

The Private Student's Junior High School and Their Numeracy Literacy Competency

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Abstract: Numerical literacy is an important aspect of schooling. Students must be able to count, relate, and perform arithmetic. The purpose of this study is to know deeply the numeracy literacy competency of private student's junior high school. The following findings are the result of research employing tests as a data collection instrument. There are two students in the high category, five in the medium group, and nineteen in the low category. Based on these findings, it is possible to conclude that children at the research school have poor literacy skills. Furthermore, it is envisaged that schools will seek alternate learning techniques capable of concretizing numeracy literacy principles. Numerical literacy is an important part of the world of education. Students are expected to understand and acquire the competency of numeracy.

Keywords: Indonesia; Numeracy literacy; Students

Introduction

Many academic discussions related to numeracy literacy have been carried out by lecturers, teachers, and observers of mathematics (Alfan et al., 2022; Gal et al., 2020; Umbara & Suryadi, 2019). Numerical literacy is closely related to the use of numbers and symbols related to basic mathematics to solve contextual problems and information presented in various forms of graphs, tables, and charts (Ardellea & Hamdu, 2022). In simple terms, numeracy literacy can be interpreted as skills in applying the concept of numbers and arithmetic operations to solve contextual problems (Wium & Louw, 2012). The essence of numeracy literacy is the skills and attitudes needed by each student in using numbers and data to make decisions in student and social life (Sa'dia, 2021).

Numerical literacy skills cover three things, namely counting, numerical relations, and arithmetic operations (Munahefi & Lestari, 2023; Sa'dia, 2021). Counting is the ability or skill in identifying the number of an object and skills in counting an object verbally (Rahman, 2014). Numerical relations relate to students' ability to relate the quantity of an object, such as less, more, higher, or

lower (Buckley, 2007; Winata et al., 2021). Next, arithmetic operations are the ability to complete basic mathematical operations such as subtraction, addition, multiplication, and division. Numerical literacy consists of components that cannot be separated from mathematics (Wium & Louw, 2012).

Numerical literacy is not the same as mathematics. However, numeracy literacy cannot be separated from mathematics because numeracy literacy is part of mathematics (Ambarwati & Kurniasih, 2021). Numerical literacy is useful in solving basic arithmetic and solving practical and contextual problems. In numeracy literacy, there is a scope of mathematics (Rahman, 2014). In its application, numeracy literacy applies basic mathematical operations and is practical, which means it can be used to solve problems in everyday life (Nurfallah & Pradipta, 2021).

In reality, numeracy literacy is of particular concern to teachers and researchers in Indonesia. Attention is given to the low ability of students to understand numeracy (Baroroh et al., 2019; Wulandari et al., 2023). They still have difficulty understanding tables, diagrams, charts, etc (Yusuf Al-Amin, 2021). Indonesia is a country that has very low numeracy literacy skills,

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compared to countries in Southeast Asia. Sari (2021) explained that the results of Indonesia's participation in TIMSS and PISA were not satisfactory, this can be seen in the achievement in mathematics competence which has not increased significantly, in 2012 Indonesia got 375 points and in 2015 got 386 points. This increase only brought Indonesia to rank 63 out of 70 countries (Ardellea & Hamdu, 2022). Then in 2016, the Ministry of Education and Culture's GLN TEAM also explained the results of Indonesia's participation in TIMSS and PISA were ranked at the bottom. Judging from the 2015 PISA and 2016 TIMSS tests, PISA issued the results of the Indonesian mathematics test with a score of 387. Then the results of the Indonesian TIMSS scored 395 with an average score of 500. The 2018 PISA results released by the OECD (2019) also show an average score of Indonesian students' mathematics reached 379 with an average OECD score of 487 (Umbara & Suryadi, 2019). OECD is The Organization for Economic Cooperation and Development working on financial literacy as the knowledge and understanding of the concepts and risks associated with financial aspects (Indefenso & Yazon, 2020). These results indicate that the students' numeracy literacy skills are still low due to the large amount of material tested by TIMSS and PISA in the form of questions that are context problems in real life, while students are not used to solving real problems and are unable to analyze information in real life (Ashri & Pujiastuti, 2021).

