



## Analysis of Numeracy Ability of Class VII Students SMP Negeri 1 Siantar

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**Abstract:** Arithmetic is a field of mathematics closely related to human existence. It will be helpful for anyone to perform any task that requires calculation if they have a basic understanding of mathematics. However, sometimes it is optional to carry out precise calculations. Counting is the backbone or breath of learning mathematics. Students' ability to count becomes vital in teaching mathematics to students. The research aimed to measure Class VII students' numeracy skills at SMP Negeri 1 Siantar, Simalungun Regency. The method used is a descriptive-quantitative approach. The population is nine classes with 254 students, and the sample is taken in layers and randomly as many as four classes with 112 students. The nine classes consist of 2 groups, namely the Superior Class (KU) of 2 classes, namely class VII1 and class VII2, and the Ordinary Class (KB) of 7 classes, namely class VII3, VII4, VII5, to class VII9. The research concluded that the Superior Class could count, while the Ordinary Class was 5.95% unable to count. The findings of this study imply that apart from providing students with a better learning environment and infrastructure, it is essential to improve their arithmetic skills.

**Abstrak:** Aritmatika adalah bidang matematika yang terkait erat dengan keberadaan manusia. Siapa pun akan terbantu saat melakukan tugas apa pun yang membutuhkan perhitungan jika mereka memiliki pemahaman dasar tentang matematika. Tetapi terkadang tidak perlu melakukan perhitungan yang tepat. Berhitung merupakan penopang atau napas dari pembelajaran matematika. Kemampuan siswa dalam berhitung menjadi penting dalam pembelajaran matematika kepada siswa. Tujuan penelitian adalah untuk mengukur kemampuan berhitung Siswa Kelas VII SMP Negeri 1 Siantar Kabupaten Simalungun. Metode yang digunakan adalah pendekatan deskriptif-kuantitatif. Populasi 9 kelas dengan siswa 254 orang, sampel diambil secara berlapis dan acak sebanyak 4 kelas dengan siswa 112 orang. Kesembilan Rombel terdiri dari 2 kelompok, yaitu Kelas Unggulan (KU) sebanyak 2 Rombel yaitu kelas VII1 dan kelas VII2, dan Kelas Biasa (KB) sebanyak 7 Rombel, yaitu kelas VII3, VII4, VII5, sampai kelas VII9. Penelitian menyimpulkan Kelas Unggulan mampu berhitung, sedangkan Kelas Biasa ada 5,95% belum mampu berhitung. Temuan penelitian ini menyiratkan bahwa selain menyediakan lingkungan dan infrastruktur belajar yang lebih baik bagi siswa, penting untuk meningkatkan keterampilan aritmatika mereka.



## A. Introduction

One of the compulsory subjects, mathematics, is taught at all levels of education, be it kindergarten, elementary, junior high, high school, and college. Therefore, mathematics can be found in everyday life. The title "Queen of Science" is awarded to mathematics. The purpose of learning mathematics is to help students count accurately, using methodical and mathematical-based long-chain thinking, which is then solved logically and scientifically (Masitoh & Aedi, 2020; Melisa et al., 2019). Educational goals, if one's mathematical arithmetic talent falls to a high level, this can be achieved and completed.

It is clear from some of these studies that studying mathematics requires a strong foundation in mathematical calculations. Therefore, students must be highly numerate in mathematics because mathematical skills enable students to solve mathematical puzzles that measure a person's intellectual prowess in performing arithmetic procedures that require the ability to reason logically and methodically. Teachers must consider the importance of numerical mathematical abilities for learning mathematics because students who have solid numerical mathematical abilities find learning easy to follow, especially when studying mathematics, which will increase their learning achievement in these subjects (Pradja & Firmansyah, 2020; Saputra et al., 2021).

Among the definitions of mathematics, one states that mathematics is knowledge of numbers and calculations (Syamsu et al., 2019; Ramadhani et al., 2020). Fundamentally, counting is related to the addition, subtraction, multiplication, and division of numbers (Lestary et al., 2022). Counting is essential at work and in everyday human life. Counting is the backbone or breath of learning mathematics (Zaini & Sutirna, 2021). Students' ability to count is essential in teaching mathematics to students (Heriyati & Munasiah, 2022).

