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Fractional Counting Understanding of Students in Jagoan Muhammadiyah Islamic Elementary School (MI Muhammadiyah Jagoan), Boyolali

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Abstract

Counting skill is a basic ability that must be possessed by students as a provision in everyday life. Fractions understanding is not only a number calculation but also a problem-solving process. Therefore, students must be able to understand fractional calculations before understanding the next material. This research was a qualitative descriptive study with a sample of 20 4th-grade students in Jagoan Muhammadiyah Islamic Elementary School (MI Muhammadiyah Jagoan), Sambi, Boyolali. Data collection techniques were interviews, observation, and study documents. The triangulation technique was employed to achieve data validity. Data analysis used interactive techniques with stages of data collection, data reduction, data presentation, and drawing conclusions. The purpose of this research was to observe the students' understanding of counting fractions. The results revealed that most students were still deficient in understanding fractions. It could be seen from the classical average of students that the score was only 16, which was still far below the Minimum Completeness Criteria (KKM) of 65. Of the 20 students, none of them achieved a score above the KKM.

Keywords
fractional counting understanding; elementary school ; student.

I. Introduction

One of the basic skills that students must master is counting. Until later, counting becomes one of the crucial components in evaluating international education, known as the Program for International Student Assessment (PISA). There are three components in the PISA assessment indicators, including literacy, mathematics, and science. Besides being used as a benchmark for evaluation, the three components are necessary and worked in everyday life by humans. Mathematics is included as one of the indicators of the PISA assessment because mathematics is a continuous logical thinking activity (Friantini et al., 2020). Therefore, mathematics understanding must be appropriately considered because mathematics is a series of causes and effects arranged based on the previous concept and will become the next concept. Hence, the student's understanding of mathematical concepts must be mastered correctly (Ermayani et al., 2018).

Sanjaya in Tanjung, E. et al. (2021) states that one of the problems faced by our education world is the problem of the weakness of the learning process. Including mathematics learning, because learning mathematics is considered difficult by students. The difficulty in learning mathematics is not solely due to the mathematics subject matter itself, but also due to the ineffective ability of the teacher to manage mathematics learning. Where

in the learning process, the strategies applied by the teacher are generally less varied and do not involve students in the learning process.

The government also emphasized the importance of learning mathematics by issuing Law No. 20 of 2003 concerning the National Education System, article 37, which contains mathematics as one of the compulsory subjects for students at the primary and secondary education levels. Susanto (2013) has argued that mathematics is a scientific discipline that can improve the ability to think, argue, and solve problems encountered in everyday life. In line with this opinion, Japa & Suarjana (2014) has also said that learning mathematics for students starting from the elementary school level helps prepare them with various abilities. The abilities include logical, analytical, systematic, critical, and creative thinking skills and working together. Moreover, not just counting numbers, mathematics learning in elementary school (SD) also teaches problem-solving. Therefore, it is agreed with the objectives of mathematics subjects in the 2013 curriculum: problem-solving, which consists of the abilities to understand problems, design mathematical models, complete models, and interpret solutions obtained. Ackles (2014) has also confirmed that the curriculum supports students to use alternative methods to solve problems.

Mathematics learning presented using Student Worksheets requires active participation from students, because the Student Worksheets are a form of teacher effort to guide students structured through activities that are able to attract students to learn mathematics. In addition, learning with Student Worksheets can make the learning process more effective as expected in each learning that is increasing the creativity of students' thinking so that learning objectives are achieved. (Tarigan, E. et al. 2020)

A good mathematics understanding is a contextual mathematics that can be used in everyday life. Therefore, learning mathematics in the classroom must be packaged in such a way optimally and based on issues of problems in daily life so that, in the end, it can be applied in everyday life. Students still have difficulties if mathematics learning is only conducted in numbers so that their understanding becomes abstract. Piaget's cognitive theory also supports this opinion that elementary school-aged children have difficulty in understanding abstract mathematics. From the abstractness, mathematics is relatively difficult to comprehend by elementary students in general (Ermayani et al., 2018). Here, the heavy-duty of a teacher is not only cognitively intelligent but also sensitive to the surrounding conditions. Therefore, story-based questions are emerged to support contextual learning. In everyday life, children are faced with various personal problems. These problems arise in their playing world. The problems might be trivial and straightforward, but for students, they are considered heavy and crucial. Many of these problems are related to the application of mathematics. Good mastery of mathematics can assist students in solving these problems. For this reason, it takes various efforts from mathematics educators to make mathematics learning easy to be absorbed by students.