From some of the information presented above, it can be seen that students in Indonesia have low numeracy literacy skills. For this reason, efforts to increase numeracy literacy skills are the joint responsibility of mathematics teachers in particular (Adawiyah et al., 2023; Alfani et al., 2022). And based on searching for articles in scientific journals, many efforts have been made to advance students' numeracy literacy skills (Ardellea & Hamdu, 2022; Khoirunnisa & Ulfah, 2021; Sari et al., 2021). However, these efforts must always be made until TIMSS and PISA are good.

The measurement of numeracy literacy skills in various schools really needs to be pursued (Ambarwati & Kurniasih, 2021; Ardellea & Hamdu, 2022). The goal is to immediately know the general level of students' numeracy literacy skills (Adawiyah et al., 2023). Not to forget, their learning motivation also needs to be detected (Rakimahwati, 2014; Suratman et al., 2019). What is their actual motivation to learn numeracy, high, medium, or low? What ways can be pursued to foster interest in learning numeracy are continuously being sought and researched (Adawiyah et al., 2023). By knowing the level of their numeracy literacy skills and their motivation to learn numeracy, the teacher will be able to determine the right solution for this problem (Syafii, 2021). The problem of low students'

understanding of numeracy also occurs in junior high schools Muhammadiyah Al-Kautsar PK Gumpang Kartasura.

Based on the teacher's notes, most students have not mastered the skills in applying the concept of numbers and arithmetic operations to solve contextual problems. The next problem is that most of the unskilled students are male or female and have not been detected. Then it is also not yet known the level of students' motivation in learning numeracy. Are women more motivated or vice versa? Of course, early detection related to these problems will greatly assist teachers in teaching numeracy. Problems in schools related to numeracy literacy are quite complex and need to be studied carefully in order to quickly find a solution. However, on this occasion, the researchers only focused on knowing deeply the numeracy literacy competency of private student's junior high school. By understanding the students' position, it can be used to determine the steps that must be taken by the teachers.

Method

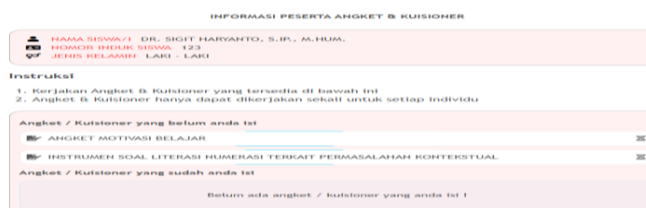


Figure 1. Initial view

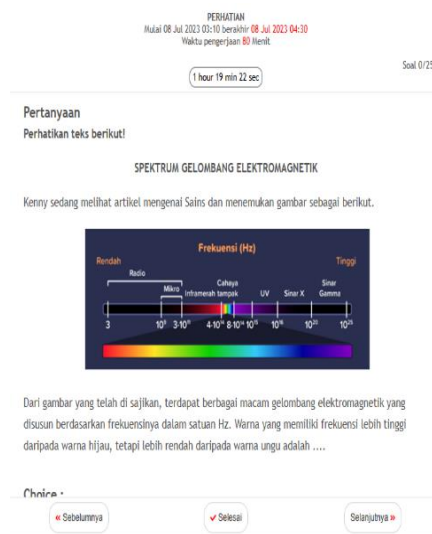


Figure 2. Example questions

This quantitative descriptive research was conducted in junior high schools Muhammadiyah Al-Kautsar PK Kartasura, Sukoharjo, Central Java in the 2022/2023 academic year. In this study, the researcher attempted to describe the conditions of the research

subjects naturally and emphasized meaning rather than generalizations. This is based on the aim of the researcher who wants to examine students' numeracy literacy skills associated with their learning motivation. Purposive sampling was used in determining the research sample. The research sample is class VIII students.

Data were taken through a test given to 26 students in grade 8A. The test was used to retrieve literacy ability data assisted by an addressable online test application <https://simante-dee-sig.ums.ac.id/angket/>. The appearance of the test equipment can be seen in Figures 1 and 2. Furthermore, the instrument lattice of numeracy literacy questions related to contextual issues can be seen in Table 1.

