2017; Juwıta et al., 2018; Rahim, 2018). Education is also important in improving the quality of human resources and the national development process (Putri et al., 2020; Rogahang, 2019; Sukendar et al., 2019). In addition, education serves to increase the ability to develop self-potential and shape the character of each individual, this can be done by getting used to behaving well (Hartini et al., 2018; Mithen et al., 2021; Sholahuddin et al., 2021). Education in improving good behavior is also supported by a quality curriculum (Ernawati & Safitri, 2017; Nuzulia et al., 2017; Zuhra et al., 2017).

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One of the sciences that study calculations is mathematics. Mathematics lessons are abstract in the form of numbers and aim to improve students' cognitive, affective, and psychomotor abilities (Diandita et al., 2017; Kencanawaty et al., 2020; Surya et al., 2017). However, mathematics remains one of the most important sciences in the world of education and in everyday life (Alan & Afriansyah, 2017; Apertha & Zulkardi, 2018; Nugroho et al., 2017). Therefore mathematics still has to be learned, one form of learning that can be used in learning mathematics is problem solving (Murtopo et al., 2018; Muyassaroh & Suyadi, 2020; Soleh, 2020). Problem solving is used as a learning model to solve problems in learning (Arifin & Herman, 2018; Malihatuddarojah & Prahmana, 2019; Widjayanti et al., 2019). Problem solving is an important issue and basic ability in learning mathematics, and also a determinant of students' cognitive levels (Hidayat & Sariningsinh, 2018; Tambunan, 2019; Wijayanti, 2020). Mathematical problem solving is cognitively complex and every student needs it, because it is considered important (Peranginangin & Surya, 2017; Permatasari et al., 2019). Mathematical problem solving is an important ability to learn and it takes a lot of effort in the process, it will lead to social interaction (Nurlaily et al., 2019; Rohman et al., 2020; Widodo et al., 2020). Of course, in the process of social interaction, each individual requires skills.

Process skills are not only in the form of concepts and memorization but are also related to physical and mental skills that produce a product in the form of attitudes and processes (Fitriana et al., 2019; Gustiana et al., 2019; Siswono, 2017). In process skills, it is also discussed about science that demands to think critically and systematically with literacy which is considered important (Fauzan et al., 2017; Mutakinati et al., 2018; Pahrudin et al., 2019). In addition to literacy, critical thinking skills also need to be developed because it will affect science and care for the environment (Fattah, 2019; Sulistyono & Dwikurnaningsih, 2020; Wilson et al., 2020). To improve process skills, it takes a strong will and intention, this can be done by learning mathematics on the material of addition and subtraction of fractions. There are many teaching materials taught in mathematics learning, one of which is addition and subtraction of fractions. Fractions include elementary school learning materials that are considered difficult and solutions must be found (Amir & Wardana, 2017; Suryowati, 2015). In addition to being considered difficult, fractions are also considered a center in the field of mathematics that studies numbers (Luh & Nuraini, 2016; Nasution et al., 2018; Rosli et al., 2020). In addition, fractions are considered important because they are used to improve mathematics learning and application in everyday life (Aminah & Kurniawati, 2018; Rasyid et al., 2017; Widiastuti et al., 2018). So important is the problem described that several experts research on the same topic.

Previously, research on problem solving has been carried out with the aim of producing a new mathematical learning model (Suastika, 2017). This research produces an open problem solving mathematical learning model that can be developed with student creativity. In a similar study conducted by other previous researcher that aim to produce a learning model (Nurdyansyah et al., 2017). From this research, the object of research is problem solving, but it has not been linked or linked to other variables. Therefore, researchers are interested in conducting research on student process skills and student responses using problem solving models in mathematics subjects with addition and subtraction of fractions. The urgency of conducting research on process skills and student responses using problem solving models is to serve as a reference for educators in improving students' process skills, and to find out the problem of process skills from the sample studied, so that each student can develop process skills in order to simplify the problems they face . The research focused on process skills and student responses with problem solving models for mathematics subject matter, namely addition and subtraction of fractions. The purpose of this research is to analyze the comparison of students' processing skills, to compare the responses of problem solving models to mathematics subjects, and to analyze the relationship between the responses of problem solving models and students' process skills to mathematics lessons with addition and subtraction of fractions.