Mathematics in schools, especially elementary schools, comprises various kinds of material, one of which is fractional material. Fractions can be interpreted as part of something whole (Heruman, 2007). Fractions occur because one object is divided into several equal parts and the parts have fractional values. Given many mathematical aspects related to the concepts and operations of fractions needed in real life, it is crucial to master the concepts and operations of fractions (Subarinah, 2006). In elementary schools, especially in grade 4, the fractional material taught is recognizing fractions and their sequence, simplifying fractions, adding fractions, subtracting fractions, and solving problems related to fractions. Teaching fractional calculations in schools should not be formalistic in calculating numbers but based on meaningful learning, that is, learning in a realistic context. Realistic learning

starts from problems that exist in the world (real-world issues) and can be found in everyday life (Purnamasari, 2015).

Although mathematical fractions learning has been taught since the beginning of elementary school, not all students can fully understand fractional calculations correctly. Moreover, the pandemic that has not entirely subsided has resulted in face-to-face learning not running optimally. Besides, the calculation of fractions is essential in everyday life. The calculation of fractions becomes the initial capital for students in continuing the next mathematical material. Haloho et al. (2019) stated that learning fractions are an initial skill that will continue to be used in the next material. In the old curriculum, the Education Unit Level Curriculum (KTSP) emphasized the importance of mastering mathematics as mastery of problem-solving (Unaenah, 2020). The inequality of students in understanding simple fractions material needs to be understood because each student has a different level of ability, but it also cannot be permitted. However, all students should realize that although later their proficiency is different, at least they can understand the fraction material. Several things cause differences in the abilities of each student also to vary. These problems can come from outside themselves (external) or within themselves (internal).

Moreover, researchers found that student learning outcomes, particularly in fractions, were relatively low based on initial research findings. Learning outcomes were seen from daily assignments, which showed that only around 50% of students understand fractions. In addition, the results of the observations demonstrated students with high enthusiasm and low enthusiasm. For this reason, the researcher wants to observe further how the understanding of fractions material is. Here, the case study was 20 students in 4th-grade elementary school. There are several primary references used to conduct this research. First, Synthia Hotnida Haloho et al. (2019) examined increasing understanding of counting numbers with the discovery learning model. Second, Luh Ermayani et al. (2018) analyzed the students' abilities to solve simple fraction problems. Third, Robina Astuti (2017) investigated the contextual approach to fractions in elementary school. Lastly, Ratih Purnamasari (2015) reviewed the improvement of learning fractions through a realistic mathematical approach. From these references, it is expected that the researcher will discover new research findings because the study of fractional counting skills in MI Muhammadiyah Sambi has never been reported.

II. Research Method

This research was a qualitative descriptive study. Descriptive research is research focusing on the problems that existed or encountered when the research is conducted. It is said 'descriptive' because it aims to obtain an objective explanation. Sukmadinata (2017) stated that descriptive research is research aimed to describe existing phenomena, both natural phenomena and man-made phenomena, including activities, characteristics, changes, relationships, similarities, and differences between one phenomenon and another. This research was conducted in Jagoan Muhammdiyah Islamic Elementary School (Madrasah Ibtidaiyah (MI) Muhammadiyah Jagoan), Sambi, Boyolali. The sample was 20 students in grade 4. The research was held in October 2021. Here, the data collection techniques involved interviews, observation, and document study. The data validity employed triangulation techniques in which data were obtained from interviews, observations, and documentation. Further, this study applied interactive data analysis techniques with data reduction, data presentation, and drawing conclusions (Miles & Huberman, 1992). Data were descriptive quantitative and descriptive qualitative to identify and clarify so that a clear, detailed, and adequate description was acquired to determine students' understanding in calculating simple fractions. It can be classified in the following Table 1.

