

## **PROFILE OF STUDENTS' CONCEPTIVE UNDERSTANDING IN FRACTIONS AT SMP MUHAMMADIYAH BANDA ACEH**

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### **Abstract**

Students find mathematics boring to study because it is thought to be difficult for them to understand, particularly when it comes to arithmetic operations, symbols, and a variety of abstract formulas. The challenge in working with fractions is equal the denominator throughout addition and subtraction operations. This study's goal was to identify the types and causes of student difficulty in the content for fractional arithmetic operations. Descriptive research is used in this study. All class VII students make up the population, and there were a total of 17 participants sampled. a tool with an interview guide and written test. Six students were chosen for interviews based on the test results that have been examined. The results showed that the students' level of difficulty was 29.41 percent, moderate difficulty was 5.88 percent, high difficulty was 41.18 percent, and very high difficulty was 23.53 percent. The types of difficulties experienced by students in using concepts and principles ranged from 26.47 percent to 64.71 percent, and difficulties in using verbal were as high as 14.71 percent. It was determined that children were still having trouble grasping the idea of fractions.

**Keywords:** Mathematical aptitude, comprehension of mathematical concepts, and fractional understanding

## INTRODUCTION

Mathematics is one of the subjects in schools, from kindergarten to university. School mathematics are elements or parts of mathematics that are selected based on or oriented towards the interests of science and technology education and development.<sup>1</sup> Mastery of mathematics in mathematics will make an important contribution to the achievement of educational goals in general, namely through the formation of humans who are able to think logically, systematically and carefully as well as be objective and open in dealing with various problems. According to Russeffendi that mathematics is a pattern of thinking, a pattern of organizing logical proofs, knowledge of an organized structure containing properties, theories made deductively based on elements that are not defined, axioms, properties or theories that have been proven true.<sup>2</sup>

Mathematics as a universal science that underlies modern science, has an important role in developing human thinking power. Therefore mathematics is needed both for everyday life and in the face of advances in technological science. So that mathematics needs to be provided to students from an early age. Mathematics apart from being a field of knowledge in the world of education is also a very important field of study, both for students and for the development of other scientific fields. The position of mathematics in the world of education is very beneficial because mathematics is a tool in educational development and intellectual intelligence.

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<sup>1</sup>Soejadi, *Kiat Pendidikan Matematika di Indonesia* (Jakarta, Departemen Pendidikan Nasional. 2000). Hal. 37

<sup>2</sup>Russeffendi, E.T, *Pengajaran Matematika Modern Untuk orang tua Murid Guru dan SPG. Seri ke-2*, (Bandung: Tarsindo, 1988), hal. 2.

An effective learning process and improve learning achievement. Adequate facilities such as a library with relevant books, laboratories with adequate equipment and funding, etc. can support the teaching and learning process. However, this does not guarantee that it can overcome various educational problems related to the teaching and learning process. Which is in accordance with the demands and expectations of the National Education System Law No. 20 of 2003, explaining that education is a conscious effort to prepare students through guidance, learning and training activities for their role in the future. Therefore, there is a need for commitment from both students, parents, teachers and the community in making the learning process a better one. Especially here the important role of parents and teachers is to always control, supervise, guide and direct students to concentrate in the world of education. Because without this commitment it is impossible for education to run for the better.

In learning activities at school, teachers are faced with a number of diverse student characteristics. There are students who can carry out their learning activities smoothly and successfully without experiencing difficulties, but on the other hand there are not a few students who actually experience various difficulties in learning. Learning difficulties because mathematics is considered difficult for students in arithmetic, especially in arithmetic operations, understanding of symbols, and a series of abstract formulas that make students feel bored and bored to learn and study mathematics. This is indicated by the existence of certain obstacles to achieving learning outcomes, so that in the end it can cause the learning outcomes achieved to be below what they should be.

