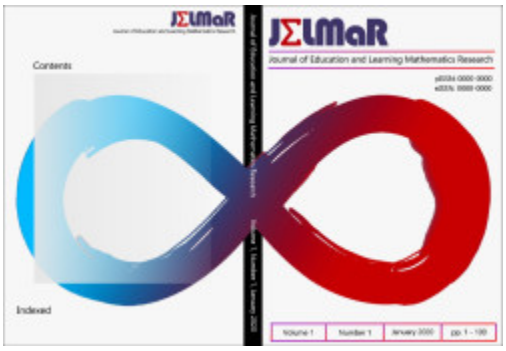

Journal of Education and Learning Mathematics Research (JELMaR)

Online ISSN : 2715-9787
Print ISSN : 2715-8535
Journal Homepage : http://jelmar.wisnuwardhana.ac.id/index.php/jelmar/index

Analysis of Students' Numeracy Skills in Solving Problems on Fractional Materials at SD Muhammadiyah 1 Menganti

Enis Mulyasari, Liknin Nugraheni, Lydia Lia Prayitno

To cite this article Mulyasari, E., Nugraheni, L., & Prayitno, L. (2025). Analysis of Students' Numeracy Skills in Solving Problems on Fractional Materials at SD Muhammadiyah 1 Menganti. *Journal of Education and Learning Mathematics Research (JELMaR)*, *6*(1), 47-54. https://doi.org/10.37303/jelmar.v6i1.3826

To link this article: https://doi.org/10.37303/jelmar.v6i1.3826

Publisher
Department of Mathematics Education,
Faculty of Teacher Training and Education,
Universitas Wisnuwardhana Malang

Journal of Education and Learning Mathematics Research (JELMaR)
Volume: 6, Number: 1, May 2025, pp. 47-54
p-ISSN: 2715-8535, e-ISSN: 2715-9787

Received: 17 March 2025 *Revised: 15 April 2025* *Accepted: 30 April 2025* *Published: 4 May 2025*

Analysis of Students' Numeracy Skills in Solving Problems on Fractional Materials at SD Muhammadiyah 1 Menganti

[1]Enis Mulyasari, [2*]Liknin Nugraheni, [3]Lydia Lia Prayitno
Mathematics Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Adi Buana Surabaya, Indonesia
Email: liknin@unipasby.ac.id

***Abstract**: numeracy ability is the benchmark of education in Indonesia. This study used a qualitative descriptive method to describe students' numeracy abilities based on their initial mathematical abilities, categorized as high, medium, and low. The subjects were three students who represented each level of initial mathematics ability, namely high, medium, and low of 5th grade A from SD Muhammadiyah 1 Menganti, Data were collected through tests, interviews, and documentation and were analyzed through three stages: data reduction, data presentation, and conclusion drawing. The results show that students with high initial mathematical ability met all three numeracy indicators, those with medium initial ability met two indicators, and those with low initial ability met only one numeracy indicators.*
Keywords: initial math ability, numeracy ability, fractions

INTRODUCTION

Education is essential for everyone because it helps individuals to adapt and survive in their environment. One of the aspects that plays a role in determining the quality of human resources is the level of education (Khoirunnisa & Adirakasiwi, 2023). Therefore, One effort to enhance the quality of human resources is to improve educational innovation, particularly in mathematics. Learning mathematics involves a series of organized activities that help students develop the skills needed for the math materials they learn (Yayuk, 2019).

In the 21st century, mathematics education emphasizes critical thinking, technological literacy, collaboration, and communication (Janah et al., 2019). To meet the demands of character, literacy, and competence, students must develop strong reasoning and critical thinking skills—skills that are grounded in numeracy. Numeracy, as a fundamental ability, enables students to apply mathematical concepts and number sense in real-world contexts. (Setiawan & Sukamto, 2021). According to Han Susanto (in Nurhayati et al., 2022) Numeracy skills are a very essential skill for students, because this skill helps students in solving everyday problems related to mathematics.