## 2. METHOD

This type of research is a quasi-experimental quantitative research by comparing 8 classes using problem solving models with addition and subtraction material. This research was conducted in 4 schools namely 2 SD and 2 MI with each class opening 36 students. So the total number of students as a whole is 288 students. This study uses a type of comparative quantitative research. The sample in this study was 288 students from SD Negeri 001/I Pasar Muara Tembesi, SD Negeri 04/I Sungai Ruan Ilir, MIS Nurul Aufa and MIS Nurul Ihsan in Batanghari district. The sampling technique is purvosive sampling. Purposive sampling is a type of sampling in which a research more a less handpicks case. The reason for taking this technique is because not all samples have criteria that match the phenomenon being studied. The most important thing in sampling should consider the analysis of the sample. The sample taken is class VA and VB consisting of 288 students. The research samples used in this study are shown in Table 1.

**Table. 1** Research Sample

| SD Negeri 001/I Pasar Muara Tembesi | | SD Negeri 04/I Sungai Ruan Ilir | | MIS Nurul Aufa | | MIS Nurul Ihsan | |
|---|---|---|---|---|---|---|---|
| **V A** | **V B** | **V A** | **V B** | **V A** | **V B** | **V A** | **V B** |
| 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |

There are 2 instruments in this study, namely Process Skills and Problem Solving Learning models. There are 47 items of process skills questions that use a Likert scale of 4 and 26 items of questions in the problem solving learning model that uses a Likert scale of 5. The scale consists of 5 points for the learning model with 1 (very bad), 2 (not good), 3 (Good enough), 4 (good), 5 (very good), while 4 points for process skills with 1 (very bad), 2 (not good), 3 (good), and 4 (very good). Each statement is representative of each indicator of process skills and learning models. The focus of this research is on 3 dimensions of science process skills, namely observation, classification and measurement. Then the indicators used to measure the Problem Solving model are enthusiasm in participating in learning, use of media, interest in learning science and easy understanding of the concepts and importance of science. For the questionnaire grid for this research, it can be seen in Table 2 and Table 3. The description of the questionnaire instrument for student process skills on the addition and subtraction of fractions is shown in Table 2.

**Table 2.** Grid of Students' Science Process Skills Questionnaire on the Material of Addition and Subtraction of Fractions

| Variable | Indicator | Statement Item Number |
|---|---|---|
| Science process skills with addition and subtraction of fractions | Observation<br>Measure<br>classification | 1,2,3<br>13,14,15<br>8,9,10,11,12 |
| **Number of Statements** | | **10** |

The description of the questionnaire instrument for the Problem Solving model with the material for addition and subtraction of fractions is shown in Table 3.

**Table 3**. Grid of the Problem Solving Model Questionnaire on the Addition and Subtraction of Fractions

| Variable | Indicator | Statement Item Number |
|---|---|---|
| Problem solving model for addition and subtraction of fractions | enthusiasm for learning<br>Media use<br>interest in learning mathematics<br>easy to understand the concept and importance of mathematics | 1,2,3,4,5,6<br>7,8,9,10,11,12,13<br>14,15,16,17,18,19,20<br>21,22,23,24,25,26 |
| **Number of Statements** | | **26** |

In this study using quantitative data analysis with the help of SPSS statistics 25, to look for descriptive statistics and inferential statistics. Descriptive statistics discuss ways of collecting, summarizing, presenting data so that information is easier to understand, information that can be obtained with descriptive statistics includes data concentration (mean, median, mode), data distribution (range, average deviation), mean (variance and standard deviation), the tendency of a data set, the size of the location (quartiles, deciles and percentiles) (Muchson, 2017). Inferential statistics are statistics relating to how to draw conclusions based on data obtained from samples to describe the characteristics or characteristics of a population. In this study, before testing the hypothesis, the assumptions were tested first. The assumption tests carried out in this study were the normality test and linearity test. The data is said to be normal if the value of Sig. > 0.05 and the data is said to be linear if the value of Sig < 0.05. Furthermore, after testing the assumptions, it is possible to test the hypothesis, namely the T test and correlation test. The T test is a test conducted to analyze the difference between two unpaired samples while the correlation test is carried out to find out the relationship between 2 variables. The data is said to have a difference if the value of sig. < 0.05 while the data is said to be related if the value of sig. < 0.05.