Students' numeracy skills are so crucial that mathematics learning at the SMP Class VII Semester 1 level, namely the achievement of Basic Competency (KD), which reads "Explaining and performing arithmetic operations on integers and fractions by utilizing various properties of operations", is the initial activity. Even though arithmetic operations (counting) have been studied at the elementary level, it is necessary to ensure that studying mathematics further at junior high school must be based on the student's ability to count (Masfufah & Afriansyah, 2021). As far as the author's observations are concerned, more research on students' numeracy skills is needed at the junior high school level. The research that the author has observed is "Analysis of the Numeracy Ability of Class III Students of SD Negeri Ulaweng District, Bone Regency" (2020) and "Development and Numeracy Ability of Elementary School Students in Margasari with Media Sempoa (Melani et al., 2019; Suryaningrat et al., 2021).

In other research findings, an interview with one of the eighth-grade mathematics teachers found that students still had difficulty solving problems involving numbers or mathematical symbols for numbers. Low ability was also reported in other studies. Statistics show that junior high school students' math skills in one field still need to improve because 75% of participants still need help identifying problem-solving techniques and even find it challenging to use reasoning, especially regarding numbers. In other words, Nadia's



investigation revealed that out of 37 grade VIII students, 26 did not meet the required math proficiency or numerical ability.

Counting in mathematics is still only 11 students who achieve the required proficiency in numerical mathematics. According to Tashril's research, based on his observations, math test scores are still below the KKM, and remedial measures are always carried out to increase their scores. The main reason is that the students' numerical mathematical abilities still need to improve. According to Sitriani's research, only six male students had moderate math skills, while 158 male students had low levels. Likewise, out of 197 students, only 1 had excellent numerical ability, followed by 16 students with moderate and 16 with low mathematical numerical ability.

Among the factors determining success in studying mathematics, one of them is influenced by internal factors or factors within the student (Sari, 2022). Factors within students such as interest, awareness, and willingness also depend on their ability to study mathematics (Safitri, 2021). Certain sections or branches of mathematics also require intellectual skills, such as calculating skills, integration skills, changing formulas from one form to another, and translating verbal sentences (Izzah & Azizah, 2019; Valentina & Wulandari, 2022).

A student is said to be active and able to count quickly and accurately in learning mathematics so that students will find it easier to solve problems both in mathematics lessons and then apply them in everyday life so that students can solve problems and find the right solution according to their needs. ability (Yarmayani & Simamora, 2021). According to the mathematics book issued by the Ministry of Education and Culture, the mathematics learning material for Grade VII Middle School students at the beginning of semester 1 is 'Numbers'. The results of studying the material in the arithmetic form are (1) Addition and Subtraction of Whole Numbers, (2) Multiplication and Division of Whole Numbers, (3) Addition and Subtraction of Fractional Numbers, and (4) Multiplication and Division of Fractional Numbers. Based on the concept of the number line, that numbers consist of integers and fractions, as well as positive numbers, zeros, and negative numbers, learning arithmetic groups (groups) are groups of students (students) who are enrolled in a class unit. For SMP, the maximum number of students in one class is 32 people. For class VII students at SMP Negeri 1 Siantar in the 2022/2023 academic year, the class is divided into two parts, namely the class which is called the Main Class and the class which is called the Ordinary Class (Ananda & Wandini, 2022).

Some of these studies show that the numerical arithmetic abilities of Indonesian students still need to improve. This should concern every Indonesian math instructor who wants to improve education and the teaching of mathematics in particular. Students cannot participate in learning, especially in learning mathematics, if their numerical ability in mathematics is still in the low group.

Minimum Completeness Criteria (KKM) is the lowest criterion for stating that students have achieved completeness (Asmal, 2020). Mastery means successful or able. KKM must be determined at the beginning of the school year by the education unit based

on the results of the Subject Teacher Consultation (MGMP) in the education unit or several academic units with almost the same characteristics (Amir et al., 2021). Academic considerations from educators or the MGMP forum are the primary considerations for determining the KKM (Yunita & Imami, 2022). In this study, the size of a student is said to be capable if the student reaches or exceeds the KKM (Srimularahmah & Buhari, 2022). The results of an interview with the Management of Siantar 1 Public Middle School showed that the KKM Mathematics for the Superior Class was 80, while for the Ordinary Class, it was 70.