Table 1. Numerical Literacy Ability Grid

Cognitive Level	Scope of Numeracy Literacy	Numerical Literacy ability indicator
Knowing Applying Reasoning	Number	- Understand whole numbers (max. six digits) - Orders numbers including negative integers, decimals, fractions, and irrational numbers
	Geometry and Measurement	- Use addition/subtraction/multiplication/division of fractions or decimals, including calculating the square and cubic of a decimal with one decimal place. As well as operations on integers including negative integers (including estimating the results of operations) - Understand the properties of flat shapes and the relationship between flat shapes and can use the Pythagorean Theorem - Calculate the volume of geometric shapes and surface areas (blocks, cubes, triangular prisms, cylinders, and their composite shapes). - Calculate and estimate the volume and surface area of blocks, cubes and their combinations - Recognize and use standard units of volume (cm ³ , m ³ , liter), velocity, and discharge
	Algebra	- Solve linear equations with 1 variable or systems of linear equations with 2 variables. Relations and Functions (including Number Patterns) - Understand patterns in number sequences and object configurations
	Data and Uncertainty	- Understand linear functions and their graphs, as well as their properties. Ratio and Proportion - Solve social arithmetic problems related to ratios/percentages. Data and its Representation - Determine and use the mean, median, and mode. - Compare and assess the effectiveness of various data views Uncertainty and Opportunity - Calculating the probability of a simple event.

Table 2. Numerical Literacy Ability Grid

Scale 0-100	Predicate
86 - 100	A
81-85	A-
76-80	B+
71-75	B
66 - 70	B-
61-65	C+
56-60	C
51-55	C-
46 - 50	D+
0 - 45	D

x 5. For example, if the correct answer is 10, then the score is 10X5 = 50. Next, the score is matched with a scale to obtain the title

Result and Discussion

In this sub-chapter, the researcher presents the results of the analysis related to the numeracy literacy test. The explanation of the results is presented as follows.

Numerical Literacy Test Results

The number of questions tested was 20 questions. Based on the results of the analysis it is known that the students' abilities related to numeracy literacy are

Furthermore, the data collected were analyzed by describing numeracy literacy abilities based on the criteria that have been made, namely the correct answer

classified as low. This can be seen from the low predicate frequency of 19 students (see Table 3).

Table 3. Instrument test results

Student's name	Correct point	Mark	Predicate
KH	10	50	D+
DY	13	65	C+
AM	10	50	D+
ARZ	9	45	D
CD	8	40	D
FS	13	65	C+
MP	14	70	B-
HA	9	45	D
NS	10	50	D+
ANN	9	45	D
AU	10	50	D+
RA	9	45	D
KM	10	50	D+
NA	15	75	B
NW	10	50	D+
AS	9	45	D
MH	16	80	B+
RD	17	85	A-
HI	13	65	C+
AA	9	45	D
M	10	50	D+
ABW	10	50	D+
DA	14	70	B-
RH	9	45	D
MAU	10	10	D+
SP	10	10	D+
IQ			
VP			
WS			

The existence of data related to how many students are classified as high, medium, and low can be seen in the following chart 1.

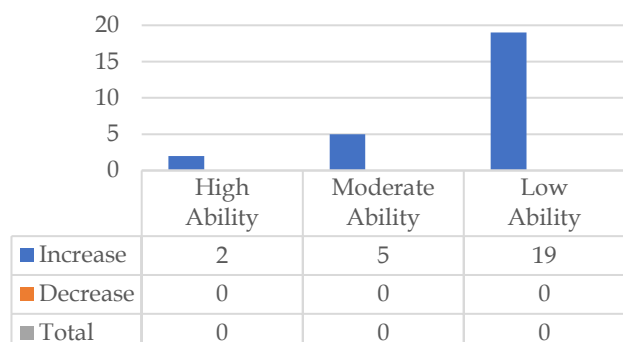


Figure 3. Predicate frequency of success

From figure 1 it can be seen that students belonging to high abilities are two people, five people are moderate, and nineteen people are low.

