



Factors Affecting the Achievement of Numerical Literacy Skills for ABK Inclusive Elementary School Students

M.M Endang Susetyawati^{1,*}, Danuri¹

¹ Universitas PGRI Yogyakarta, Indonesia

*Corresponding author: magda.fausta@yahoo.com

ABSTRACT.

Literacy is the ability of students to understand, use, evaluate, and find information from various types of texts that are used to solve problems and develop their ability to contribute productively in society. Numeracy is the ability of students to use concepts, procedures, facts, and mathematical skills to solve everyday problems in various types of relevant contexts. Numerical literacy must be possessed since children start learning. Literacy and numeracy are skills that are learned in various subjects, not only Indonesian (for literacy) and Mathematics (for counting). Numerical literacy is a set of abilities and skills of a person in applying the concept of numbers and arithmetic operations related to everyday life.

This study aims to determine the factors that influence the achievement of numeracy literacy skills of students with special needs in inclusive elementary schools. This research was conducted at the Inclusion Elementary School of the Special Region of Yogyakarta in January-March 2022. The method used in this study was a qualitative descriptive analysis method. From the analysis of data from interviews, questionnaires and student responses to the mathematical numerical literacy test, it can be concluded that the factors that influence the achievement of numeracy skills for students with special needs in inclusive elementary schools are: difficulty understanding story problems, reading and writing skills are still not fluent, do not understand the basic concepts of mathematics, learning media that can facilitate the literacy and numeracy skills of children with special needs in inclusive primary schools are not sufficient.

Keywords: Numerical Literacy, ABK, Inclusive Education

1. INTRODUCTION

Numerical literacy is a set of abilities and skills that a person has in reading, writing, speaking, arithmetic, and problem solving at a certain level of ability in everyday life. Neitzel showed that literacy in primary and secondary school students in the short term can help them learn and maintain knowledge and healthy lifestyle behaviors. [1]. The 2015 World Economic Forum agreed that students, parents and society in general need to have mastery of the six basic literacy skills. The six basic literacys are literacy, numeracy, scientific literacy, digital literacy, financial literacy, and cultural literacy and citizenship. [2].

Numerical literacy skills make elementary school children have the ability to understand counting, and are able to use mathematical skills practically to meet the

demands of everyday life. However, there is still a lack of numerical literacy skills in elementary schools, including the application of numerical literacy for children with special needs in inclusive schools. Luo found that there are consistent gaps in the educational indicators of students with disabilities [3]. Children with special needs (ABK) are children who have average abilities below the abilities of children in general in several aspects, including mental characteristics, five-sense abilities, communication skills, social behavior or physical characteristics. Children with special needs (ABK) with special characteristics that are different from children in general, do not always have mental disabilities, emotional aspects or physical aspects. Children with special needs are unique children with certain characteristics that distinguish them from children in general [4]. Inclusive Education is education based on

the model of human and social rights; with the education system must adapt to the child, not the child adapting to the system [5]. From the results of preliminary research, it was found that numerical literacy in elementary school is important and needs to be given, because it can give students the ability to use mathematical skills practically to meet the demands of life. From the results of the literature review, it is recommended that further research is needed in the application of numerical literacy to children with special needs in inclusive schools. Numerical literacy ability is the ability to use numbers, data, and mathematical symbols. Literacy and numeracy are knowledge and abilities: 1) Using numbers and symbols related to basic mathematics as a solution to practical problems in everyday life, 2) analyzing information in various forms (graphs, tables, charts, etc.), and 3) concise and clear in making infographics and numerical information [6]. Numerical literacy skills are knowledge and skills to (a) apply various numbers and basic mathematical symbols to solve practical problems in everyday life and (b) present information obtained and then displayed in various forms (graphs, tables, charts, etc.) used to make decisions [7]. In mastering mathematical literacy, students need logical and numerical reasoning at a high level [8]. Netizel's research results show that face-to-face explanations are still needed when conveying graphic and numerical information. Pomerantz's findings suggest that teachers in teaching can design tasks to maximize classroom activities. [9]. The feedback that teachers get about wrong social behavior and right and wrong academic performance can predict how students are accepted by their peers during class activities [10]. Learning-related behaviors in one class predict achievement of literacy assessments in the next, but literacy skills do not predict subsequent learning-related behaviors [11].