## B. Method

The method used in this research is a descriptive-quantitative approach (Ate & Lede, 2022; Erawati et al., 2021; Sexcio & Dafit, 2022). The population is all class VII students of SMP Negeri Siantar TP 2022/2023. The population is nine groups with a total of 254 students. The nine classes consist of 2 groups, namely the Superior Class (KU) of 2 classes, namely class VII<sub>1</sub> and class VII<sub>2</sub>, and the Ordinary Class (KB) of 7 classes, namely class VII<sub>3</sub>, VII<sub>4</sub>, VII<sub>5</sub>, to class VII<sub>9</sub>. Samples are taken in layers and randomly. The sampling results were class VII<sub>2</sub> for KU (28 people), class VII<sub>3</sub>, class VII<sub>5</sub>, and class VII<sub>7</sub> for family planning (84 people). The instrument used to measure numeracy skills is a test (Andayani & Lathifah, 2019).

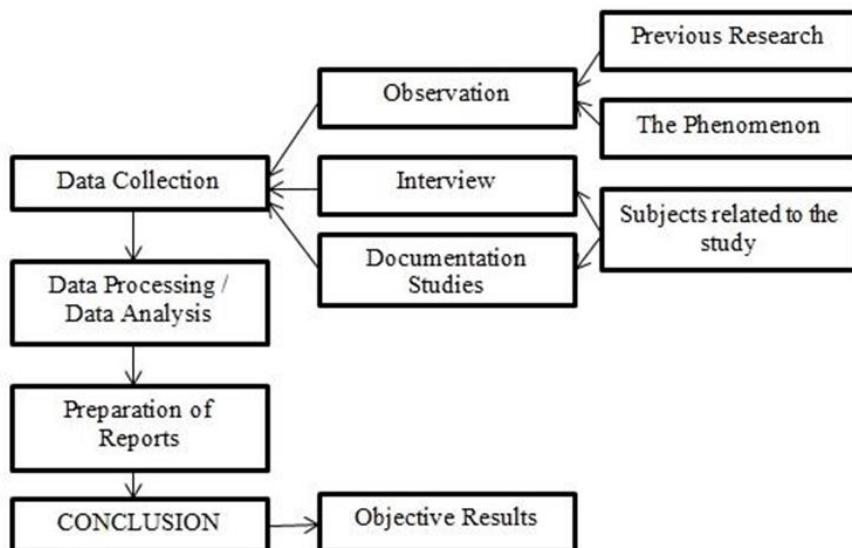


Figure 1. Descriptive-Quantitative Approach Design

Multiple choice test with four options of 32 questions. The details of the questions are as follows:

1. Adding and subtracting integers ( $x_1$ ) = 8 questions
2. Multiply and divide integers ( $x_2$ ) = 8 questions
3. Adding and subtracting fractions ( $x_3$ ) = 8 questions



4. Multiply and divide fractions ( $x_4$ ) = 8 questions.

**Table 1.** Question Difficulty Level Criteria

Coefficient Correlation	Interpretation
0.00 – 0.30	Hard
0.31 – 0.70	Currently
0.71 – 1.00	Easy

The arithmetic operations questions are arranged evenly between positive numbers and positive numbers, positive numbers and negative numbers, negative numbers and positive numbers, and negative numbers and negative numbers (Yufentya et al., 2019).

Students can solve simple kalibataku calculation problems for systematic calculation indicators (multiplication, division, addition, and subtraction). Students are required to explain problems rationally in logical thinking indicators; this ability is not related to their numeracy skills but to their understanding of mathematical problem-solving ideas. Students are expected to be able to understand a fairy tale and then translate it into an equation or mathematical formula in the form of a story for the following indicators, namely indicators of applying the notion of problem-solving. Students must learn patterns of changing numbers or letters to recognize patterns and relationships between numbers that end up being complete series. Researchers use test instruments to meet the requirements of the four indicators.

