



# Difficulty Learning Mathematics Fraction Material at Elementary School

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**Abstract-** The research aims to determine the difficulty of learning mathematics in fraction material in class V of elementary school. This research is qualitative research with a case study type. Data was collected by conducting interviews and giving fraction test questions to students. The results of this research show that there are difficulties faced by students in working on the mathematics problems that have been given, namely (1) difficulty understanding the concept of fractions and difficulties; (2) difficulty in calculating; (3) students are still not careful in calculating. The factors that influence the occurrence of mathematics learning difficulties consist of internal factors, such as students' lack of motivation to learn mathematics, and external factors, namely the lack of teacher activity in learning. This can be a consideration for mathematics teachers to create more creative and fun learning in mathematics learning, especially in elementary school fraction material.

## 1. Introduction

One of the international scale test data aimed at observing improvements in mathematics and science learning is the Trends in International Mathematics and Science Study (TIMSS) data, which is carried out every four years. Based on TIMSS results in 2011, Indonesia's average mathematics achievement score was 38th out of 42 countries (M, 2012). Then, TIMSS survey data in 2015 stated that students' mathematics abilities in Indonesia have just obtained 397 points, below the TIMSS Scale Centerpoint standard, which is 500 points (Mullis & et al., 2020). This means that mathematics learning in Indonesia is still low.

The low results of mathematics learning are due to various problems. The problem in learning mathematics is that most students still think mathematics is complicated and tedious. As a result, most students hate mathematics lessons and even make mathematics a scourge that must be avoided. Besides, mathematics learning in the classroom is identical to learning directly centred on the teacher and only applying existing formulas, but students are not.

They are invited to understand the meaning of the mathematical problems (Muthma'innah, Analysis of

Students' Mastery of Mathematical Concepts, 2023). Suppose the student does not like mathematics lessons. In that case, it will cause anxiety, which will result in students having difficulty understanding mathematics material, and of course, this will impact the student's mathematics learning achievement. Several characteristics indicate these students have difficulty learning mathematics. Students who experience learning difficulties often make mistakes in counting, geometry, and solving word problems (Runtukahu, Tombokan, & Kandou, 2014). Researchers also found the characteristics and problems of mathematics learning difficulties in fifth-grade students at SDN 016 Sagulung Batam.

Every elementary school teacher, especially teachers who teach mathematics lessons, must be aware of the learning difficulties that students often experience in class. One of the difficulties students experience in mathematics lessons is with fractions. In this material, students experience difficulty in determining the KPK from different denominators. This also agrees with Sunariah's research: "Students have difficulty comparing fractions with different denominators, especially in determining the KPK value of the denominator of the fraction" (Sunariah & Rijal, 2017).

Based on the explanation above, researchers are interested in taking the title "Analysis of Mathematics Learning Difficulties in Fraction Material in Class V Elementary School." This research aims to analyze students' mathematics learning difficulties in fraction material in Class V Elementary School.

## 2. Methods

This research uses a qualitative approach with a case study type. In this research, one case of students' mathematics learning difficulties was taken, and the data obtained will later be described and analyzed using qualitative descriptions. Data collection for this research was carried out in June. This research was carried out in the V class of SDN 016 Sagulung Batam. The subjects of this research were representatives of class V students at SDN 016 Sagulung Batam who experienced difficulties in learning mathematics regarding fractions. The sampling technique used is purposive sampling, namely, taking samples with specific considerations.

The procedure in this research uses stages Miles and Huberman: (1) data collection, namely collecting data related to difficulties in learning mathematics regarding fractions; (2) reducing data, namely taking the data that is needed and discarding data that is not needed; (3) presenting data on difficulties in learning mathematics regarding fractions; (4) draw conclusions about the difficulty of learning mathematics about fractions (Milles & Huberman, 1992).

The data collection techniques that the researchers used were structured interviews and tests. This interview method is a dialogue carried out by the interviewer with students to obtain information about difficulties in learning mathematics, especially fractions, in class V students at SDN 016 Sagulung Batam. Before the interview, the researcher prepared an interview instrument called an interview guide. This guide contains several questions that respondents are asked to answer. While the test is used to determine students' understanding of fraction material, researchers want to know the extent of students' understanding of the material the teacher has explained.