In data collection, the first activity that must be carried out is to select students based on the categories given by the researcher, then provide a questionnaire on students' process skills in mathematics subjects with addition and subtraction of fractions, and student interest questionnaires in mathematics subjects with flat-sided geometry material. Then the questionnaire data was processed using the SPSS

application. The use of the SPSS application functions to view descriptive statistics, in the form of mean, min, max, percentage, and student categories (Pramesti, 2018; Santoso, 2019; Wahyuni, 2020). The data needed in research can be collected or obtained from various data sources. The procedures for collecting data in this study are show in Figure 1.

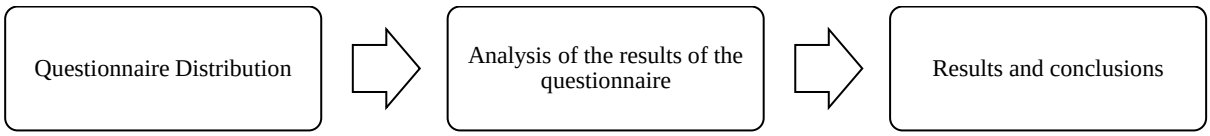


**Figure 1.** Research Procedure

## 3. RESULT AND DISCUSSION

### Result

The test results from descriptive statistics of students' process skills on mathematics subjects with the addition and subtraction of fractions on the observation indicators can be seen in Table 4.

**Table 4.** Description of Student Process Skills on Mathematics Subjects with Addition and Subtraction of Fractions on Observation Indicators

| Student Response | Interval | F | Percentage | category | Mean | Median | Min | Max |
|---|---|---|---|---|---|---|---|---|
| **SD Negeri 001/I Pasar Muara Tembesi** | 3.00 -5.25 | 13 | 18.1% | Not very good | 2.6667 | 3 | 1 | 4 |
| | 5.26-7.50 | 18 | 25.0% | Not good | | | | |
| | 7.51-9.75 | 21 | 29.2% | Good | | | | |
| | 9.76 -12.00 | 20 | 27.8% | Very good | | | | |
| **SD Negeri 04/I Sungai Ruan Ilir** | 3.00 -5.25 | 13 | 18.1% | Not very good | 2.6667 | 3 | 1 | 4 |
| | 5.26-7.50 | 18 | 25.0% | Not good | | | | |
| | 7.51-9.75 | 21 | 29.2% | Good | | | | |
| | 9.76 -12.00 | 20 | 27.8% | Very good | | | | |
| **MIS Nurul Ihsan** | 3.00 -5.25 | 13 | 18.1% | Not very good | 2.6667 | 3 | 1 | 4 |
| | 5.26-7.50 | 18 | 25.0% | Not good | | | | |
| | 7.51-9.75 | 21 | 29.2% | Good | | | | |
| | 9.76 -12.00 | 20 | 27.8% | Very good | | | | |
| **MIS Darul aufa** | 3.00 -5.25 | 13 | 18.1% | Not very good | 2.6667 | 3 | 1 | 4 |
| | 5.26-7.50 | 18 | 25.0% | Not good | | | | |
| | 7.51-9.75 | 21 | 29.2% | Good | | | | |
| | 9.76 -12.00 | 20 | 27.8% | Very good | | | | |

Based on Table 4, the process skills of students at SDN 001/I Pasar Muara Tembesi are more dominant in the good category with a percentage of 29.2%. The process skills of students at SDN 04/I Sungai Ruan Ilir are more dominant in the good category with a percentage of 29.2%. The process skills of students at MIS Nurul Ihsan are more dominant in the good category with a percentage of 29.2%. The process skills of Darul Aufa MIS students are more dominant in the good category with a percentage of 29.2%. The results of the descriptive statistics of students' process skills on mathematics subjects with addition and subtraction material on classification indicators can be seen in Table 5.

