

## **Application of Numerical Literacy to Elementary School Students**

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### **Abstract**

Elementary school students must have numeracy literacy skills to encourage student-centered learning. His abilities, knowledge, and skills in analyzing, solving problems, interpreting analysis results, and making decisions are some of them. This study aims to determine how effective numeracy literacy is in elementary school students. The method used is literature research. This process is carried out systematically to collect, process, and conclude data based on existing literature, including articles published in national and international scientific journals related to research problems. The study results show that numeracy literacy is the ability to access, use, interpret, and communicate information using mathematics as a basic concept for solving problems in everyday life. To improve the numeracy literacy of elementary school students, two approaches can be used: the class-level approach, which includes learning mathematics and non-mathematics; the school-level approach, which provides for interventions, numeracy enrichment through the physical environment, and numeracy events or programs with the family.

**Keywords:** *Numerical Literacy, Elementary School*

## INTRODUCTION

Based on the PISA survey is the Program for International Students Assessment for some 15 year old students. The ranking of Indonesian students' mathematical literacy from 2009 to 2015 did not show a significant increase (Stacey, 2015) . In 2009 Indonesia was ranked 68th out of 74 countries. In 2012 Indonesia was ranked 64th out of 65 countries with a relatively low level of achievement. While the results of PISA in 2015 showed that Indonesia's ranking experienced a slight increase in order, namely 63 out of 72 countries. The results during the three surveys showed that the ability of students in Indonesia in terms of mathematical literacy, in particular, was still very low compared to other PISA participating countries (Ahmadi & Ibda, 2018; Novitasari, 2022a) .

In Indonesia, through a government program, the Ministry of Education and Culture in 2016 launched the National Literacy Movement (GLN). The National Literacy Movement is an implementation of the Minister of Education and Culture Regulation Number 23 of 2015 concerning the Growth of Character and Character. The National Literacy Movement (GLN), which has been launched by the government, is implemented through schools called the School Literacy Movement (GLS). The School Literacy Movement can be interpreted as an effort made to create literate learning organizations and foster character for school members through various activities including reading non-learning books for 15 minutes (Ekowati et al., 2019; Khakima et al., 2021) .

One of the School Literacy Movements is in the form of numeracy literacy. Numerical literacy is the knowledge and skills to use various numbers and symbols related to basic mathematics to solve practical problems in everyday life and then analyze the information presented in various forms and interpret the results of the analysis to predict and make decisions (Ministry of Education and Culture in Mahmud & Pratiwi, 2019).

Numerical literacy is defined as a person's ability to use reasoning. Reasoning means analyzing and understanding a statement, through activities in manipulating mathematical symbols or language found in everyday life, and expressing these statements through writing or orally (Puspaningtyas & Ulfa, 2020) .

Numerical literacy consists of three aspects, namely arithmetic, numeracy relations, and arithmetic operations. Counting is the ability to count an object verbally and the ability to identify the number of objects. Numerical relations relate to the ability to distinguish the quantity of an object such as more, less, higher or shorter. Meanwhile, arithmetic operations are the ability to carry out basic mathematical operations in the form of addition and subtraction. The three aspects of numeracy literacy that have been described previously are basic aspects in learning mathematics which are important to

be introduced from an early age until children enter the lower grades (Mahmud & Pratiwi, 2019).

The importance of numeracy literacy skills can be observed through the following example, a student learns the concept of multiplying integers with integers. Twice three is six. The result remains the same even though the question is replaced with three times two. However, it will be different when given in a drug administration situation. The rules for administering the drug twice three times three times two will give a different absorption and healing effect. By mastering the concept of multiplication with integers and good numeracy skills students will be able to explain the reasons why the effect of drug absorption is different. Another example in a different situation, the bus that will be used for study tour activities has a capacity of 48 people. If the study tour participants are 165 people, then how to make bus costs more efficient? In this problem students learn to realize that even though the result of  $165:48$  is 3.44, this tourism activity requires at least four tourism buses. The concept of rounding numbers is not used in this problem. Furthermore, in order to be cost efficient, the capacity of the fourth bus was chosen according to the shortage of seats for participants, not using four buses with a capacity of 48 people (Perdana & Suswandari, 2021).