The data analysis technique used uses the stages of analysis according to Miles and Huberman: data reduction, data presentation, and conclusion (Milles & Huberman, 1992). The data analyzed is related to the mathematics learning difficulties of Class V Elementary School students.

## 3. Results and Discussion

According to Rostina Sundayana, mathematics plays an essential role in education and supports the development of science and technology (Sundayana & Rostina, 2014).

According to Susanto, mathematics learning is a teaching and learning process designed by the teacher. Mathematics learning aims to develop students' creative thinking and improve their ability to construct new knowledge to improve mastery of mathematical material (Susanto, 2013). From the explanation above, in general, mathematics learning is an effort by teachers to enable students to build understanding to improve their abilities and mastery of mathematical material.

Learning difficulties are a condition where students are less successful in mastering concepts, principles, or problem-solving algorithms, even though they have tried to learn them (Mabrurroh et al., 2020). This learning difficulty is not only caused by students' low intelligence but can also be caused by non-intelligent factors (Abdurrahman & Mulyono, 2010).

There are several scopes of learning difficulties, including (Kusdaryani, Wiwik, & Trino, 2015):

1. Learning disorder is a condition where the learning process is disrupted due to the emergence of conflicting responses;
2. Learning disabilities (inability to learn) are students' inability or tendency to avoid the learning process, resulting in lower learning outcomes than their intellectual potential.
3. Learning dysfunction is a failure of the learning process to function correctly, even though there are no visible mental abnormalities, sensory disturbances, or other psychological disorders.
4. A slow learner (slow learner) is a condition where the learning process is slow and experienced by a student, resulting in the student needing more time than a group of students with the same intellectual abilities.

Learning difficulties are disorders of one or more basic psychological processes, including understanding or using spoken or written language. This disorder can include difficulties in listening, thinking, speaking, reading, writing, spelling, or arithmetic (Muthma'innah, Difficulty Learning Mathematics Material for Multiplication Counting Operations in Elementary School, 2023).

Based on the explanation above, it can be concluded that learning difficulties are disturbances or obstacles experienced by students in achieving optimal academic achievement caused by various factors. The following are the types of mathematics learning difficulties in elementary/MI students:

1. Students' basic mathematics skills are low, and there are errors in reading questions, understanding problems, transformations, and answering writing process skills.
2. Conceptual errors include determining theorems/formulas and not writing down theorems or formulas.
3. Procedural errors include the inability to correctly manipulate the steps in mathematics and use inferential reasoning.
4. Computational errors include manipulating operations, not rechecking the calculation results, or not being careful in calculating (Arifin, 2020).

The factors that cause learning difficulties experienced by students come from the students themselves, and some come from outside the students. The following are factors that cause learning difficulties, including:

1. The factors themselves: 1) The IQ level of each student is different; 2) Ability to follow lessons; 3) Frequent health problems; 4) Students' attitudes towards learning (Yeni & Mukhlesi, 2015).

2. Factors from the school environment

Learning difficulties originate not only from within the student but also from the school where the student receives formal education—for example, teacher variations in teaching. The proper learning method used by the teacher will make it easier for students to understand the material. Additionally, varied learning methods can reduce students' boredom levels in class. Slameto stated that poor teaching methods will affect student learning processes and outcomes (Slameto, 2010). For example, when students are selected to be tutors, peer tutoring will guide friends in their group. This will help overcome students' mathematics learning difficulties (Muthma'innah, What's about Peer Tutoring Learning Model?, 2017). Apart from methods, learning media is also needed, especially in mathematics learning. Teachers should use concrete media in learning so that students can understand the concepts being taught well.

3. Family factors

The family is the first centre of education for students. The main factor in student learning success is parental guidance and attention. As Ahmadi, Abu, and Supriyono stated, children who experience learning difficulties tend to lack parental supervision or guidance (Ahmadi, Abu, & Supriyono, 2013).

4. Factors from society

In general, children's learning progress will not be hindered by society. Society needs educated children to progress. The level of education of each child shows the level of progress and prosperity of the community (Yeni & Mukhlesi, 2015).