**Table 2.** Interpretation of Mathematical Numerical Ability Values

No	Value Range	Criteria
1	90 – 100	Very high
2	80 – 89	High
3	65 – 79	Currently
4	55 – 64	Low
5	0 – 54	Very low

Steps to analyze students' numeracy skills are carried out:

1. Change the student's correct score for each variable ( $x_1, x_2, x_3, x_4$ ) to values ranging from 0-100
2. Determine the variable  $X$ ,  $X = x_1 + x_2 + x_3 + x_4$ .  $X$  is a measure of numeracy ability.  $x_1, x_2, x_3, x_4$  is the size of the numeracy sub-components.
3. Compile  $X$  frequency distribution table and relative frequency, and provide interpretation.
4. Compile a frequency distribution table  $x_1, x_2, x_3, x_4$ , relative frequencies, and provide interpretation.

## C. Results and Discussion

### Results

The frequency distribution of the results of measuring students' numeracy skills ( $X$ ) after being converted to grades is shown in Table 3.

**Table 3.** Frequency Distribution of the Results of Measurement of the Numeracy Ability of Students in Superior Class (KU) and Ordinary Class (KB)

KU (KKM = 80)				KB (KKM = 70)			
Value (X)	F	Relative F	FX	Value (X)	F	Relative F	FX
81	2	7.14%	162	63	1	1.19%	63
84	3	10.71%	252	69	4	4.76%	276
88	8	28.57%	704	72	8	9.52%	576
91	10	35.71%	910	75	19	22.62%	1425
94	4	14.29%	376	78	24	28.57%	1872
97	1	3.57%	97	81	21	25.00%	1701
$\Sigma$	28	100.00%	2501	84	7	8.33%	588
				$\Sigma$	84	100.00%	6501

The average numeracy ability of KU students (Excellent class) is 89, and KB students (Ordinary Class) is 77. So on an average score, all class VII students of SMP Negeri 1 Siantar TA 2022/2023 can count. According to each student's score, all of the Superior Class students were able to count, but in the Ordinary Class, 5.95% of students were unable to count. The breakdown of the average value based on the variables  $x_1$ ,  $x_2$ ,  $x_3$ , and  $x_4$  is shown in Table 4. Based on data from Table 4, even though the Superior Class can count as a whole, on average, students still need to reach the KKM in multiplying and dividing numbers fractions (Ardiawan, 2019). Likewise, in the Ordinary Class, students have yet to reach the KKM in multiplying and dividing fractions (Sepripiyani & Novtiar, 2021).

**Table 4.** Details of Student Ability Measurement Results

Class	KKM	$x_1$	$x_2$	$x_3$	$x_4$	Value (X)
MY	80	99	97	87	74	89
KB	70	89	83	75	64	77

### Main Class Variable Analysis

The frequency distribution of  $x_1$ ,  $x_2$ ,  $x_3$ , and  $x_4$  for Superior Class students are shown in Table 5. Table 5 states that in terms of the numeracy sub-components, 8% of students have yet to reach the KKM in adding and subtracting fractions, and 83% of students have not reached the KKM in multiplying and dividing fractions.

**Table 5.** Preferred Class Frequency Distribution Based on  $x_1$ ,  $x_2$ ,  $x_3$ , and  $x_4$ 

$x_1$	$f_1$	$f_{1\text{relative}}$	$x_2$	$f_2$	$f_{2\text{relative}}$	$x_3$	$f_3$	$f_{3\text{relative}}$	$x_4$	$f_4$	$f_{4\text{relative}}$
87.5	3	11%	87.5	7	25%	75	8	29%	50	1	4%
100	25	89%	100	21	75%	87.5	14	50%	62.5	5	18%
$\Sigma$	28	100%	$\Sigma$	28	100%	100	6	21%	75	17	61%
						$\Sigma$	28	100%	87.5	5	18%
									$\Sigma$	28	100%

### Ordinary Class Variable Analysis

The frequency distribution of  $x_1$ ,  $x_2$ ,  $x_3$ , and  $x_4$  for Ordinary Class students are shown in Table 6. Table 6 it is stated in terms of the sub-components of numeracy skills, 4% of students have not reached the KKM in adding and subtracting fractions, 58% of students have not reached KKM in multiplying and dividing fractions.