Students' numeracy skills are an important indicator of a country's educational progress (Kurniawati & Kurniasari, 2019). Numeracy plays a crucial role in the national literacy movement (Gerakan Literasi Nasional, or GLN) and the Minimum Competency Assessment (Asesmen Kompetensi Minimum, AKM), both aimed at improving educational quality. Indonesian students' performance in numeracy is evident from PISA (Programme for International Student Assessment) results, which indicate a continuing decline in mathematics scores since 2015 (OECD, 2022). The Ministry of Education and Culture decided to replace the national exam with the AKM, which emphasizes numeracy more effectively.

Student are anticipated to demonstrate a solid ,astery of the subject matter as part of the learning process (Nikmah & Nugraheni, 2023). Numeracy has an important role related to learning in school. The numeracy specifically implemented in mathematics learning is fractional material. Fractions require understanding and using numbers and math symbols, which are essential parts of numeracy. Students will learn to carry out arithmetic operations with fractional numbers in this topic. According to untari (in Riswari et al., 2023) Mathematics learning is closely related to calculation operations.

Students frequently struggle with fractions, mainly because they are unable to fully understand the teacher's explanations (Dewi et al., 2020). Initial observations with the Grade V homeroom teacher at SD Muhammadiyah 1 show that students still struggle with fraction problems such as not being able to choose the right mathematical operation for the context of the question. According to (Baharuddin et al., 2021) fractional material is one of the materials that students have applied in their daily lives, but students are less able to understand the concept of fractions given.

Based on the previous description, this study aimed to analyze the numeracy abilities of Grade V A students at SD Muhammadiyah 1 Menganti during the 2024/2025 academic year in solving problems related to fractions.

METHOD

This study used a qualitative approach to describe students' numeracy skills in solving fraction problems based on qualitative data. A qualitative method was used because the study focused on understanding patterns and drawing conclusions through both deductive and inductive reasoning. The research was conducted at SD Muhammadiyah 1 Menganti, involving three students of 5th Grade A, each representing a different level of initial mathematical ability: high, medium, and low. The data analyzed in this study were sourced from primary data, collected directly through test results and interviews.

The type of test used in this study consists of 2 tests, namely the initial math ability test and the numeracy ability test. (a) The initial mathematics ability test is given to students of 5th Grade A to determine the initial mathematical ability of each student where the researcher will use the results of the test in determining 3 subjects representing high, medium, and low initial ability levels. This test consists of 6 descriptive questions that contain basic fractional competencies as well as levels of easy, medium, and difficult questions. (b) The numeracy ability test is given to 3 subjects that have been selected based on the results of the initial mathematics ability test. This test contains 1 question describing fractional material which includes 3 indicators of numeracy ability which include (1) Analyzing information displayed in various forms (2) Using various mathematical symbols and numbers (3) Predicting a result to get an answer. The interview method used in this study is a structured interview. In this study, interviews are used to explore and support more deeply the answers produced by students. The interview guidelines have been prepared according to the numeracy ability indicators used in this study. The test and interview instruments used in this study have gone through the stages of content validity test by validators and reliability tests so that the instruments can be said to be valid and can be used in the data collection process.

RESULT AND DISCUSSION

Data on initial mathematical ability were obtained from all 17 students of 5th Grade A at SD Muhammadiyah 1 Menganti. The results of the initial proficiency test were analyzed using scoring guidelines, and the data were then categorized based on each student's level of mathematical ability.