Ariyanto stated that a fraction is a number symbol that shows a partial sum of all numbers (Ariyanto, 2017). Fractions are part of rational numbers that are not whole numbers and can be expressed where  $a$  and  $b$  are an ordered pair of whole numbers with  $b \neq 0$ ;  $a$  is called the numerator, and  $b$  is the denominator.

The meaning of fractions in elementary school can be interpreted as dividing an object or set into several equal parts. For example, a mother who has just returned from the market brings three guavas of the same size while she has two children. The three guavas must be divided by 2 for the children to get equal shares. In this division, each child gets  $1\frac{1}{2}$  guavas.

Fraction operations in elementary school are as follows:

### 1. Addition and subtraction of fractions

Adding fractions can be divided into two: adding fractions with the same denominator and adding fractions with different denominators.

The addition of fractions with the same denominator is a new fraction number, with the numerator being the sum of the numerators of the two operating fractions and the denominator being the same as the denominator of the two operating fractions.

Symbolically stated:  $\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$

Based on these rules or formulas, the result of adding two numbers with unequal denominators can be determined using the following formula:  $\frac{a}{b} + \frac{c}{d} = \frac{ad+c}{bd}$

The above method is also used to calculate the subtraction of fractions with the same or different denominators. The only difference is the sign of the arithmetic operation, namely the subtraction arithmetic operation (Azkiyah, 2013).

### 2. Multiplication and Division of Fractions

Multiplication operations on fractions are performed by directly multiplying the numerator by the numerator and the denominator by the denominator. Symbolically expressed:  $\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d}$

Meanwhile, the formula for division operations on fractions is the inverse of multiplication. Symbolically stated (Azkiyah, 2013):

$$\frac{a}{b} : \frac{c}{d} = \frac{a \times d}{b \times c}$$

Below are questions that the author has created to interview sources according to the material to be researched:

1. Do you like mathematics?
2. Can you differentiate the numerator and denominator in fractions?
3. Have you been able to equate the denominators?
4. Can you add and subtract fractions?
5. Have you been able to change mixed fractions to improper fractions?
6. Has your teacher ever used learning media to teach mathematics? Like a prop?
7. Do you feel bored while learning?
8. Do you think fraction material is complex?
9. What do you do when you have difficulty working on a math problem?

The following are answers from the author's interview with one of the VA class students at SDN 016 Sagulung Batam:

1. I wouldn't say I like it, bro, I like PJOK Hehe
2. If that's easy, sis, the denominator is above, right, the numerator above the denominator is below sis.
3. Well, I don't care about that, bro, but it could be just a little, but if the number is small, I'm not sure.
4. If the denominators are the same, it's easy; if the denominators are different, it's difficult; I have a headache; it's complicated.
5. Sometimes you forget, bro; you have to look at your notes first
6. No, sis, our teacher only wrote on the blackboard, and then we were told to write in the notebook.
7. Yes, sis, I'm sleepy because we came in at noon, and MTK lessons are usually in the first period.
8. It isn't accessible if you don't look at your notes.
9. Ask your classmate, Sis, and then ask the teacher, too.

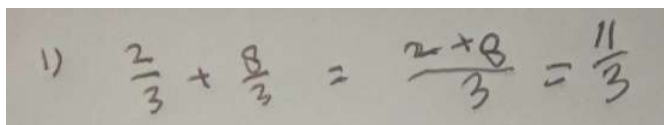
Based on the results of the fraction test questions that students have filled in, it can be found that there are several difficulties experienced by students in working on the mathematics problems they face, which will be discussed as follows:

#### Question 1

$$\frac{2}{3} + \frac{8}{3} = \dots$$

Correct answer  $\frac{2+8}{3} = \frac{10}{3}$

Student answers:



Handwritten student answer: 1)  $\frac{2}{3} + \frac{8}{3} = \frac{2+8}{3} = \frac{11}{3}$

Figure 1. Student answers to question No.1

In the first question in Figure 1, it can be seen that the student has done it correctly conceptually. In his interview, he said he could add fractions using the same denominator. This fraction problem is still

relatively easy because the denominators are the same, so students only need to add the numerators while the denominators are fixed. What Hanif (a 5th-grade student at SDN 016 Batam) did was correct, but he made a mistake in adding the numerators, which should have been ten, but he wrote with a result of 11. In this case, the difficulty experienced by the student was due to a deficiency in calculating. Students with a good understanding of mathematical concepts do not always have the same ability to calculate. Students' inaccuracy causes this in reading mathematical symbols or not being precise in operating numbers.

