

## THE DIFFICULTIES OF FIFTH GRADE STUDENTS IN SOLVING MATHEMATIC FRACTIONS WORD PROBLEMS

**May Nisa Istiqomah**

Universitas Pendidikan Indonesia  
maynisa\_istiqomah@upi.edu

**Sufyani Prabawanto**

Universitas Pendidikan Indonesia  
sufyani@upi.edu

**Submit:** 20 November 2019

**Accepted:** 6 Mei 2019

**Publish:** 19 Juni 2019

### ABSTRACT

Mathematics is often become the frightening subjects for students. Mathematics is considered as something which is difficult to solve. One of the elementary schools mathematics materials which is considered difficult is fractions. Not only students who consider fractions as difficult material but also teachers admit it as well. Teachers feel difficult in teaching fractions to students. Basic concept of fractions which is difficult for the student to grasp, would become even more complex if it is delivered in the form of word problem. In solving word problems students do not only need mathematic skills but also language skills. This research is aimed to analyze students learning difficulties in solving fractions word problem. This research is a qualitative research. The method of analysis used in this research is Newman method. The results of the research show that students faced difficulties in solving fractions word problems because (1) it is difficult for the students to understand the question and to translate it into mathematical sentence, (2) it is difficult for the students to determine the operation used in the word problems, (3) students are not accustomed to, thus they forget to write the conclusion/write the conclusion without the unit in every answers.

**Keyword:** *Learning Difficulties, Newman Analysis, Fractions Word Problems*

### INTRODUCTION

Education is a very important aspect for human, because every humans needs education. Education makes someone to have broad knowledge for one's future life. Education needed by a child is not only from the family, because not all the skills needed by human to live in society are taught in the family, therefore a child needs education in school, especially elementary education.

Education aspects in elementary schools obviously cannot be separated from the learning aspects, of which the learning process conducted in school one on the objectives is to improve the students' potential, which later expected to optimize students learning achievement. One of the effort to improve the potential is by mathematics learning. According to Department of Education's regulation number 22 year 2006 explained that "Mathematics is required to be taught to all students to equip them with the logical, analytic, systematic, critical and creative thinking skills and cooperative working skills". Those competencies are needed in order for the students to develop their abilities in their social life as a foundation for their life in the future. Simanjuntak, et al, explained that student love to study mathematics only in the beginning, they were introduced

to simple mathematics, the higher their grade the more “difficult” mathematics they learn, that is why the less their interest to learn mathematics, thus they assume mathematics as a difficult, complex and tricky subject.<sup>1</sup> That opinion was supported by the result from Trends in International Mathematics and Science Study (TIMSS) in 2015, where Indonesia was in 46th position out of 60 countries. One of the reasons of the non-optimal result is the Indonesian students who are not accustomed to do High Order Thinking Skills (HOTS) questions which require critical and creative thinking skills, the student’s learning time which is also not proportional with the learning quality, and the teachers who are still not fully mastered the learning curriculum.

Mathematics learning cannot be separated from the operations, whether it is addition, subtraction, multiplication, or division, all of them are always related to numbers. One of the lessons about numbers which is taught in elementary school is fractions. Fractions is taught in grade IV of Elementary School, where the lesson cover materials about simplifying the form of fractions, addition, and subtraction of fractions and solving mathematical problems. So far, fractions always become a hard challenge for students. Wearne & Kouba in Walle, stated that The National Assessment of Educational Progress (NAEP) test results consistently showed that students have very weak understanding about the concept of fractions. This weak understanding then cause the difficulties in calculating fractions, the decimal and percentage concept, the use of fractions in measurements, the concept of ratio and proportions, also difficulty is solving fractions in the form of word problem.<sup>2</sup>

Word problem is a question which integrate everyday life experience with lesson material. Word problem in mathematics is an integration between everyday life with numbers, that later need to be solved to get the answer. Often times students feel difficult to solve word problems, including word problems in mathematics. According to Ellerton and Clements in Runtukahu & Kandou the difficulties that occur in solving the word problems are often caused by (1) language skills, especially reading, (2) mathematic skills, one of them is counting, (3) imagination, (4) relating previous knowledge and experience with the current one, and also (5) attitude.<sup>3</sup>

The same thing happens in mathematic learning in fifth grade of a certain elementary school in Bandung Barat regency. The students felt difficult to understand the fractions word problem. These difficulties faced by the students including difficulty in understanding the question, transforming the question and difficulty in counting. According to the teacher of the fifth grade,