Table 1. Classification of Students' Understanding of Counting Fractions

No	Variable	Method of collecting data	Source	Data Properties	Data analysis method
1	Students' ability to solve simple fraction questions	Essay Test	Student	Score	Descriptive Quantitative
2	Constraints and solutions faced in solving simple fraction questions	Document Note Interview	Teacher and student	Description	Description Qualitative
3	Factors causing difficulty in solving simple fraction questions	Observation and Interview	Teacher and student	Description	Description Qualitative

III. Result and Discussion

As in the 2013 curriculum, simple fractions have been taught since 4th grade with Basic Competencies no 3.13 (KD 3.13), namely understanding equivalent fractions and arithmetic operations (multiply, divide, add, subtract) on fractions using concrete objects or pictures. Madrasah Ibtidaiyah (MI) is an Islamic elementary school under the auspices of the Ministry of Religion. Officially, MIs also use the curriculum of the national education unit, which refers to the ministry of education, but it has an additional Islamic curriculum. In terms of formal learning competence, MIs have the same demands as other elementary schools.

According to the research findings, the understanding of students in fractions materials was diverse. The researcher saw the students' problems in three ways: by observation, interviews, and the results of daily tests held in October 2021. Students' ability to solve simple fractions was measured based on an essay test with five indicators consisting of 10 questions done individually. From these questions, it was found that the highest score obtained by students was 40, and the lowest score was 0. For the average student test results in solving fractional problems classically, the score was 16, which was very poor. If it was based on the KKM, no student passed the KKM value of 65. Table 2 presents the results of students' ability tests in solving simple fractions.

Table 2. The results of students' ability to solve fraction problems

No Question	Number of students who answered correctly	Percentage	Category
1	13 students	65%	Enough
2	6 students	30%	Very low
3	9 students	45%	Low
4	0 students	0%	Very low
5	0 students	0%	Very low
6	0 students	0%	Very low
7	7 students	35%	Very low
8	5 students	25%	Very low
9	0 students	0%	Very low
10	3 students	15%	Very low

The analysis results of students' abilities in solving fractions showed the classical average of students' abilities was very low, that the score was only 16. It was very far from the KKM of 65. The analysis result in solving Question number 1 was categorized enough, meaning that most students understand and can solve the question correctly. Meanwhile, for Question number 3, it was considered low. The rest of Questions number 2, 4, 5, 6, 7, 8, 9, and 10 were in the very low category. Even there were Questions with 0% percentage, meaning that none of the students could answer correctly; those were numbers 4, 5, 6, and 9.

It appeared that in solving simple fractions, students had difficulty in determining the value of fractions, comparing two fractions, and solving story-based questions. The results aligned with Suaryani's study (2016), revealing that students' ability to complete arithmetic operations, especially fractional material, still requires improvement because it is classified in the low category. Accordingly, based on the analysis and Suaryani's research, the ability of students to solve simple fraction problems requires improvement to achieve learning objectives in a learning process. Even in learning during the Covid-19 pandemic, the proper solutions to solve these obstacles must be found.

Furthermore, the researcher also discovered findings from interviews with class teachers. It revealed that one of the obstacles students faced was that several students had not been able to read fluently, so that understanding of fractional counting was in a low category. Meanwhile, some questions were story-based questions adopted from everyday life. According to the class teachers, increasing practice exercises on fraction questions with story questions is necessary. Also, the role of parents needs to be improved when they accompany students to study at home, both in doing questions and in online learning. Moreover, these findings were also in line with Widyasari's research (2015), exhibiting that students could not answer the questions correctly, indicating that students had obstacles in the learning process. Besides, Suaryani's research (2016) also showed that students experienced problems when solving story-based questions because the Indonesian language was rarely used in the learning process. As a result, it made students feel difficult to solve story-based questions.

According to interviews with teachers and several students, it could be concluded that students did not understand simple fractions when they were asked to compare fractions and questions in the form of story-based questions so that they often answered questions incorrectly. The solutions to overcome the difficulties faced by students in solving simple fractional problems are providing students with several questions during the learning process and giving them various practice questions more often. Besides, it can also be done by giving homework to the students to practice questions at home. The other solution offered by the researcher is that in the learning process, especially in teaching simple fractions, the teachers should do various methods such as using learning media and teaching aids that can help students understand the materials more easily. It is in line with Untari et al. (2017), stating that learning media in the learning process will help the smoothness, effectiveness, and efficiency of achieving learning objectives. In addition, the selection of appropriate learning methods or models will make learning more effective.