**Table 5.** Description of Student Process Skills on Mathematics Subjects with Addition and Subtraction of Fractions on Classification Indicators

| Student Response | Interval | F | Percentage | Category | Mean | Median | Min | Max |
|---|---|---|---|---|---|---|---|---|
| **SD Negeri 001/I Pasar Muara Tembesi** | 5.00-8.75 | 5 | 6.9% | Not very good | 2.7778 | 3 | 1 | 4 |
| | 8.76-12.50 | 17 | 23.6% | Not good | | | | |
| | 12.51-16.25 | 39 | 54.2% | Good | | | | |
| | 16.26-20.00 | 11 | 15.3% | Very good | | | | |
| | 5.00-8.75 | 4 | 5.6% | Not very good | 2.7917 | 3 | 1 | 4 |

| Student Response | Interval | F | Percentage | Category | Mean | Median | Min | Max |
|---|---|---|---|---|---|---|---|---|
| SD Negeri 04/I Sungai Ruan Ilir | 8.76-12.50 | 17 | 23.6% | Not good | | | | |
| | 12.51-16.25 | 41 | 56.9% | Good | | | | |
| | 16.26-20.00 | 10 | 13.9% | Very good | | | | |
| | 5.00-8.75 | 6 | 8.3% | Not very good | | | | |
| MIS Nurul Ihsan | 8.76-12.50 | 19 | 26.4% | Not good | 2.6944 | 3 | 1 | 4 |
| | 12.51-16.25 | 38 | 52.8% | Good | | | | |
| | 16.26-20.00 | 9 | 12.5% | Very good | | | | |
| | 5.00-8.75 | 4 | 5.6% | Not very good | | | | |
| MIS Darul aufa | 8.76-12.50 | 18 | 25.0% | Not good | 2.7500 | 3 | 1 | 4 |
| | 12.51-16.25 | 42 | 58.3% | Good | | | | |
| | 16.26-20.00 | 8 | 11.1% | Very good | | | | |

Based on Table 5, the process skills of students at SDN 001/I Pasar Muara Tembesi are more dominant in the good category with a percentage of 54.2%. The process skills of students at SDN 04/I Sungai Ruan Ilir are more dominant in the good category with a percentage of 56.9%. The process skills of students at MIS Nurul Ihsan are more dominant in the good category with a percentage of 52.8%. The process skills of Darul Aufa MIS students are more dominant in the good category with a percentage of 58.3%. The test results from descriptive statistics of students' process skills on mathematics subjects with the addition and subtraction of fractions on measuring indicators can be seen in Table 6.

**Table 6.** Description of Student Process Skills on Mathematics Subjects with Addition and Subtraction of Fractions on Measuring Indicators

| Student Response | Interval | F | Percentage | category | Mean | Median | Min | Max |
|---|---|---|---|---|---|---|---|---|
| SD Negeri 001/I Pasar Muara Tembesi | 3.00 -5.25 | 13 | 18.1% | Not very good | | | | |
| | 5.26-7.50 | 18 | 25.0% | Not good | | | | |
| | 7.51-9.75 | 30 | 41.7% | Good | 2.5417 | 3 | 1 | 4 |
| | 9.76 -12.00 | 11 | 15.3% | Very good | | | | |
| SD Negeri 04/I Sungai Ruan Ilir | 3.00 -5.25 | 16 | 22.2% | Not very good | | | | |
| | 5.26-7.50 | 19 | 26.4% | Not good | 2.4722 | 3 | 1 | 4 |
| | 7.51-9.75 | 24 | 33.3% | Good | | | | |
| | 9.76 -12.00 | 13 | 18.1% | Very good | | | | |
| MIS Nurul Ihsan | 3.00 -5.25 | 11 | 15.3% | Not very good | | | | |
| | 5.26-7.50 | 23 | 31.9% | Not good | 2.5556 | 3 | 1 | 4 |
| | 7.51-9.75 | 25 | 34.7% | Good | | | | |
| | 9.76 -12.00 | 13 | 18.1% | Very good | | | | |
| MIS Darul aufa | 3.00 -5.25 | 15 | 20.8% | Not very good | | | | |
| | 5.26-7.50 | 20 | 27.8% | Not good | 2.4861 | 3 | 1 | 4 |
| | 7.51-9.75 | 24 | 33.3% | Good | | | | |
| | 9.76 -12.00 | 13 | 18.1% | Very good | | | | |