Learning mathematics cannot be separated from mastering basic concepts because mastering these basic concepts will help us solve mathematical problems. Mathematics learning and education is emphasized on understanding concepts because students now not only know how to obtain them, but they want to know how answers can be obtained logically from certain known concepts. Many students cannot use mathematical concepts, as Soejono said that many students experience difficulties in using mathematical concepts.<sup>3</sup>

Apart from that, because mathematics is a high mental activity that must really be studied sequentially and gradually, a person will more easily master mathematics if he has understood the basic concepts. Because someone will more easily learn higher concepts if the basic concepts are well mastered. This is in accordance with what was stated by Hudoyo that learning concept B which is the basis of concept A, one needs to understand concept A, without understanding concept A it is impossible for that person to understand concept B.<sup>4</sup>

Students in learning mathematics have a special basis of difficulty. Soejono said that there are 3 (three) difficulties that are often faced by students, namely: 1) difficulties in using concepts, 2) learning difficulties in using principles and 3) difficulties in solving problems in verbal form.<sup>5</sup>

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<sup>3</sup>Soejono, Agoes. *Bimbingan ke Arah yang Sukses*, Jakarta: Aksara Baru, 1984, Hal. 45

<sup>4</sup>Hudoyo, Herman. *Pengembangan Kurikulum dan Pembelajaran Matematika*, (Malang: Penerbit Universitas Negeri Malang, 2005), Hal. 4

<sup>5</sup>Soejono, *Diagnosis Kesulitan Belajar dan Pengajaran Remedial Matematika*, (Jakarta: PPLPTJ, 1984), hal. 4.

Observing the opinion of Soejono above, it can be said that difficulties in mathematics are in the form of difficulties in using principles and difficulties in solving verbal problems. Difficulty in using the concept means that students forget the abbreviation or technical name of an object. For example, students forget about the concept of addition and subtraction. Another difficulty in learning mathematics is the difficulty in learning to use principles. This means that students do not have concepts that can be used to develop principles as new knowledge and students cannot use principles because they lack clarity about these principles. We can pay attention to this when a student is given a test with an analysis level, if the student has the basic concept then the student will more easily solve it by using the principles he has from the concept. Conversely, if students do not have a strong basic concept, it will be difficult for students to develop the principles of the concept, and result in these students being unable to complete the tests given.

One of the obstacles or difficulties currently experienced by students is on fractional operations such as addition, subtraction, multiplication and division which are learned at the high school level<sup>6</sup>. Based on several research results including Gustiani<sup>7</sup> and Pujiati<sup>8</sup> that there are obstacles in mastering mathematical material such

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<sup>6</sup> Firdausi, I., dan Suparni, S. Game Edukasi Android Deck Card untuk Memfasilitasi Pemahaman Konsep Siswa Materi Pecahan. *Mosharafa: Jurnal Pendidikan Matematika*, 11(3), 2022, hal. 447-458

<sup>7</sup> Gustiani, D. D., dan Puspitasari, N. Kesalahan Siswa dalam Menyelesaikan Soal Matematika Materi Operasi Pecahan Kelas VII di Desa Karang Sari. *Plusminus: Jurnal Pendidikan Matematika*, 1(3), 2021, hal. 435-444.

<sup>8</sup> Pujiati, P., Kanzunudin, M., & Wanabuliandari, S. Analisis pemahaman konsep Matematis Siswa kelas IV SDN 3 Gemulung pada Materi Pecahan. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, 1(1), 2018, hal. 37-41.

as addition, subtraction in the form of fractions, where students in addition operations are still difficult when equating the denominator. Thus students will experience difficulties in solving questions on other subjects. Some of the students' difficulties in solving fractional problems are supported by the results of research from Siti Wahyuningsih<sup>9</sup>, Nadia Ulfa<sup>10</sup>, Yerrina Swaratifani<sup>11</sup> and Ules Sumule<sup>12</sup> that there are problems understanding the concept of fractional operations by students and this needs further attention.