Table 1. Results of the Initial Mathematics Ability Test

Initial Abilities	Number of students	Percentage
High Initial Ability	9	56%
Intermediate Initial Ability	3	19%
Low Initial Ability	4	25%

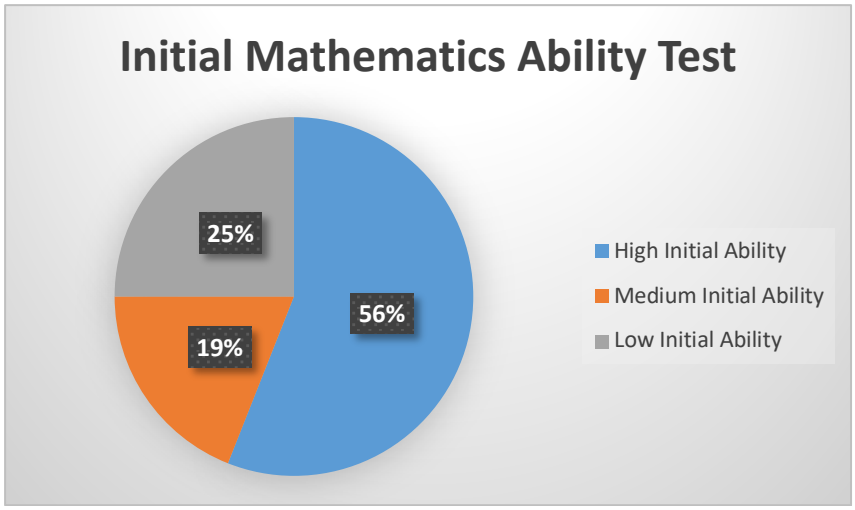

Figure 1. Initial Mathematics Ability Diagram

The initial mathematics ability test obtained students with high initial mathematics ability as many as 9, students with medium initial mathematics ability as many as 3, and students with low initial mathematics ability as many as 4. After obtaining data related to the initial mathematical ability, it will be followed by data collection related to numeracy ability. Here is a list of subject codes along with their initial math skills.

Table 2. Numeracy Proficiency Test Subject Code

Subject Code	Preliminary Mathematics Ability
Students With High Initial Mathematics	high
Students With Medium Initial Mathematics	medium
Students With Low Initial Mathematics	Low

Based on the test results from the three selected subjects, relevant data were obtained. Each subject was also interviewed by the researcher to gather additional information and support the answers provided in the previous tests. The data from the numeracy ability tests and student interviews related to solving problems on fractions are presented as follows:

1. **Analysis of the numeracy ability of Students With High Initial Mathematics in solving fractional problems**
   The results of the Students With High Initial Mathematics in solving problems on fractional material are shown in the following figure

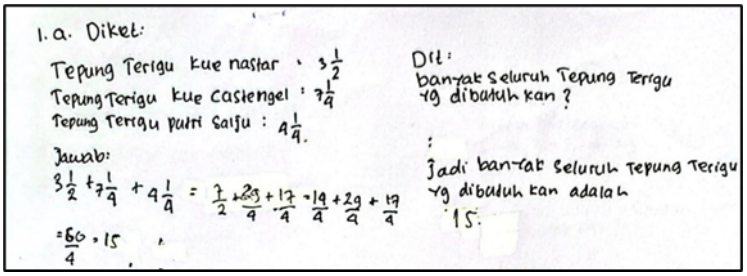

Figure 2. SKT Test Results

Based on the test results shown in Figure 2, the student with high initial mathematical ability (SKT) is able to analyze the information presented in table form. SKT is able to write down what information is known and what is asked in the question. SKT is able to use symbols and numbers that are relevant to the

questions presented. SKT wrote the fraction size with the corresponding mathematical operation into a mathematical sentence. In working on these problems, SKT used his logical thinking skills to obtain the right calculation results. In addition, at the end of the answer, it can be seen that SKT also wrote the conclusion of the calculation results obtained. The following are the results of the researcher's interview with SKT:

Researchers : What is known and asked in the question?
SKT : In this question, what is known is the recipe for nastar cake, castangel cake, and snow white cake. What is asked is the amount of wheat flour needed.
Researchers : How do you solve it?
SKT : By adding up the amount of wheat flour needed in making nastar cakes, castangel cakes, and snow white cakes, which is three one-twos plus seven one-quarters plus four one-quarters.
Researchers : What symbols do you use to solve the problem?
SKT : Sum, equals sign and comparison sign.
Researchers : What are the steps you use when working?
SKT : Changing the form of a mixed fraction to an ordinary fraction, then equalizing the denominator by searching for the LCM and then adding it.
Researchers : Did you find it difficult to do the problem?
SKT : No, sir.