Based on Table 6, the process skills of students at SDN 001/I Pasar Muara Tembesi are more dominant in the good category with a percentage of 41.7%. Process skills of students at SDN 04/I Sungai Ruan Ilir are more dominant in the good category with a percentage of 33.3%. The process skills of students at MIS Nurul Ihsan are more dominant in the good category with a percentage of 34.7%. MIS Darul Aufa's process skills are more dominant in the good category with a percentage of 33.3%. The test results from the descriptive statistics of the problem solving learning model on mathematics subjects with the addition and subtraction of fractions can be seen in the Table 7.

**Table 7.** Description of the Problem Solving Learning Model for Mathematics Subjects with Addition and Subtraction of Fractions

| Student Response | Interval | F | Percentage | category | Mean | Median | Min | Max |
|---|---|---|---|---|---|---|---|---|
| **SD Negeri 001/I Pasar Muara Tembesi** | 26.0-46.8 | 0 | 0% | Not very good | 2.7500 | 3 | 2 | 4 |
| | 46.9-67.6 | 19 | 26.4% | Not good | | | | |
| | 67.7-88.4 | 52 | 72.2% | Good | | | | |
| | 88.5-109.2 | 1 | 1.4% | Very good | | | | |
| | 109.3-130 | 0 | 0% | Not very good | | | | |
| **SD Negeri 04/I Sungai Ruan Ilir** | 26.0-46.8 | 0 | 0% | Not good | 2.7500 | 3 | 2 | 4 |
| | 46.9-67.6 | 20 | 27.8% | Good | | | | |
| | 67.7-88.4 | 50 | 69.4% | Very good | | | | |
| | 88.5-109.2 | 2 | 2.8% | Not very good | | | | |
| | 109.3-130 | 0 | 0% | Not good | | | | |
| **MIS Nurul Ihsan** | 26.0-46.8 | 0 | 0% | Good | 2.8333 | 3 | 2 | 4 |
| | 46.9-67.6 | 14 | 19.4% | Very good | | | | |
| | 67.7-88.4 | 56 | 77.8% | Not very good | | | | |
| | 88.5-109.2 | 2 | 2.8% | Not good | | | | |
| | 109.3-130 | 0 | 0% | Good | | | | |
| **MIS Darul aufa** | 26.0-46.8 | 0 | 0% | Very good | 2.7917 | 3 | 2 | 4 |
| | 46.9-67.6 | 17 | 23.6% | Not very good | | | | |
| | 67.7-88.4 | 53 | 73.6% | Not good | | | | |
| | 88.5-109.2 | 2 | 2.8% | Good | | | | |
| | 109.3-130 | 0 | 0% | Very good | | | | |

Based on Table 7, the problem solving learning model for mathematics subjects at SDN 001/I Muara Tembesi Market is more dominant in the fairly good category with a percentage of 72.2%. The problem solving learning model for mathematics subjects at SDN 04/I Sungai Ruan Ilir is more dominant in the fairly good category with a percentage of 69.4%. The problem solving learning model for mathematics subjects at MIS Nurul Ihsan is more dominant in the good enough category with a percentage of 77.8%. The problem solving learning model for mathematics subjects at MIS Darul Aufa is more dominant in the good enough category with a percentage of 73.6%.