Based on the results of preliminary research conducted with mathematics teachers at SMP Muhammadiyah Banda Aceh, it was found that many student learning outcomes were low in fractional material with a value of 50, and did not meet the specified KKM, namely  $\geq 60$ . This was due to the level of students' understanding in understanding very low math lessons. Understanding difficulties that often arise for students in learning fraction material are difficulties in equalizing denominators, in subtraction, addition operations.

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<sup>9</sup> Siti Wahyuningsih dan Afit Istiandaru, Kesulitan Belajar Siswa untuk Materi Pecahan di Kelas VII SMP Muhammadiyah 2 Gamping, *Journal of Mathematics and Mathematics Education*, 3(2), 2021, hal. 99-106.

<sup>10</sup> Nadia Ulfa, al Jupri dan Turmudi, Analisis Hambatan Belajar pada Materi Pecahan, *Research and Development Journal Of Education*, 7(2), 2021, hal. 226-236.

<sup>11</sup> Yerrina Swaratifani dan Budiharti, Analisis Faktor Kesulitan Belajar Matematika Materi Operasi Hitung Pecahan Kelas V SD Mutiara Persada, *Lucerna: Jurnal Riset Pendidikan dan Pembelajaran*, 1(1), 2021, hal. 14-19.

<sup>12</sup> Ules Sumule, Peningkatan Hasil Belajar Pecahan Senilai Siswa Menggunakan Permainan Domino Pecahan Kelas VII SMPN 4 Kaubun, *Laplace: Jurnal Pendidikan Matematika*, 4(2), 2021, hal. 201-210.

Based on the background of the problem, the purpose of this study was to describe the level of difficulty, the type of difficulty, and the causes of difficulties experienced by students in the material for fractional operations. The benefits of this research are expected to provide material for teachers to think about students' difficulties in learning the concept of fractions and its operations in class VII SMP.

## **RESEARCH METHODS**

This research is a qualitative research with a descriptive research type. The use of qualitative methodology as a research procedure that produces descriptive data in the form of written or spoken words from people and observable behavior, this approach is directed at specific backgrounds and individuals in a holistic (whole) manner.<sup>13</sup> Based on this, the data is used to look for types and causes and difficulties experienced by students in understanding the concept of fractional operations.

The research subjects in this study were all 17 (seventeen) grade VII students of SMP Muhammadiyah Banda Aceh for the 2020/2021 academic year. Some or representatives of the data sources studied are called samples.<sup>14</sup> Researchers took samples using the total sampling technique. Because the population is less than 100, all subjects in the population are used as research samples. According to Sukardi, total sampling is all members of the population used as research samples.<sup>15</sup>

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<sup>13</sup>*Metodologi Penelitian Pendidikan: Kompetensi dan Praktiknya*, (Jakarta: Bumi Aksara, 2014), hal. 56.

<sup>14</sup> *Ibid*, hal. 55.

<sup>15</sup> *Ibid*, hal. 58.

The data collection instrument used in this study was a material test on fractional arithmetic operations in the form of an essay consisting of 5 (five) questions with different weights, the questions were worked on for 1 lesson hour (1 x 40 minutes). Furthermore, the researcher conducted interviews with 6 (six) students so that verbal communication dialogs occurred in the form of conversations aimed at obtaining further information.<sup>16</sup>

The data analysis stage is the most decisive step in a study because data analysis serves to conclude research results. Data processing used through the tests that have been collected will be processed using percentages and formulated by Sudjana.<sup>17</sup> The guideline for assessing the level of difficulty of students is based on the opinion of Sutrisno Hadi with the provisions being: 1) 0% - 19% = Very little; 2) 20% - 29% = A fraction; 3) 40% - 49% = Less than half; 4) 50% - 69% = more than half; 5) 70% - 79% = Most; and 6) 80% - 100% = In general.