#### Question 2

$$\frac{3}{2} + \frac{1}{5} = \dots$$

Correct answer  $\frac{15}{10} + \frac{2}{10} = \frac{17}{10}$

Student answers:

2)  $\frac{3}{2} + \frac{1}{5} = \frac{3+1}{7} = \frac{4}{7}$

Figure 2. Student answers to question No.2

This second question can be seen in Figure 2. According to the interview results, he did not understand how to calculate fractions with different denominators. It can be seen from his answer that he could not equate the denominators by finding the LCM. Therefore, he faced difficulty understanding the concept because the student immediately added two fractions without making the same denominators. Students should equate the denominators first. So, students still have difficulty understanding the concept of adding fractions with different denominators.

#### Question 3

$$\frac{1}{2} : \frac{1}{7} = \dots$$

Correct answer  $\frac{1}{2} \times \frac{7}{1} = \frac{7}{2}$

Student answers:

3)  $\frac{1}{2} : \frac{1}{7} = \frac{1}{3}$

Figure 3. Student answers to question No.3

The third question can be seen in Figure 3; the student's answer was still wrong in the division operation. It should be reversed and multiplied, but the student seemed to share the numbers immediately. After further interviews, it turned out that he said that his teacher had not told him about the operation of calculating division in fractions, so he did not know how to do it. It could be said that the difficulties he faced this time came from outside himself because he had not received the learning; this could be because the teacher was late in providing the material.

#### Question 4

$$2\frac{1}{3} + \frac{3}{5} = \dots$$

Correct answer  $2 + (\frac{5}{15} + \frac{9}{15}) = 2\frac{14}{15}$

Student answers:

4)  $2\frac{1}{3} + \frac{3}{5} = \frac{2+1+3}{8} = \frac{6}{8}$

Figure 4. Student answers to question No.4

Next, as seen in Figure 4, the fourth question is related to mixed fractions; according to the interview results, Hanif likes to forget the material taught. He said he could do it if he looked at his notes, but when working on this test question, he was not allowed to look at them. As a result, the answer is also wrong because he forgot how to answer it. The difficulty this time came from himself taking learning for granted and rarely repeating lessons at home so the material didn't stick in his mind.

#### Question 5

Convert it to an ordinary fraction  $3\frac{2}{6}$ ,  $4\frac{1}{5}$

Correct answer  $3\frac{2}{6} = \frac{20}{6}$ ,  $4\frac{1}{5} = \frac{21}{5}$

Student answers:



5)  $3 \frac{2}{6} = \frac{6}{6}$   
 $4 \frac{1}{6} = \frac{4}{6}$

**Figure 5.** Student answers to question No.5

The last question can be seen in Figure 5, namely, changing mixed fractions into improper fractions. As previously said, he doesn't remember this lesson; he forgot it because he rarely opens the book at home unless there is homework. In this problem, the student experienced conceptual difficulties because he multiplied an ordinary number by the numerator, which should have been multiplied by the denominator, and the ordinary number was then added to the numerator. In this case, students do not understand changing mixed fractions into improper fractions.

This means that understanding the concept of adding different denominators and changing mixed fractions into improper fractions must be given more attention. Students who can solve mathematical problems already understand the mathematical concept (Muthma'innah, Analysis of Students' Mastery of Mathematical Concepts, 2023).

So, based on the practice questions given to see the extent of students' abilities and understanding of fraction material, it can be seen that students still do not understand mathematical concepts well. Based on interviews conducted, he said that mathematics is complex and accessible. However, when testing questions, this student had difficulty answering; none of the five questions were 100% correct. So in this, we can take into consideration the learning difficulties faced by students, namely:

1. Low student learning motivation, which makes students not enthusiastic about learning and lazy to pay attention to mathematics lessons
2. Lack of reinforcement by the teacher
3. Students do not repeat learning at home, which creates difficulty in working on questions.
4. The lack of teacher creativity can be seen when the teacher uses the blackboard as a learning medium.
5. The method must be improved, and the student's character must be better understood.