Several researchers have conducted research on numeracy literacy. Nyoman Dantes in his research discusses the application of the blended learning model to numeracy literacy. The results of his research stated that there was an increase in the numeracy literacy of Class V elementary school students in Singaraja City with the implementation of the Blended Learning model (Dantes & Handayani, 2021). Likewise, Meggy Novitasari also produced research in the form of AKM model questions which were developed to have a positive potential effect on students' mathematical literacy abilities (Novitasari, 2022b). Not only that, research from Alfi Nurlaili states that the literacy skills of elementary school students in Padangsidempuan are still low, this can be seen from the average percentage of students' literacy skills in reading, science and mathematics, which is 54.46%. (Rahmawati, 2021). In this study, researchers discussed the application of numeracy literacy in elementary school students in the hope that there would be an increase in numeracy literacy.

## **METHODS**

The method of research is literature study since it is conducted utilizing library research. Mendes claimed that the teacher and student collaborated to evaluate the material and analyze pertinent themes during the library research process. (Mendes dkk., 2020).

Without undertaking field research, a literature search can make use of journals, books, dictionaries, records, periodicals, and other sources. The results of the analysis are presented as descriptive data in the form of written sentences and the results of prior research after gathering several journals relating to critical thinking skills in elementary school students and using descriptive qualitative analysis through literature study to analyze the data. According to Miles & Huberman's review, there are three stages to literature study research: data gathering, data reduction, data presentation, and drawing conclusions. (Ridder, 2014).

## **RESULTS AND DISCUSSION**

### **a. Literasi Numerasi**

Numerical literacy is the knowledge and skills to (a) use various numbers and symbols related to basic mathematics to solve practical problems in various contexts of everyday life and (b) analyze information presented in various forms (graphs, tables, charts, and so on) then use the interpretation of the analysis results to predict and draw conclusions and decisions (Keefe & Copeland, 2011; Siskawati et al., 2021).

In simple terms, numeracy can be interpreted as the ability to apply number concepts and arithmetic operations skills in everyday life (Mahmud & Pratiwi, 2019). Numerical literacy also includes the ability to translate quantitative information around us. In short, numeracy literacy is the ability or skill to develop knowledge and skills to use mathematics confidently in all aspects of life. Numerical literacy includes knowledge, skills, attitudes, and positive behavior (Agustina & Zayyadi, 2023).

The objectives of learning numeracy literacy for students are as follows (Darwanto & Putri, 2021).

- a. Sharpen and strengthen students' knowledge and numeracy skills in interpreting numbers, data, tables, graphs, and diagrams.
- b. Apply numeracy literacy knowledge and skills to solve problems and make decisions in everyday life based on logical considerations.
- c. Form and strengthen Indonesian human resources capable of managing natural resource wealth (SDA) so that they are able to compete and collaborate with other nations for the prosperity and welfare of the nation and state.

The benefits of learning numeracy literacy for students are as follows (Darwanto & Putri, 2021; Latifah & Rahmawati, 2022).

- a. Students have knowledge and skills in planning and managing good activities.
- b. Students are able to perform calculations and interpretation of existing data in everyday life.
- c. Students are able to make the right decisions in every aspect of their life.

Numeration is not the same as math competence. Both are based on the same knowledge and skills, but the difference lies in the empowerment of these knowledge and skills. Mathematical knowledge alone does not make a person have numeracy skills. Numeration includes skills in applying mathematical concepts and rules in real, everyday situations. When the problem is often unstructured, has many ways of solving, or even no complete solution, and is related to non-mathematical factors.

For example, a student learns how to divide an integer by another integer. If the first number is not divisible, there will be a remainder. Usually students are taught to write down quotients with remainders, then they also learn to express quotients in decimal form. In the context of everyday life, precision quotient (with decimals) is often unnecessary, so rounding is often done. Mathematically, the rule of rounding down is done if the decimal value is less than 5, rounding up if the decimal value is greater than 5, and rounding up or down can be done if the decimal value is 5.