---

<sup>1</sup> Simanjuntak, Lisnawaty, et.al, *Metode Mengajar Matematika*, Jilid I, (Jakarta: Rineka Cipta, 1993), p.72

<sup>2</sup> J. A. Walle NB, *Matematika Sekolah Dasar dan Menengah*, Jilid II, Diterjemahkan Suyono, (Jakarta: Penerbit Erlangga, 2008), p.45

<sup>3</sup> Runtukahu, Tombokan dan Selpius Kandou, *Pembelajaran Matematika Dasar Bagi Anak Berkesulitan Belajar*, (Yogyakarta: Ar-Ruzz Media, 2014), p.24

students have low mastery in fractions. The teacher stated that among fifth grade materials from the first and second semester, the most difficult material for the students to understand is fractions, thus teachers need longer time to explain the material. The difficulty in fractions continues to difficulty in solving fractions word problems. The students tend to be lazy in reading the question and confuse in determining the operation for the question.

The students' difficulty in solving mathematic word problems raises a question about whether there is a flaw in the teaching learning process so that correction in teaching learning is needed. However before any corrective action are taken, there should be an analysis about the difficulty faced by the students so that the corrective action can run optimally and effectively. Based on that underlying problem the researcher intended to make a research entitled "The Difficulties of Fifth Grade Students in Solving Mathematic Fractions Word Problems".

## RESEARCH METHOD

This research used qualitative approach case study. Case study research according to Arikunto, "case study is a detailed and in depth research on a particular organization, institution, or phenomenon".<sup>4</sup> Qualitative approach is chosen in order to deeply analyze the problem faced by students in solving fractions word problems. There are several factors that caused students to answer word problem incorrectly, but these have not been revealed by the students so that the teacher may know. In this research, the researcher could directly communicate with the aforementioned students or teachers in order to get detailed information about the difficulties that they faced, so that the information can be used as an indicator in the analysis. The procedure of analysis used to analyze the question is Newman analysis. Jha explained that Newman analysis is a method used to analyze the error when solving a word problem. Newman analysis is an analysis based on fact.<sup>5</sup> According to Jha there are five indicators used in the analysis namely:

1. Difficulty in reading the question, is a condition where the student cannot read the key word or symbol in the question, thus unable to interpret it.
2. Difficulty in understanding the problem, is condition where the student is able to read all the words in the question correctly, yet unable to interpret and understand the problem, thus the student is difficult to continue to the working step of the word problem.

---

<sup>4</sup> Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, (Jakarta: Rineka Cipta, 2014), p.185

<sup>5</sup> Shio Kumar Jha, *Mathematics Performance of Primary School Students in Assam (India): An Analysis Using Newman Procedure*, International Journal of Computer Applications in Engineering Sciences, Vol.2, No.1, 2012, p. 17-21

3. The difficulty in transforming the question, is a difficulty faced by the student to determine the type of operation needed to solve the question. This error is caused by the student who is unable to transform the word problem into mathematical sentence.
4. Difficulty in counting process is a difficulty when the student has already able to identify the problem, but cannot determine the steps needed to solve the operation. This error is usually affected by the student's lack of counting skill.
5. Difficulty in writing the final answer, is a condition when the student is able to solve the question well, yet the students fail to draw conclusion or write it well.<sup>6</sup>

## RESULT AND DISCUSSION

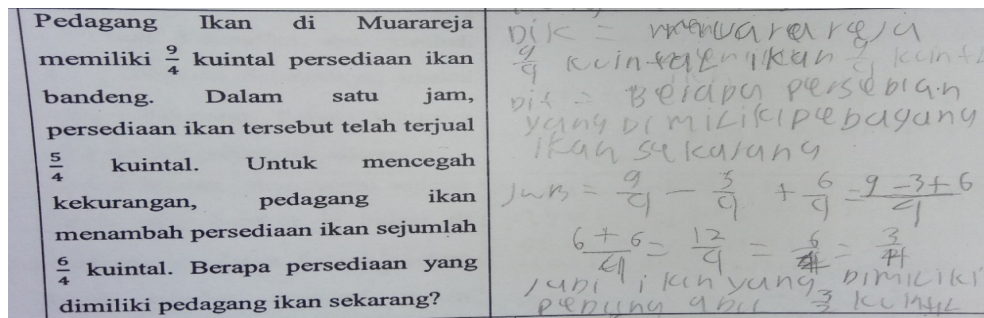
The researcher has conducted the research on fifth grade students of particular elementary school in Bandung Barat regency. Data collection was conducted on March 29<sup>th</sup> – April 20<sup>th</sup> 2018. Data collected from the research are in the form of students' works on solving word problems, the result of the interview with students about the cause of their difficulty in solving word problem, also the results of the interview with the teachers about the factors causing students difficulty and solutions to minimize the students' learning difficulty based on the Newman analysis. The researcher found several students error in answering the word problem which are divided into several types of errors, including reading errors as many as 153 times, errors in understanding the question as many as 154 times, errors in transforming as many as 129 times, errors in calculation as many as 218 times, and errors in writing the answers as many as 228 times.