Meanwhile, factors that influence this difficulty include the teacher's lack of creativity. This can be seen from the results of interviews, where the teacher only uses a blackboard as a learning medium. Another factor is the lack of student motivation to repeat learning at home, which causes difficulty working on questions.

#### 4. Conclusion

Based on the analysis and discussion, it can be concluded that there is a description of students' difficulties in terms of the results of interviews and test results for class V students at SDN 016 Sagulung Batam. Students could not solve the five questions created by the researcher; in other words, this student still had difficulty understanding the mathematics learning implemented by the teacher in class. The difficulties faced include difficulty understanding the concept of fractions and calculating. Meanwhile, factors that influence this difficulty include the teacher's lack of creativity. This can be seen from the results of interviews, where the teacher only uses a blackboard as a learning medium. Another factor is the lack of student motivation to repeat learning at home, which causes difficulty working on questions. Based on the description above, the researcher hopes that the results of this analysis can be used as a lesson in evaluating the difficulties experienced by students in mathematics learning. Teachers are expected to be able to utilize creative methods and models in learning so that learning is not monotonous.

#### References

1. Abdurrahman, & Mulyono. (2010). Education for Children with Learning Difficulties. Jakarta: Rineka Cipta.
2. Ahmadi, Abu, & Supriyono. (2013). Learning Psychology. Jakarta : Rineka Cipta.
3. Arifin, M. F. (2020). Student Learning Difficulties and Their Handling in Mathematics Learning SD/MI. Jurnal Inovasi Penelitian, 1(5), 989-1000.
4. Ariyanto. (2017). Analysis of Errors in Solving Problems on Calculating Fractional Number

- Operations in Class VII Students of SMP Negeri 2 Toroh. Doctoral DISSERTATION Universitas Muhammadiyah Surakarta.
5. Azkiyah, S. (2013). Development of a Mathematics Textbook with Fraction Material Based on the Indonesian Realistic Mathematics Education Approach (PMRI) for SD/MI. Thesis at UIN Maulana Malik Ibrahim Malang.
  6. Kusdaryani, Wiwik, & Trino. (2015). Foundations of Education. Semarang Ibrahim Malang: IKIP PGRI Semarang Press.
  7. M, I. V. (2012). TIMSS 2011 international results in mathematics. United States: TIMSS and PIRLS International Study Center Lynch School of Education, Boston College.
  8. Mabruroh, U., & et al. (2020). Analysis of Learning Difficulties in Mathematics Content for Class IV SD Tahfidzul Qur'an Darul Abror. *Contextual Scientific Journal*, 2(01), 58-68.
  9. Milles, & Huberman. (1992). *Qualitative Data Analysis*. Jakarta: Universitas Indonesia Press.
  10. Mullis, I. V., & et al. (2020). TIMSS 2019 International Results in Mathematics and Science. Boston: TIMSS & PIRLS International Study Center.
  11. Muthma'innah, M. (2017). What about the Peer Tutoring Learning Model? *Journal of Physics: Conference Series*, 1-6.
  12. Muthma'innah, M. (2023). Analysis of Students' Mastery of Mathematical Concepts. *Tarbiyah: Jurnal Ilmiah Kependidikan*, 135-147.
  13. Muthma'innah, M. (2023). Difficulty Learning Mathematics Material for Multiplication Counting Operations in Elementary School. *Rangkiang Mathematics Journal*, 2(2), 29-33.
  14. Runtukahu, Tombokan, & Kandou, S. (2014). *Fundamental Mathematics Learning for Children with Learning Difficulties*. Yogyakarta: Ar-Ruzz Media.
  15. Slameto. (2010). *Learning and Factors That Influence It*. Jakarta: Rineka Cipta.
  16. Sunariah, & Rijal, R. (2017). Analysis of Student Learning Difficulties in Mathematics Learning Fraction Material. *Primary*, 09(01), 93-108.
  17. Sundayana, & Rostina. (2014). *Media and Teaching Aids in Mathematics Learning*. Bandung: Alfabeta.
  18. Susanto, A. (2013). *Learning and Learning Theory in Elementary Schools*. Jakarta: PT. Kharisma Putra Utama.
  19. Yeni, & Mukhlesi, E. (2015). Difficulty Learning Mathematics in Elementary School. *JUPENDAS*, 2(2), 1-10.