Based on the results of tests and interviews conducted by researchers with subjects with high initial mathematical abilities, it was identified that the subject successfully fulfilled all three established numeracy indicators during problem solving activities. Istiqomah (2023) asserted that individuals exhibiting strong foundatonal mathematical capabilities tend to grasp given concepts and instructional materials with greater ease. Subject with advanced initial mathematical competence were able to accurately transcribe presented information, cite relevant numerical data and symbols, delineate methodical procedural steps, and employ logical reasoning effectively to arrive at sound conclusions. This finding is consistent with the perspective put forward by Wahyuni Teresia, n.d. (2021) that students with good numeracy skills are able to use systematic and logical thinking skills in completing calculation operations.

2. **Analysis of the numeracy ability of students with medium initial mathematical ability (SKS) in solving fractional problems**

The results of the SKS'work in solving problems on fractional material are shown in the following figure

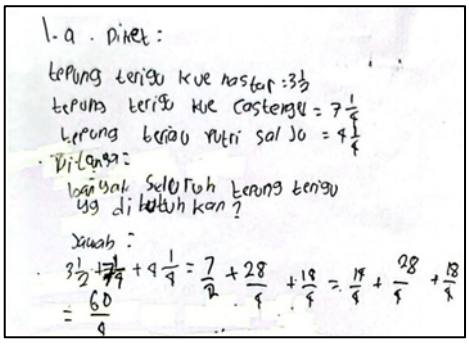

Figure 3. Credit Test Results

Based on the test results in figure 3, students with medium initial mathematical ability (SKT) could analyze the information presented in the form of a table. SKS could write down what information was known and asked in the question. SKS are able to use symbols and numbers that are relevant to the questions presented. SKS wrote the fraction size with the corresponding mathematical operation into a mathematical sentence. In working on these problems, SKS has not been able to use his logical thinking skills to obtain the right calculation result. In addition, at the end of the answer, it can be seen that SKS did not write the conclusion of the calculation results obtained. The following are the results of the researcher's interview with SKS:

Researchers : What is known and asked in the question?
SKS : Recipe for nastar cake, castangel cake and snow white cake. What is asked in the question is that many wheat grains are needed.
Researchers : How do you solve it?
SKS : Three one-twos is numbered by seven one-quarters is numbered by four-one-quarters
Researchers : What symbols do you use to solve the problem?
SKS : Sum, equals sign and comparison sign.
Researchers : What are the steps you use when working?
SKS : Changing the form of a mixed fraction to an ordinary fraction, then equalizing the denominator by searching for the LCM and then adding it.
Researchers : From the results of the work you do, you see that the results obtained are not right. Do you find it difficult to do it?
SKS : Actually, no. It seems that I am not careful in summing and writing down the results
Researchers : Why can't you be thorough?
SKS : Yes, maybe I calculated it too hastily so that the final result I got was not right
Researchers : Then if you forget, don't check the answer again?
SKS : No sister

Based on the results of tests and interviews conducted by researchers with who have intermediate mathematical abilities, it was found that in solving problems, the subjects were able to fulfill two out of the three numeracy indicators applied. These findings are consistent with the study by Baharuddin et al., (2021) which revealed that individuals with moderate mathematical proficiency are capable of analyzing presented information an utilizing appropriate mathematical symbols and numbers. Subjects with intermediate mathematical skills demonstrated the ability to record relevant information, identify pertinent numbers and symbols, and describe systematic steps for problem solving. However, they struggled to apply logical reasoning effectively resulting in incorrect conclusions. This observation aligns with the view of Yuniawati, et al. (in Baharuddin et al., 2021) which said that the lack of accuracy of students in counting can result in errors in the final results obtained.