The difficulty in reading word problems is affected by the students who make errors in spacing between sentences, students who still have difficulty in reading/ still reading by spelling, students who misunderstand the keyword, students who are lazy to read so that they do not pay attention to the question. Those results are in line with the research conducted by Singh, who explained that 35% of students were unable to read the questions well because of their language skills were still low. In the experiment class, there were students who still had difficulty in reading, so that they become very slow in doing the questions. Like one of the students, where he did not pay attention to the reading that make him understand the question incorrectly.<sup>7</sup> The difficulties faced by students are displayed in the image below:

---

<sup>6</sup> Shio Kumar Jha, *Mathematics Performance of Primary School Students in Assam (India): An Analysis Using Newman Procedure*, International Journal of Computer Applications in Engineering Sciences, Vol.2, No.1, 2012, p. 17-21

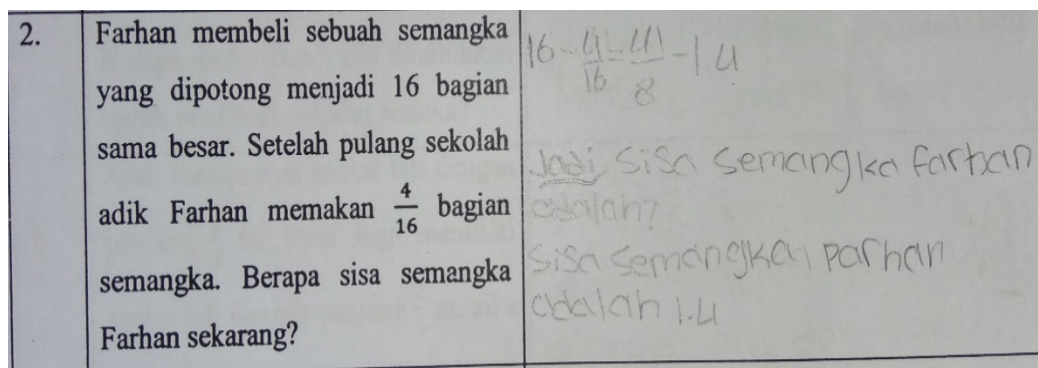
<sup>7</sup> P. Singh, A.A. Rahman, and T. Sian Hoon, *The Newman Procedure for Analyzing Primary Four Pupils Errors on Written Mathematical Task: A Malaysian Perspective*, Procedia on International Conference on Mathematics Education Research 2010 (ICMER 2010), 8 (2010), p.264-271



**Image 1: Students Reading Difficulty In Solving Fractions Word Problem**

The errors in the questions are reading errors, where students incorrectly read the number of fish which is sold that is supposed to be  $\frac{5}{4}$  but the students wrote it down as  $\frac{3}{4}$ . This error caused miscalculation of the answer in the next step.

The difficulty of the students in understanding the problem will be related to he determining of the operation used to solve the fractions word problem. Beside determining the operation, understanding the problem also correlated to organize the question, such as what is known and what needs to be found out. Based on the research by Jha showed that the most errors committed by students were in the understanding the question and transformation step.



**Image 2: Difficulty In Understanding The Question To Solve Fractions Word Problems.**

In that question, students were unable to understand the question well, because the students misread the word in the question sentence. In the question it was written that Farhan bought a watermelon and cut it into 16 pieces, it means  $\frac{16}{16}$  which later eaten by his sibling as many as  $\frac{4}{16}$  hence  $\frac{16}{16} - \frac{4}{16} = \frac{12}{16} = \frac{6}{8} = \frac{3}{4}$ . However, what the students understood was that there were 16 watermelons. It happened because the students were not careful enough when they read.