Nevertheless the criteria are categorized as follows:

Table 1. Criteria for Student Learning Difficulty Level

Range	Category
0% - 39%	low
40% - 59%	medium
60% - 75%	high
80% - 100%	very high

To determine the type of difficulty of a test, a formula can be used:

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<sup>16</sup> S. Nasution, *Metodelogi Research*, (Bandung: Jammars, 2011), hal. 113.

<sup>17</sup> Sudjana, *Metode Statistik*, (Bandung: Tarsito, 2010), hal. 8



$P = \frac{x}{n} \times 100\%$  provided that P is the difficulty index and B is the number of students who answered the question correctly and n is the total number of students taking the test.

The types of difficulties in understanding fractional arithmetic operations are classified into concept, principle and operational arithmetic operations difficulties based on criteria set by Soejono. The first is the difficulty in understanding the concept of fractional arithmetic operations, with the indicators being a) students forget the abbreviation/technical name of an object; b) inability to remember one or more sufficient terms and so on. Second, the difficulties in understanding the principle of calculating fractions with indicators are a) students do not have concepts that can be used to develop principles as new knowledge items; b) students cannot use the principle because of a lack of clarity about the principle and so on. Third, is the difficulty in understanding the operational operations of calculating fractions, with indicators that difficulties in solving verbal questions occur when students cannot translate word problems into mathematical language, in the form of illustrated pictures, symbols, graphs and tables.<sup>18</sup>

To find out the causes of students' difficulties in solving fractional arithmetic operations questions, the author will choose to answer fractional questions to be interviewed with the hope that after conducting the interview, he will be able to find the causes of students' difficulties in solving fractional arithmetic operations questions.

## **DISCUSSION**

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<sup>18</sup>Soejono, *Diagnosis Kesulitan Belajar dan Pengajaran Remedial Matematika*, (Jakarta: PPLPTJ, 1984), hal. 4.

Based on the test results that have been carried out by students, it can be seen the difficulties faced by these students in working on fractional arithmetic operations questions, can be seen in table 2 below.

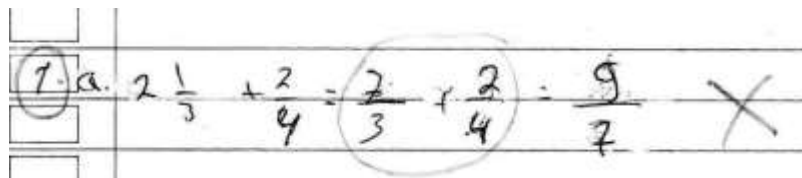
Table 2 Distribution of the Average Percentage of Difficulty Levels for Grade VII Students

Range	Category	Frequency	Percentage
0% - 39%	low	5	29,41%
40% - 59%	medium	1	5,88%
60% - 75%	high	7	41,18%
80% - 100%	very high	4	23,53%
Average			25%

From Table 2 above it can be seen that the percentage of the average score is 25%. If the score is expressed in the form of a percentage, the following data is obtained. Poor category with a frequency of 5 obtained a percentage of 29.41%, medium category with a frequency of 1 obtained a percentage of 5.88%, high category with a frequency of 7 obtained a percentage of 41.18%, high category, with a frequency of 7 obtained a percentage of 41.18% and category very high with a frequency of 4 obtained a percentage of 23.53%. This shows that there are still many students who have difficulty in answering the questions that the author gives.

After knowing the difficulties experienced by students as seen in the table of the types of difficulties experienced by students, then the causes of student difficulties were analyzed. To find out the causes of the difficulties experienced by students in solving fractional operations questions, an analysis of test results and interviews was carried out with several students. The following shows the results of the tests and interview excerpts. Then the results of the tests and interviews were analyzed with

several students. The following are the results of the tests and interview excerpts. The 6 (six) interviewees have different ranges. There are 2 (two) with a value range of 5-10; 2 (two) people with a score range of 15-30; and 2 (two) people with a score range of 35-50. One of the descriptions of the results of interviews with students who have difficulty using the concept on the 10th subject for question number 1, is presented as follows.