3. Analysis of students with Low initial mathematical ability (SKR) numeracy ability in solving fractional problems

The results of SKR's work in solving problems on fractional material are shown in the following figure

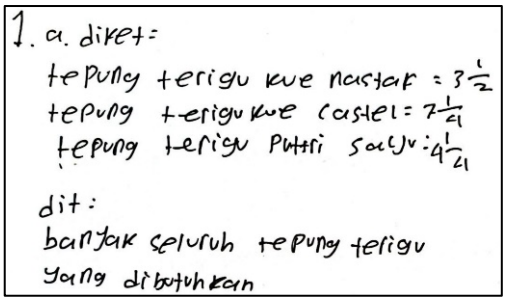

Figure 4. SKR Test Results

Based on the test results in figure 4, students with Low initial mathematical ability (SKR) could analyze the information presented in the form of a table. SKR could write down what information is known and what is asked in the question. However, SKR has not been able to use symbols and numbers that are relevant to the questions presented. SKR does not write the fraction size with the corresponding mathematical operation into a mathematical sentence. In working on these problems, SKR has not been able to use his logical thinking skills to obtain the right calculation results. In addition, at the end of the answer, it can be seen that SKR did not write down the steps and conclusions of the calculations obtained. The following are the results of the researcher's interview with SKR:

Researchers : What is known and asked in the question?
SKR : Recipe for nastar cake, castangel cake and snow white cake. What is asked in the question is that many wheat grains are needed.
Researchers : How do you solve it?
SKR : I'm sorry, I'm confused about how to do it.
Researchers : If the math sentence is a math sentence, do you know?
SKR : I don't understand what a math sentence is.
Researchers : So you don't write down the answer because you don't know what a math sentence is, right?
SKR : Yes, sis. I felt confused when I was working.
Researchers : Okay, then, do you know what symbols you are familiar with in the question?
SKR : What kind of mathematical symbol is that? I still don't understand.
Researchers :Well. Here I tell you a little. The mathematical symbols are variegated such as the number sign, subtraction, equals and comparison sign.
Researchers : If you give me a little direction for the steps to do it, are you still having difficulties?
SKR : Yes, sis.

Based on the results of tests and interviews conducted by researchers with subjects with low initial mathematical ability, the subject was able to fulfill only one out of the three assessed numeracy indicators. Specially the indicator related to analyzing information presented in various forms. This outcome stands in contrast to the study conducted by Jayanti Putri Purwaningrum, n.d. (2024) which indicated that subject with low initial mathematical ability were able to meet the indicator involving the utilization of diverse mathematical numbers and symbols. Furthermore, Istiqomah (2023) noted that students prossesing low levels of initial

mathematical aptitude frequently encounter difficulties in comprehending instructional material.

CONCLUSION

Based on the analysis, the numeracy abilities of 5th-grade students at SD Muhammadiyah 1 Menganti for the 2024/2025 academic year can be summarized as follows: (1) Students with high initial mathematical ability are able to demonstrate all three indicators of numeracy skills: analyzing information presented in various forms, using mathematical symbols and numbers appropriately, and predicting results to arrive at correct answers. (2) Students with medium initial mathematical ability are able to demonstrate two indicators: analyzing information and using mathematical symbols and numbers. (3) Students with low initial mathematical ability are able to demonstrate only one indicator: analyzing information presented in various forms. Therefore, It can be concluded that students' numeracy skills in solving fraction problems are strongly influenced by their level of initial mathematical ability.