Difficulty in transforming the question is the determining of operation used by the students to answer the question correctly. Transformation error is obviously related to student understanding of the word problems. Students have to understand the question, so that they can interpret it in to mathematical sentence. In this indicator, students felt confuse to use operation for every question. The students think too hard to solve a question, and cannot come up with simple

solution. Transformation errors are mostly caused by students' inability to understand the question, and the key words in the questions

No.	Soal	Jawaban
1.	Ayah akan mengikat dua kardus dengan tali. Kardus pertama memerlukan $\frac{3}{8}$ meter tali dan kardus kedua memerlukan $\frac{4}{8}$ meter tali. Berapa meter panjang tali yang harus dibeli Ayah?	Diketahui $\frac{3}{8} \times \frac{4}{1} = \frac{3}{16}$  Jadi panjang tali yang harus dibeli ayah adalah $= \frac{3}{16}$ meter tali

**Image 3: Difficulty In Transforming The Questions To Solve Fractions Word Problem.**

The transformation error in the question above is the use of multiplication where it should use addition instead. In this case, students think too hard about the question, they even think about multiplication when actually only addition is needed. The error in choosing the operation to use as it was admitted by the students happened because they didn't understand the words of the question and how to transform them in to mathematical sentence.

Counting errors is largely affected by students' difficulty determining the lowest common multiple from different denominator. The low mastery of LCM made the students took longer time and still made error in determining the LCM of several numbers. Solving addition, subtraction, multiplication and division of fraction problem are still not well mastered, students are often confused between using multiplication and addition. Beside that problem, there are some students who are still made error in simplifying improper fraction into mixed number.

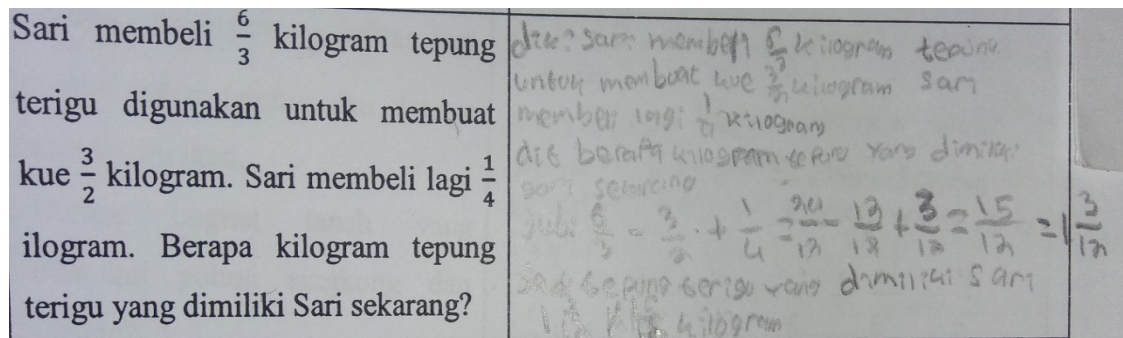
Pedagang Ikan di Muarareja memiliki $\frac{9}{4}$ kuintal persediaan ikan bandeng. Dalam satu jam, persediaan ikan tersebut telah terjual $\frac{5}{4}$ kuintal. Untuk mencegah kekurangan, pedagang ikan menambah persediaan ikan sejumlah $\frac{6}{4}$ kuintal. Berapa persediaan yang dimiliki pedagang ikan sekarang?	Diketahui: Pedagang ikan di Muarareja memiliki $\frac{9}{4}$ kuintal persediaan ikan bandeng. Dalam 1 jam, persediaan ikan tersebut telah terjual $\frac{5}{4}$ kuintal. Untuk mencegah kekurangan persediaan ikan pedagang menambah persediaan ikan sebanyak $\frac{6}{4}$ kuintal. Berapa persediaan persediaan ikan sekarang?  Jawab: $\frac{9}{4} - \frac{5}{4} = \frac{4}{4} + \frac{6}{4} = \frac{10}{4} = 2\frac{2}{2} = 2\frac{1}{1}$  Jadi persediaan persediaan ikan pedagang sekarang $1\frac{1}{4}$ kuintal ikan
--	--

**Image 4 Counting Difficulty In Solving Fractions Word Problem**

The error above is counting error in which the students miscalculate the improper fraction  $\frac{10}{4}$  by simplifying it into  $1\frac{1}{4}$ , when  $\frac{10}{4}$  should be simplified into  $2\frac{1}{2}$ . When the respondent was



interviewed, they admitted that the counting error was caused by their rushed and careless work. Students wanted to finish quickly, therefore they did not recheck their work.