However, in a real context, this rule cannot always be applied. For example, if 40 people who are going on an excursion are transported by a minibus that contains 12 people, mathematically the minibuses needed to accommodate all the people are 3.333333. Of course, this number is unreasonable, so we rounded it down to 3 minibuses. However, if a seat can only be occupied by one person, it means that 4 people cannot get a seat. Therefore, the number of minibuses that should be ordered is 4. It should be noted that numeracy requires knowledge of mathematics that is learned in the curriculum. However, learning mathematics itself does not necessarily develop numeracy skills.

### **Application of Numerical Literacy to Elementary School Students Numeration in Mathematics Subjects**

Numeration plays a role in determining the way and direction of learning mathematics in schools, so that learning mathematics is more meaningful for students contextually. Several principles of strengthening numeracy in mathematics include (1) paying attention to real-life contexts; (2) application of mathematical knowledge; (3) the use of physical, representational and digital tools; 4) increasing positive attitudes towards the use of mathematics to solve problems encountered in everyday life; and (5) a critical orientation to interpret mathematical results and make evidence-based decisions.

Numerical demands in mathematics involve the knowledge and capacity to take advantage of the interrelationships of mathematical ideas (between various topics and domains of mathematics). For mathematics teachers, the challenge is to pay special attention to how mathematics is used outside of the mathematics classroom, for example posing problems whose solutions depend on context and asking students to

justify their solutions and the choice of math skills they use. Strengthening numeracy in mathematics can be done by viewing other subjects as providing meaningful contexts in which mathematical concepts can be introduced or developed.

### **Cross Curriculum Numeration (Non Mathematics Subjects)**

For numeracy to be useful for students it must be learned in a variety of contexts and through all school subjects, not just math. The approach needed is what is known as cross-subject numeracy, namely the active role of teachers of subjects other than mathematics to identify opportunities for numeracy in the subjects they teach and to stimulate discussion of numeracy in the curricula of all subjects. This does not mean that non-mathematics teachers change their function to become mathematics teachers, but rather that they embed numeration in the subjects they teach without losing focus on these subjects. Teachers can create different types of numeracy learning opportunities through the following:

- 1) Identify the specific numerical demands of their subject by analyzing the curricula of the subjects of the disciplines taught.
- 2) Provide learning experiences and opportunities that support the application of students' general mathematical knowledge and skills.
- 3) Be aware of the correct use of mathematical terminology in their subject and use this language in their teaching accordingly.

When non-mathematics teachers pay attention to numeracy in cross-curricular subjects, it can actually improve learning in these subjects. For example, a social studies teacher, when participating in training students in reading and interpreting data presented through graphs, will also help students understand the lesson, for example, to recognize the unequal distribution of wealth and power that occurs in society. Thus, when the teacher strengthens students' numeracy skills, reciprocally, students' ability to understand these disciplines also increases.

### **CONCLUSION**

Numerical literacy is the ability to apply number concepts and arithmetic operations skills in everyday life. Numerical literacy includes knowledge, skills, attitudes, and positive attitudes. Numeration requires knowledge of mathematics that is learned in the curriculum. However, learning mathematics itself does not necessarily develop numeracy skills. Numerical literacy is beneficial for elementary school students because students can have knowledge and skills in planning and managing good activities, doing calculations and interpreting existing data in everyday life, making the right decisions in every aspect of their lives.

The application of numeracy literacy to elementary school students by applying it to mathematics and non-mathematics subjects. In mathematics subjects include (1) paying attention to real life contexts; (2) application of mathematical knowledge; (3) the use of physical, representational and digital tools; 4) increasing positive attitudes towards the use of mathematics to solve problems encountered in everyday life; and (5) a critical orientation to interpret mathematical results and make evidence-based decisions. In non-mathematics subject matter numeration 1) Identify the specific numeration demands of their subject by analyzing the curriculum of the subject disciplines being taught. 2) Provide learning experiences and opportunities that support the application of students' general mathematical knowledge and skills. 3) Be aware of the correct use of mathematical terminology in their subject and use this language in their teaching accordingly.

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