REFERENCES

Baharuddin, M. R., Sukmawati, S., & Christy, C. (2021). Deskripsi Kemampuan Numerasi Siswa dalam Menyelesaikan Operasi Pecahan. *Pedagogy: Jurnal Pendidikan Matematika*, *6*(2), 90–101.

Dewi, N. K., Untu, Z., & Dimpudus, A. (2020). Analisis Kesulitan Menyelesaikan Soal Matematika Materi Operasi Hitung Bilangan Pecahan Siswa Kelas VII. *Primatika : Jurnal Pendidikan Matematika*, *9*(2), 61–70. https://doi.org/10.30872/primatika.v9i2.217

Istiqomah, D. N. (2023). Analisis Hubungan Kemampuan Awal Mahasiswa Terhadap Hasil Belajar Matematika. *Jurnal Ilmiah Matematika Realistik*, *4*(2), 156–160. https://jim.teknokrat.ac.id/index.php/pendidikanmatematika/article/view/2553%0Ahttps://jim.teknokrat.ac.id/index.php/pendidikanmatematika/article/download/2553/969

Janah, S. R., Suyitno, H., & Rosyida, I. (2019). Pentingnya literasi matematika dan berpikir kritis matematis dalam menghadapi abad ke-21. *PRISMA, Prosiding Seminar Nasional Matematika*, *2*, 905–910.

Jayanti Putri Purwaningrum, L. N. A. (n.d.). *DIDIK SISWA DALAM MENYELESAIKAN MATERI BILANGAN CACAH SAMPAI 1000*. *11*(2), 129–141.

Khoirunnisa, S., & Adirakasiwi, A. G. (2023). Analisis Kemampuan Literasi Numerasi Siswa Smp Pada Era Merdeka Belajar. *Jurnal Pembelajaran Matematika Inovatif*, *6*(3), 925–936. https://doi.org/10.22460/jpmi.v6i3.17393

Kurniawati, I., & Kurniasari, I. (2019). Literasi Matematika Siswa Dalam Menyelesaikan Soal Pisa Konten Space and Shape Ditinjau Dari Kecerdasan Majemuk. *MATHEdunesa*, *8*(2), 441–448.

Nikmah, N., & Nugraheni, L. (2023). Analysis of Students' Mathematical Communication Skills in Eight Grade of Junior high school on Number Patterns. *Journal of Education and Learning Mathematics Research (JELMaR)*, *4*(1), 20–30. https://doi.org/10.37303/jelmar.v4i1.106

Nurhayati, N., Asrin, A., & Dewi, N. K. (2022). Analisis Kemampuan Numerasi Siswa Kelas Tinggi dalam Penyelesaian Soal Pada Materi Geometri di SDN 1 Teniga. *Jurnal Ilmiah Profesi Pendidikan*, *7*(2b), 723–731. https://doi.org/10.29303/jipp.v7i2b.678

Riswari, L. A., Mukti, L. I., Tamara, L. F., Ayu, M., Hapsari, P., & Cahyaningrum, D. Y. (2023). Analisis Kemampuan Pemecahan Masalah Matematis Pada Materi Pecahan Siswa Kelas Iii Sdn 2 Karangrejo. *Jurnal Ilmiah Matematika Realistik (JI-MR*, *4*(2), 188–194.

Setiawan, F., & Sukamto, S. (2021). the Implementation of Pioneer Teaching Campus (Ptc)

As a Forerunner of Literacy and Numeracy Learning Movement At Elementary School. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, *10*(2), 339–345. https://primary.ejournal.unri.ac.id/index.php/JPFKIP

WAHYUNI TERESIA, 2021. (n.d.). *ASESMEN NASIONAL 2021*. Guepedia. https://books.google.co.id/books?id=CrlIEAAAQBAJ

Yayuk, E. (2019). *PEMBELAJARAN MATEMATIKA SEKOLAH DASAR*. UMMPress. https://books.google.co.id/books?id=uc_oDwAAQBAJ