**Test assumptions**

The next test is the normality test. Normality test is used to determine whether the data that has been collected is normal or not. Data can be said to be normally distributed if the value of sig. > 0.05. The results of the normality test in this study are shown in the table. The description of the normality test of process skills and problem solving learning models for students in mathematics lessons with the addition and subtraction of fractions can be seen in Table 8.

**Table. 8** Description of the Normality Test of Process Skills and Student Problem Solving Learning Models on Mathematics Lessons with Addition and Subtraction of Fractions

| Variable | Schools | Sig. | Distribute |
|---|---|---|---|
| **Process skills** | SD Negeri 001/I Pasar Muara Tembesi | 0.200 | Normal |
| | SD Negeri 04/I Sungai Ruan Ilir | 0.200 | Normal |
| | MIS Nurul Ihsan | 0.200 | Normal |
| | MIS Darul aufa | 0.100 | Normal |
| **Problem solving** | SD Negeri 001/I Pasar Muara Tembesi | 0.200 | Normal |
| | SD Negeri 04/I Sungai Ruan Ilir | 0.200 | Normal |
| | MIS Nurul Ihsan | 0.200 | Normal |
| | MIS Darul aufa | 0.100 | Normal |

Based on the results of Table 8, it was obtained that the normality test with the Kolmogorov-Smoniv test had a significance value of > 0.05, so it can be concluded that the data is normally distributed. Furthermore, linearity test is a test used to determine whether the data used has a significant linear relationship or not. The data can be said to have a significant linear relationship if the value of sig. < 0.05. The description of the linearity test of process skills and problem solving learning models for mathematics lessons with addition and subtraction of fractions can be seen in Table 9

**Table. 9** Description of the Linearity Test of Process Skills and Problem Solving Learning Models on Mathematics Lessons with Addition and Subtraction of Fractions

| Variable | schools | Sig. | Distribute |
|---|---|---|---|
| **process skills * problem solving** | SD Negeri 001/I Pasar Muara Tembesi | 0,026 | linear |
| | SD Negeri 04/I Sungai Ruan Ilir | 0,044 | linear |
| | MIS Nurul Ihsan | 0,045 | linear |
| | MIS Darul aufa | 0,036 | linear |

Based on Table 9, the results of the linearity test were obtained with a significance value < 0.05, which means that there is a significant linear relationship between process skills and problem solving learning models on mathematics lessons on addition and subtraction of fractions in the four schools tested. The next step is to test the hypothesis by using the T test which aims to determine whether the independent variable has an effect on the dependent variable and the correlation test which aims to analyze the relationship between process skills and students' interest in mathematics. The results of the T-test of students' processing skills on mathematics subjects with the addition and subtraction of fractions can be seen in Table 10.

**Table 10.** Description of Student Process Skills T Test on Mathematics Subjects with Addition and Subtraction of Fractions

| Schools | Class | Sig.(2-tailed) |
|---|---|---|
| **SD Negeri 001/I Pasar Muara Tembesi** | V A<br>V B | 0.037 |
| **SD Negeri 04/I Sungai Ruan Ilir** | V A<br>V B | 0.035 |
| **MIS Nurul Ihsan** | V A<br>V B | 0.036 |
| **MIS Darul aufa** | V A<br>V B | 0.032 |

Based on Table 10, the results of the T test with a value of sig. (2-tailed) < 0.05, it can be concluded that there are differences in students' process skills in mathematics. The results of the T-test of the problem solving learning model of students on mathematics subjects with the addition and subtraction of fractions can be seen in Table 13.

**Table 11**. Description of the T-test of the student problem solving learning model on Mathematics Subjects with Addition and Subtraction of Fractions

| Schools | Class | Sig.(2-tailed) |
|---|---|---|
| **SD Negeri 001/I Pasar Muara Tembesi** | V A<br>V B | 0.034 |
| **SD Negeri 04/I Sungai Ruan Ilir** | V A<br>V B | 0.046 |
| **MIS Nurul Ihsan** | V A<br>V B | 0.032 |
| **MIS Darul aufa** | V A<br>V B | 0.043 |

Based on Table 11, the results of the T test with a value of sig. (2-tailed) < 0.05, it can be concluded that there is a difference in the results of the students' problem solving learning model responses to mathematics. The results of the correlation test between process skills and problem solving learning models to determine whether there is a relationship between the two can be seen in Table 12.