Furthermore, according to the interviews with class teachers and students, the factors hindering students from counting fractions can be explained in detail. In this case, the obstacle factors are classified into internal and external. The internal factors are divided into three aspects: the student's initial knowledge, concept understanding, and interest and motivation. The explanation of the three factors can be described as follows:

3.1. Students' Initial Knowledge

A lack of initial knowledge can cause students difficulties in completing fractional arithmetic operations. Initial knowledge is used as a basic form of concepts and frameworks in thinking possessed by students, which is used in organizing and interpreting the information obtained. The lack of initial knowledge is characterized by difficulty in solving fractional arithmetic operations problems. It means that students cannot add or subtract fractions with unequal denominators, and students cannot simplify fractions.

3.2. Student's Concept Understanding

Concepts understanding that is still wrong is one of the causes of students' difficulties in solving simple fraction problems. Due to misunderstandings in concepts, students often make mistakes when using simple fraction concepts to determine the value of simple fractions, compare simple fractions, and add and subtract arithmetic operations. Students still feel confused when solving story questions. During completing questions, especially in the addition operation, students also add up the denominator of the fraction value.

3.3. Interest and Motivation Factors

Interest is related to students' interest in learning mathematics, particularly simple fractions, and students' attitudes towards learning fractional arithmetic operations. Motivation is related to students' attention to simple fraction learning and students' efforts to be involved in the learning process.

Furthermore, external factors include three main aspects: teachers, infrastructure, and student learning environment. These three aspects impact students' understanding of fractional counting. The three aspects can be explained in detail as follows:

3.4. Teacher

The teacher can also cause students difficulty in solving simple fractions. In this pandemic condition, learning is significantly disrupted, and all face-to-face learning is directly changed to online. Although conditions have recently improved and the learning process is in the trial stage of limited face-to-face, the learning process has not been optimal. During the face-to-face trial learning, the teachers have not been able to use the media properly. In addition, they are still fixated on classical learning, so that students with online learning have not yet received good teaching.

3.5. Infrastructure

Inadequate infrastructure facilities are also the cause of students' difficulties in solving simple fractions. The facilities do not support the atmosphere and learning activities, especially during online learning. Most students do not have smartphones, and some students also cannot operate them. In online learning, parents must always accompany their children, but not all parents can attend them all the time.

3.6. Environmental factor

The environment also influences the students' difficulties in solving simple fraction problems. For example, the lack of parental or family roles in supervising, assisting, and educating children in doing online learning causes children difficulty to learn. So there are materials that the students do not understand. On the other hand, face-to-face learning remains in the trial stage, resulting in an unsupporting learning environment.

Understanding simple fractions is the primary and essential thing that students must master. It becomes mandatory because it is the initial ability before entering the following material. The existence of this pandemic condition causes difficulty for teachers and students to perform the learning process. Not all teachers have the knowledge and competence to conduct online learning with such demands from understanding IT, media innovation, etc. On the other hand, students also experience difficulties performing the learning process at home due to inadequate support for facilities and infrastructure. These things have become a global obstacle in learning today, especially in schools in the regions. It is expected that with improved conditions, learning will normally run so that teachers and students can catch up with material that has not been maximally taught in online learning. Later, there will be no lost generation in the education system in this country.

IV. Conclusion

Understanding fractions is essential for students, especially at the elementary school level. It is because, at this stage, students must have mathematical, literacy, and scientific abilities as in the PISA international evaluation. In addition, mathematical understanding, especially in fractions material, can stimulate students to think logically. However, in this study, conducted in MI Muhammadiyah Jagoan, Sambi, Boyolali, the fractions' understanding was very low. It remained far from the minimum completeness criteria (KKM) required in schools of 65. Of 20 students, none of them passed the KKM value. The score of the classical average was only 16. This condition was very concerning. Based on the study results, two main factors influenced the students' low understanding of fractions: internal and external factors. Internal factors included students' initial knowledge, concepts understanding, and interests and motivations. Additionally, the external factors come from teachers, inadequate infrastructure during online learning, and an unsupporting learning environment. According to the research findings, it is expected that the findings will become notes for teachers, school agencies, and researchers afterward to conduct follow-up research to improve student learning outcomes, notably in fractional count material.

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