**Table 6.** Ordinary Class Frequency Distribution Based on  $x_1$ ,  $x_2$ ,  $x_3$ , and  $x_4$ 

$x_1$	$f_1$	$f_{1\text{relative}}$	$x_2$	$f_2$	$f_{2\text{relative}}$	$x_3$	$f_3$	$f_{3\text{relative}}$	$x_4$	$f_4$	$f_{4\text{relative}}$
75	18	21%	75	43	51%	62.5	3	4%	37.5	2	2%
87.5	39	46%	87.5	33	39%	75	77	92%	50	23	27%
100	27	32%	100	8	10%	87.5	4	5%	62.5	24	29%
$\Sigma$	84	100%	$\Sigma$	84	100%	$\Sigma$	84	100%	75	35	42%
									$\Sigma$	84	100%

### Analysis between Superior Class and Ordinary Class

As a percentage, there are more students in the Superior Class than in the Ordinary class who have yet to be able to according to parts of the measurement of numeracy skills (Syahril et al., 2021). However, in reality, this happened because the KKM, which became the benchmark for the numeracy abilities of the Superior Class students (80), was higher than the Ordinary Class (70).

### Discussion

Based on the results of the research above, it is known that class VII students have difficulty in calculating multiplication, especially when asking questions about the nature of commutative, associative, and distributive multiplication operations, as well as solving multiplication problems made by themselves. To determine what causes students difficulties when formulating arithmetic problems involving commutative, associative, and distributive multiplication properties. Obtained from the results of interviews with 16 class VII students showed that they were able to answer multiplication commutative, associative, and distributive questions. When making their questions, students' answers were flawed because there needed to be a more in-depth correct conceptual understanding of the nature of commutative, associative, and distributive multiplication operations. It still needs to be



right or wrong. Typical student answers when asked about the properties of commutative, associative, and arithmetic multiplication operations. Distributive gives a confusing answer.

In line with the results of research conducted by [Pujiyono et al](#) (2022). The results of this study indicate that the multiplication skills of third-grade elementary school students are included in the high category on the problem-solving ability indicator. In contrast, the ability to create problems and find solutions is included in the low category. Considering the results, the findings of this study imply that apart from providing better facilities and infrastructure for students to learn, it is essential to improve their ability to perform multiplication calculations. In line with the results of research conducted by [Suryaningrat et al](#) (2021) based on data analysis, it can be concluded that a common mistake among students is failure to understand the problem. Social math problems are complex for students to understand. Choose a problem-solving technique and check the answers' results as students who can do it on the indications of the mathematical model.

According to [Malik](#) (2018); [Jonsson et al](#) (2020), mathematics is taught systematically and step-by-steply, developing from concrete to abstract concepts and from basic to sophisticated concepts. Alternatively, moving from a more straightforward concept to a more challenging one. According to [Runtukahu & Kandou](#) (2014), this supports learning objectives that are selected according to children's learning abilities and are beneficial for children, so that: (1) think rationally and clearly; (2) overcoming difficulties in everyday life; (3) recognize patterns, correlations, and generalizations from experience; (4) foster creativity; and (5) increasing awareness of cultural development.

## D. Conclusion

The numeracy abilities of class VII students of SMP Negeri 1 Siantar, Simalungun Regency, TA 2022/2023, are as follows that of the Superior Class; on average, between the sub-components of numeracy skills, all students can count. Regular class; on average, between the numeracy sub-components, there were 5.95% of students unable to count. Regarding the sub-component of numeracy skills, 8% of students had yet to reach the KKM in adding and subtracting fractions, and 83% of students had not reached the KKM in multiplying and dividing fractions. Regarding the sub-component of numeracy skills, in students in Ordinary Classes, 4% of students have yet to reach the KKM in adding and subtracting fractions, and 58% of students have yet to reach the KKM in multiplying and dividing fractions. First, there needs to be retraining of students in multiplying and dividing fractions. Second, the KKM Mathematics for Superior and Ordinary Classes should be reviewed.

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