Based on Table 12, the results of the correlation test between process skills and problem solving learning models with a value of sig. (2-tailed) < 0.05, it can be concluded that there is a relationship between process skills and problem solving learning models on mathematics subjects.

**Table 12.** Description of the correlation test between process skills and problem solving learning models

| Schools | Variable | Pearson Correlation | Sig.(2-tailed) | N |
|---|---|---|---|---|
| **SD Negeri 001/I Pasar Muara Tembesi** | Process Skills Student responses to problem solving models | 0.636 | 0.046 | 72 |
| **SD Negeri 04/I Sungai Ruan Ilir** | Process Skills Student responses to problem solving models | 0.674 | 0.038 | 72 |
| **MIS Nurul Ihsan** | Process Skills Student responses to problem solving models | 0.646 | 0.022 | 72 |
| **MIS Darul aufa** | Process Skills Student responses to problem solving models | 0.651 | 0.041 | 72 |

**Discussion**

From the results of the test, students from the four schools that became the research sample had good observation skills. In the classification indicator, it was found that the process skills of students at SDN 001/I Pasar Muara Tembesi were more dominant in the good category with a percentage of 54.2%. Process skills of students at SDN 04/I Sungai Ruan Ilir are more dominant in the good category with a percentage of 56.9%. The process skills of students at MIS Nurul Ihsan are more dominant in the good category with a percentage of 52.8%. MIS Darul Aufa's process skills were more dominant in the good category with a percentage of 58.3%. From the test results, the students from the sample studied had good process skills in the classification category. In measuring indicators, it is found that the process skills of students at SDN 001/I Pasar Muara Tembesi are more dominant in the good category with a percentage of 41.7%. Process skills of students at SDN 04/I Sungai Ruan Ilir are more dominant in the good category with a percentage of 33.3%. The process skills of students at MIS Nurul Ihsan are more dominant in the good category with a percentage of 34.7%. MIS Darul Aufa's process skills are more dominant in the good category with a percentage of 33.3%. Likewise with the test results for the measuring category, students from the sample studied have good measuring skills in mathematics subjects with the addition and subtraction of fractions.

The test results from the descriptive statistics of the problem solving learning model for mathematics subjects with addition and subtraction of fractions, the results obtained in the form of a problem solving learning model for mathematics subjects at SDN 001/I Muara Tembesi Market is more dominant in the good enough category with a percentage of 72.2 %. The problem solving learning model for mathematics subjects at SDN 04/I Sungai Ruan Ilir is more dominant in the fairly good category with a percentage of 69.4%. The problem solving learning model for mathematics subjects at MIS Nurul Ihsan is more dominant in the good enough category with a percentage of 77.8%. The problem solving learning model for mathematics subjects at MIS Darul Aufa is more dominant in the good enough category with a percentage of 73.6%. The test results showed that students from the four schools that became the research sample had a fairly good response to the problem solving model, with a high presentation. This happens due to the enthusiastic attitude of each student to be able to develop their process skills, besides that the teachers also provide good encouragement so that students are enthusiastic in learning.

There are two assumptions test analysis used, namely normality test and linearity. The description of the Normality Test of Student Process Skills on Mathematics Lessons with the addition and Subtraction of Fractions material is obtained by the normality test with the Kolmogorov-Smoniv test with a significance value of > 0.05, it can be concluded that the data is normally distributed. As for the description of the linearity test of process skills and problem solving learning models for mathematics lessons with the addition and subtraction of fractions at SD Negeri 001/I Pasar Muara Tembesi, the results of the linearity test with a significance value > 0.05, which means there is a significant linear relationship between skills problem solving learning process and model for mathematics lessons on addition and subtraction of fractions at SD Negeri 001/I Pasar Muara Tembesi.