Handwritten student work for a fraction addition problem. The student has written:  $7. a. 2 \frac{1}{3} + \frac{2}{4} = 2 \frac{2}{3} + \frac{2}{4} = \frac{9}{7}$ . A large 'X' is drawn over the final result. The numbers 2, 2, and 9 are circled in the student's work.

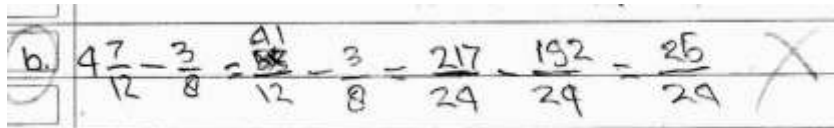
Alternative correct answer

1. a.  $2 \frac{1}{3} + \frac{2}{4} = 2 \frac{4}{12} + \frac{6}{12} = 2 \frac{10}{12} = 2 \frac{5}{6}$

The description of the results of the interview is presented below.

- P = try to pay attention and read the questions?  
S = (read questions)  
P = Do you understand what fraction means?  
S = yes understand sir  
P = you understand how to calculate the addition and subtraction of fractions?  
S = don't understand sir  
P = how do you add or subtract the fractions?  
S = just add it right away sir  
P = are you sure that's the way  
S = I'm sure  
P = is there any other way?  
S = No  
P = Do you always study math/fractions at school?  
S = yes  
P = Can you understand what the material has been taught by the teacher at school?  
S = don't understand sir

From tests and interviews, it was obtained that student data with the 10th sample did not understand the concept of fractions as seen from the inability of students to perform operations on adding fractions, besides that, students' difficulties were also caused by students not being serious in learning and students not paying attention when the teacher explained so that students had difficulty solve the problem with the correct concept. Furthermore, one of the descriptions of the results of interviews with students who have difficulty using principles on subject 1 for question number 1b, is presented as follows.



b.  $4\frac{7}{12} - \frac{3}{8} = \frac{41}{12} - \frac{3}{8} = \frac{217}{24} - \frac{9}{24} = \frac{208}{24}$  X

The correct alternative answer is  $4\frac{7}{12} - \frac{3}{8} = 4\frac{14}{24} - \frac{9}{24} = 4\frac{5}{24}$

The description of the results of the interview is presented below

- P = try to pay attention and read the questions?  
S = (read questions)  
P = Do you understand what is meant by fraction?  
S = No, Sir  
P = you understand how to calculate the addition and subtraction of a Fractions?  
S = understand a bit sir  
P = what fraction is this?  
S = mixed and common fractions  
P = Do you know how to operate mixed fractions?  
S = Yes, I know, sir, first change it to an ordinary fraction  
P = are you sure like that?  
S = Yes, I'm sure Sir  
P = is there any other way?  
S = I don't know sir  
P = Do you always study math/fractions at school?

S = yes

P = Has this material been taught by the teacher at school and can you understand it?

S = I don't understand sir

From the results of the above tests and interviews, it was found that students with the subject still had difficulty solving mixed and common fractions with different denominators. This is due to a lack of understanding of the basic concept of reducing fractions so that when solving the whole problem correctly.

Then, one of descriptions of the results of interviews with students who experience difficulties in verbal form on the 6<sup>th</sup> subject for question number 4, is presented as follows.

4-  $1 - \frac{1}{4} - \frac{1}{3} = \frac{97}{12} - \frac{35}{12} = \frac{12}{12} = 1$  X

Alternative correct answer

Total work is 1 part of the remaining part of the work that Tomi does at night, namely

$$1 - \frac{1}{4} - \frac{1}{3} = \frac{12}{12} - \frac{3}{12} - \frac{4}{12} = \frac{5}{12}$$

The description of the results of the interview is presented below

P = try to pay attention and read the questions!

S = (students read the questions)

P = Do you understand what is meant by fraction??