**Image 5 Difficulty In Writing Down The Conclusion In Solving Fractions Word Problem**

. The error of writing the conclusion is due to the previous error, the error of reading the question, the misunderstanding of the question, the transformation error, and the counting error. In that case, there was an error in the counting process, causing the final result and conclusion became wrong. In the study in fifth grade, there were no errors that only included error in writing conclusions. Some things done by the students, errors in writing conclusion occur because of the errors in the previous process.

The result of the interview with the students shows some difficulties faced by the students in solving the fractions word problem, such as (1) the students who are difficult to understand the question and interpret the question into a mathematical sentence, (2) the students who have difficulty in determining the operation used in the problem, 3) students who do not write conclusions/write conclusions without units on each answer.

Results of interviews with students are in accordance with the answers of interviews with the fifth grade teacher. Teacher explained that if mastery and understanding of students about fractions were still very low. It makes students difficult to solve fractions word problem. Moreover there are still students who have difficulty in reading, so it takes a long time and a deeper understanding to solve the question. Students often feel lazy when doing the word problem, because it looks plenty and boring, so they become lazy to read and understand the question. The habit of organizing answers by writing down what is known, asked, and giving conclusions is still not seen in every student.

Some of these difficulties can be minimized, so it can help to optimize learning in the classroom. Aunurrahman explains, efforts to help students to overcome difficulties and errors in learning mathematics can be done through several stages namely, 1) Identification, 2) Diagnosis, 3) Prognosis, 4) Therapy or provision of assistance, 5) Follow up.<sup>8</sup>

<sup>8</sup> Aunurrahman, *Belajar dan Pembelajaran*, (Bandung: Alfabeta, 2013), p.197-198

## CONCLUSION

Based on the results of the research, it can be concluded that the difficulty in solving the problem of fractions word problems, including: (1) problem in reading the questions, (2) difficulty in understanding the question, (3) difficulty in transforming the question, (4) difficulty in counting process, (5) difficulty in writing the conclusion of the final answer. The most errors are in the indicator of error of transforming the question. Students find difficulties in determining the operation that is used in solving the word problem. Students think too far to solve the problem, but cannot understand the problem in question. In addition to the difficulty of transformation, the difficulty in equating denominators (with the method of looking for LCM) is also still difficult for students. These difficulties were admitted by students during the interview. Students admitted difficult to understand the fractions material, especially for word problem. Students feel rushed in solving problems and want to finish quickly, ignoring of the accuracy of the answers. In addition, the students ability to read also still tend to be low, it is seen from the low student interest, so they feel lazy to read the question. Students' computing ability in mathematics has not seemed to be optimal, and student's accuracy in answering the question also still needs to be improved. In order to minimize errors in working on fractions word problem, it would be better if the teacher embed the basic concepts clearly and use methods that easily understood by the students. Difficulties in solving the word problem, one of which is affected by the students' mastery of prerequisite materials that have not been optimal, such as mastery of addition, subtraction, multiplication, and the division of integers and fractions that are still not well understood. In addition to strongly embedding the basic concept, teachers should also more often provide practice questions to students, especially questions that involve High Order Thinking Skills (HOTS) in order to hone the students' high-level thinking ability with continuous practice, students are expected to know and understand with keywords and transformation of the story into a mathematical sentence appropriate.

## REFERENCE

- Simanjuntak, Lisnawaty dkk. (1993). *Metode Mengajar Matematika Jilid I*. Jakarta: Rineka Cipta.
- Walle nb , J. A. (2008). *Matematika Sekolah Dasar dan Menengah Jilid 2*. Diterjemahkan Suyono. Jakarta: Penerbit Erlangga
- Runtukahu, Tombokan dan Selpius Kandou (2014). *Pembelajaran Matematikan Dasar Bagi Anak Berkesulitan Belajar*. Yogyakarta: Ar-Ruzz Media.
- Arikunto, Suharsimi. (2014). *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.



- Jha, Shio Kumar. (2012). *Mathematics Performance of Primary School Students in Assam (India): An Analysis Using Newman Procedure*. International Journal of Computer Applications in Engineering Sciences, 2(1): 17-21.
- Singh, P., Rahman, A.A., Sian Hoon, T. (2010). *The Newman Procedure for Analyzing Primary Four Pupils Errors on Written Mathematical Task: A Malaysian Perspective*. Procedia on International Conference on Mathematics Education Research 2010 (ICMER 2010), 8 (2010): 264-271.
- Aunurrahman. (2013). *Belajar dan Pembelajaran*. Bandung: Alfabeta.