The results of the research that has been carried out show that the students of SMP Muhammadiyah Al Kausar Gumpang Kartasura have low numeracy literacy. Of the 26 students, 19 students are in the low predicate. This finding is certainly supporting evidence that the numeracy literacy skills of Indonesian students are not encouraging. The low level of understanding of the numeracy literacy of our country's students can also be seen in the results of the PISA (Program International Student Assessment) and TIMSS (Trends in International Mathematics and Science Study) exams which are now used as a reference for the government in mapping students' numeracy literacy abilities.

Regarding Indonesia's participation in the two tests, it was not encouraging. It can be seen from what was said by Sara (2021; Suharto et al., 2018). They said that the results of Indonesia's participation in TIMSS and PISA were not satisfactory. In mathematics competence, the increase is not significant. In 2012 Indonesia got 375 points and in 2015 got 386 points. This increase only brought Indonesia to rank 63 out of 70 countries (Ardellea & Hamdu, 2022). Then in 2016, the Ministry of Education and Culture's GLN TEAM also explained the results of Indonesia's participation in TIMSS and PISA were ranked at the bottom. Judging from the 2015 PISA and 2016 TIMSS tests, PISA issued the results of the Indonesian mathematics test with a score of 387. Then the results of the Indonesian TIMSS scored 395 with an average score of 500. The 2018 PISA results released by the OECD (2019) also show an average score of Indonesian students' mathematics reached 379 with an average OECD score of 487 (Umbara & Suryadi, 2019). What is OECD? OECD is The Organization for Economic Cooperation and Development working on financial literacy as the knowledge and understanding of the concepts and risks associated with financial aspects (Indefenso & Yazon, 2020). The low numeracy literacy skills of students are mostly caused by the material tested by TIMMS and PISA in the form of questions that are context problems in real life, while students are not used to solving real problems and are unable to analyze information in various forms.

Another reason why the numeracy literacy of junior high school students in the research location is low is due to students' difficulties in understanding the questions in terms of their ability to read comprehension and mathematical sentences (Patta et al., 2021; Zerlinda, 2022). Thus, students' difficulties in solving math word problems are not sufficiently approached from the view of mathematics, but it is possible with a new view, namely word problems as a discourse related to linguistics (Mahmud & Pratiwi, 2019; Perdana & Suswandari, 2021). If a child at early school age does not immediately have the ability to read, then he or she will

experience many difficulties in learning the field of study in the next class (Ismanto, 2022). Another difficulty is students in building problem-solving strategies. If referring to the problem-solving steps according to Polya (1957) there are four stages of completion, namely: (a) understanding the problem; (b) planning problem-solving; (c) implementing a problem-solving plan; and (d) re-examination. The student is able to understand the problem, but he is wrong when preparing a solution to the problem. The next difficulty is the difficulty in drawing conclusions. Some students have good mathematical abilities (Ardellea & Hamdu, 2022; Patriana et al., 2021) can solve mathematical problems well, but have not been able to draw conclusions from problem-solving. This shows that students' numeracy skills have not developed properly.

The results of this study complement the results of research conducted by previous researchers, namely the low numeracy ability of students in Indonesia is caused by many factors, such as being unable to understand problems, representing problems in the form of mathematics or images of a problem, building reasoning in solving problem-solving problems and develop a settlement strategy.

Conclusion

It is no longer denied that the numeracy literacy of students in Indonesia is low. The results of the study showing that the number of students in the low category was higher than those in the medium and high categories, namely 19:5:2, strengthened the evidence that students in the numeracy literacy research schools were not performing well. Furthermore, these results can be used by schools to improve students' numeracy literacy skills by looking at the root of the problem and then solving them one by one so that gradually there is an increase in students' literacy skills. The way that can be done is by accelerating the understanding of the main concepts easily and concretizing the teaching materials.

Author Contributions

Safira Fitrianingrum conceptualized the research idea, design of methodology, management, and coordination responsibility. Budi Murtiyasa is a consultant for the research, he controlled the research and investigated processes, literature review, and analyzed data.

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Conflicts of Interest

The author declares no conflict of interest.

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