S = understand

P = You understand how to calculate the subtraction of a fraction?

S = equal to the denominator then add to the numerator.

P = how did you subtracted the problem?

S = the numerator is reduced

P = are you sure like that way?

S = Yes, I'm sure

P = is there any other way?

- S = No  
P = do you always study math/fractions at school??  
S = yes  
P = Has the material been taught by the teacher at school, can you understand?  
S = I understand, sir, but I forgot a little, sir.

From the test and interview results it can be seen that the 6th subject experienced verbal difficulties, where the student did not understand what was read so that students had difficulty in determining the appropriate arithmetic operations used to solve fraction story problems. In addition, students also have not mastered the concept of addition and subtraction of fractions. Maybe students have not been able to understand the basic concept of fractions, so students find it difficult to live up to the problem for the reason that it is quite complicated to solve. So learning difficulties are a situation where students or students cannot learn as they should.<sup>19</sup>

Based on the results of tests and interviews with students, it can be seen that students' difficulties were caused by students who lacked ability in mastering concepts, principles and in verbal form regarding fractional material. Based on the results of the study, the percentage of students with less difficulty was only 5 people (29.41%), medium difficulty was only 1 person (5.88%), high difficulty was only 7 people (41.18%) and very high difficulty was 4 people (23.53%). Based on the type of difficulty, students experienced conceptual difficulties as much as 30.39% due to low understanding of the basic concepts of fractions and lack of attention and seriousness during the learning process. Furthermore, students experienced principle difficulties of

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<sup>19</sup>Ahmadi AW Supriyono, *Psikologi Belajar*, (Jakarta: PT. Rineka Cipta, 2003), hal. 77.

17.76% due to students' lack of understanding of the combination of basic fraction concepts that were low in solving problems. And students experiencing verbal difficulties as much as 17.65% are caused by students not understanding questions and students' lack of knowledge about concepts, besides that students are also less able to analyze story problems turning them into appropriate mathematical methods. This is consistent and relevant to the research results of I Md Suarjana, Desak Putu Parmiti, and Pt Elma Arry Safitri<sup>20</sup> and research from Malikha<sup>21</sup> which shows that students experience many difficulties in principle compared to conceptual difficulties and in verbal form.

## CONCLUSION

Based on the results of the study, it can be concluded that the level of difficulty experienced by students is less difficulty at 29.41%, medium difficulty at 5.88%, high difficulty at 41.18%, very high difficulty at 23.53%; 2). The difficulties experienced by SMP Muhammadiyah Banda Aceh students are difficulties in using principles and difficulties in solving verbal questions, namely; students' learning difficulties in using classical concepts of 30.39%; students' learning difficulties in using classical principles of 11.76%; students' learning difficulties in solving verbal questions in a classical form

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<sup>20</sup> I Md Suarjana, Desak Putu Parmiti, dan Pt Elma Arry Safitri, Identifikasi, Analisis Kesulitan Siswa dalam Menyelesaikan Operasi Hitung Pecahan Siswa Sekolah Dasar, *International Journal of Elementary Education*, 2(2), 2018, hal. 144-155

<sup>21</sup> Malikha, Z., & Amir, M. F. Analisis Miskonsepsi Siswa Kelas VB MIN Buduran Sidoarjo pada Materi Pecahan Ditinjau dari Kemampuan Matematika. *Pi: Mathematics Education Journal*, 1(2), 2018, hal. 75-81

of 17.65%. Of these difficulties, more dominant difficulties in using concepts compared to principles and solving verbal questions.

Furthermore, the causes of student difficulties experienced by SMP Muhammadiyah Banda Aceh students in completing fractional arithmetic operations include: students experience difficulties so they are less interested in learning fractional material, so their learning outcomes are low, students' difficulties are also from parents who do not care so that it affects children themselves, students' difficulties in learning mathematics are caused because students do not understand in counting and recognize symbols, students do not understand mathematics so that students learn slowly, and students experience problems in their learning so that students are disturbed in the learning process.