Next, test the hypothesis by using the T test and correlation test. The results of the T-test of students' processing skills on mathematics subjects with addition and subtraction of fractions, the results

of the T-test with a value of sig.(2-tailed) <0.05, it can be concluded that there are differences in students' process skills on mathematics subjects. While the results of the T test of the problem solving learning model of students on mathematics subjects with the addition and subtraction of fractions material, the results of the T test with a value of sig. (2-tailed) < 0.05, it can be concluded that there are differences in students' processing skills on mathematics subjects. The differences that occur are caused by the different backgrounds of each school and from each student, but the differences that exist show the diversity of process skills possessed by students. For the results of the correlation test between process skills and problem solving learning models, the results of the correlation test between process skills and problem solving models with a value of sig. (2-tailed) < 0.05, it can be concluded that there is a relationship between process skills and problem learning models. solving of mathematics subjects. The relationship in question is that the learning response with the problem solving model improves students' process skills, this can be seen by the enthusiasm that arises from students to be able to solve existing problems. Here the role of a teacher as a teacher is also needed and affects the enthusiasm and success of students in developing their process skills.

In previous studies, research on problem solving has been carried out with the aim of producing a new mathematics learning model (Suastika, 2017). This research produces an open problem solving mathematics learning model that can be developed with student creativity. In a similar study conducted by previous researcher that aimed to produce a learning model (Nurdyansyah et al., 2017). From this research, the object of research is problem solving, but it has not been linked or linked to other variables. Therefore, the authors conducted a similar study by connecting with other variables, namely between problem solving learning models and process skills in learning mathematics.

Process skills are not only in the form of concepts and memorization but are also related to physical and mental skills that produce a product in the form of attitudes and processes (Fitriana et al., 2019; Gustiana et al., 2019; Siswono, 2017). In process skills, it is also discussed about science that demands to think critically and systematically with literacy which is considered important (Fauzan et al., 2017; Mutakinati et al., 2018; Pahrudin et al., 2019). In addition to literacy, critical thinking skills also need to be developed because it will affect science and care for the environment (Fattah, 2019; Sulistyono & Dwikurnaningsih, 2020; Wilson et al., 2020). To improve process skills, it takes a strong will and intention, this can be done by learning mathematics on the material of addition and subtraction of fractions. There are many teaching materials taught in mathematics learning, one of which is addition and subtraction of fractions. Fractions include elementary school learning materials that are considered difficult and solutions must be found (Amir & Wardana, 2017; Suryowati, 2015). In addition to being considered difficult, fractions are also considered a center in the field of mathematics that studies numbers (Luh & Nuraini, 2016; Nasution et al., 2018; Rosli et al., 2020). In addition, fractions are considered important because they are used to improve mathematics learning and application in everyday life (Aminah & Kurniawati, 2018; Rasyid et al., 2017; Widiastuti et al., 2018).

The author realizes that this research has weaknesses and limitations. This happens because in this study still using a limited sample, namely . SD Negeri 001/I Pasar Muara Tembesi, SD Negeri 04/I Sungai Ruan Ilir, MIS Nurul Ihsan, and MIS Darul Aufa. So the results obtained may make a difference if done on other samples. The data collection method used in this study only used observation sheets which were distributed and then filled in by the research sample. The variables studied in this study were only process skills and problem solving models for mathematics subjects. With the limitations of the variables studied, the writer hopes that there will be research with other variables and using a more varied learning model.

## 4. CONCLUSION

Based on the test results along with data analysis that has been carried out by the researcher, this study can find that the results of the skills test show that there are differences in students' skills in mathematics subjects in terms of material and subtraction. Likewise with model T problem solving, it can be said that there are differences from the student problem solving learning model on mathematics and mathematics subjects. As for the results of the correlation test between process skills and problem solving learning models, it can be said that there is a relationship between process skills and problem solving learning models on mathematics subjects in addition and subtraction material.

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