## REFERENCE

- Arikunto, Suharsimi, *Prosedur Penelitian Suatu Pendekatan Praktek*, Jakarta: Rineka Cipta, 2012
- Firdausi, I., & Suparni, S.. Game Edukasi Android Deck Card untuk Memfasilitasi Pemahaman Konsep Siswa Materi Pecahan. *Mosharafa: Jurnal Pendidikan Matematika*, 11(3), 2022, hal. 447-458
- Gustiani, D. D., & Puspitasari, N. (2021). Kesalahan Siswa dalam Menyelesaikan Soal Matematika Materi Operasi Pecahan Kelas VII di Desa Karang Sari. *Plusminus: Jurnal Pendidikan Matematika*, 1(3), 435-444.
- Herman Hudoyo, *Pengembangan Kurikulum dan Pembelajaran Matematika*, Malang: Penerbit Universitas Negeri Malang, 2005.
- I Md Suarjana, Desak Putu Parmiti, dan Pt Elma Arry Safitri, Identifikasi, Analisis Kesulitan Siswa dalam Menyelesaikan Operasi Hitung Pecahan Siswa Sekolah Dasar, *International Journal of Elementary Education*, 2(2), 2018, hal. 144-155.
- Malikha, Z., & Amir, M. F. (2018). Analisis miskonsepsi siswa kelas vb min buduran sidoarjo pada materi pecahan ditinjau dari kemampuan matematika. *Pi: Mathematics Education Journal*, 1(2), 75-81.
- Nadia Ulfa, al Jupri dan Turmudi, Analisis Hambatan Belajar pada Materi Pecahan, *Research and Development Journal Of Education*, 7(2), 2021, hal. 226-236.
- Pujiati, P., Kanzunnudin, M., & Wanabuliandari, S. (2018). Analisis pemahaman konsep Matematis Siswa kelas IV SDN 3 Gemulung pada Materi Pecahan. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, 1(1), 37-41
- Russeffendi, E.T, *Pengajaran Matematika Modern Untuk orang tua Murid Guru dan SPG. Seri ke-2*, Bandung: Tarsindo, 1988
- S. Nasution, *Metodologi Research*, Bandung: Jammars, 2011.
- Soejadi, *Kiat Pendidikan Matematika di Indonesia*, Jakarta, Departemen Pendidikan Nasional. 2000.
- Soejono, Agoes. *Bimbingan Ke Arah yang Sukses*, Jakarta: Aksara Baru, 2004.

Soejono, *Diagnosis Kesulitan Belajar dan Pengajaran Remedial Matematika*, Jakarta: Dikti, 2000.

Siti Wahyuningsih dan Afit Istiandaru, Kesulitan Belajar Siswa untuk Materi Pecahan di Kelas VII SMP Muhammadiyah 2 Gamping, *Journal of Mathematics and Mathematics Education*, 3(2), 2021, hal. 99-106.

Sudjana, *Metode Statistik*, Bandung: Tarsito, 2010.

Sukardi, *Metodologi Penelitian Pendidikan: Kompetensi dan Praktiknya*, Jakarta: Bumi Aksara, 2014

Supriyono, Ahmadi AW, *Psikologi Belajar*, (Jakarta: PT. Rineka Cipta, 2003.

Ules Sumule, Peningkatan Hasil Belajar Pecahan Senilai Siswa Menggunakan Permainan Domino Pecahan Kelas VII SMPN 4 Kaubun, *Laplace: Jurnal Pendidikan Matematika*, 4(2), 2021, hal. 201-210.

Yerrina Swaratifani dan Budiharti, Analisis Faktor Kesulitan Belajar Matematika Materi Operasi Hitung Pecahan Kelas V SD Mutiara Persada, *Lucerna: Jurnal Riset Pendidikan dan Pembelajaran*, 1(1), 2021, hal. 14-19.