Children with Special Needs (ABK) have mental characteristics, the ability of the five senses, the ability to communicate, social behavior or physical characteristics that are different from children in general. Children with special needs do not always show mental, emotional or physical disabilities. Based on this understanding, children with special needs are unique children and have their own characteristics that distinguish them from children in general [4]. Directgov (in Thompson, 2012), suggests that the term children with special needs (ABK) refers to children who have learning difficulties or disabilities that make it more difficult to study or access education than most children their age. According to the State Regulation for Women's Empowerment and Child Protection, that which includes children with special needs include: mentally retarded, visually impaired, speech-impaired, physically handicapped, visually impaired, double-blind, autism, gifted children, learning difficulties, writing difficulties, and arithmetic difficulties.

Inclusive education is a new development of the education system. In inclusive schools, all children are sought to be served optimally by making various modifications or adjustments. Directorate of Special Education Development (2007) in Garnida [12] Inclusive education is a system of providing education for children with certain limitations and other children regardless of their respective limitations. Their needs are definitely different from each other. The essence of inclusive education itself is a system of providing educational services in diversity, and respecting the differences of all children [13].

Numerical literacy skills are (a) the ability to use numbers and basic mathematical symbols in solving practical everyday problems (b) the ability to present the information obtained in various forms (graphs, tables, charts, etc.) to make decisions. In literacy skills students need logical reasoning and numerical skills can be demonstrated by skills in using numbers, symbols, and numeracy skills to solve a problem. Numerical literacy skills are explicitly given in mathematics lessons, but students are given various opportunities to use mathematics outside of mathematics, in various situations, including in inclusive schools. The learning problem of children with special needs is a complex problem [14]. The indicators used to determine numeracy literacy skills are:

1. Ability to analyze information, whether in the form of story sentences, tables, graphs, pictures, etc. This indicator is indicated by the ability of students to state what is known and asked.
2. The ability to use symbols in mathematical operations. This indicator can be seen from the students' ability to write mathematical formulas or sentences.
3. Ability to perform calculations.
4. Ability to use concepts to determine decisions based on interpretation results.

Inclusive students who study in regular schools with regular students, they are not assessed and given learning based on individual learning objectives, should be given special learning in order to evaluate the performance of ABK [15]. Children with visual, auditory and physical disabilities, who started school when inclusive education had facilities available to them, were much more likely to attend school than children with disabilities [16].

Inclusive learning resources and practices are positively related. German students perceive a much higher level of resources than their peers, it is important to have good learning rules for the successful implementation of inclusive education [17]. Inclusive school teachers who carry out learning according to the needs of children with special needs can build the abilities of these students and improve their welfare in unfavorable conditions. Behavior as teacher feedback on social acceptance appears to be context dependent. Social acceptance during class activities is influenced by teacher feedback [9]. Findings suggest that this particular form of inclusive classroom organization can

reach children from minority backgrounds while providing high-quality PAUD [19]. [3]. Teaching aids are proven to be suitable for children with special needs. Teaching aids are produced as evidence of the imaginative growth of students' mathematical thinking in helping Joyful Learning. [20].

2. MATERIALS AND METHODS

This type of research is descriptive research with a qualitative approach. Qualitative descriptive method is a

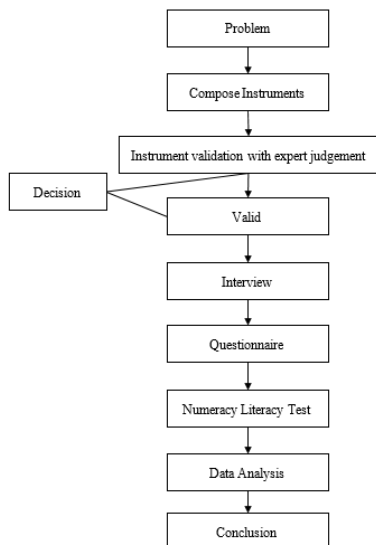
research method based on the philosophy of postpositivism which is used to examine the condition of natural objects. In qualitative research, humans are research instruments and the results are written in the form of words or statements that are in accordance with the actual situation. The research was conducted at the Inclusive Elementary School in DIY, in January-March 2022. The subjects of this study were the 33 students of the Inclusive Elementary School in DIY.

TABLE 1. Distribution of Research Subjects

| No. | Class | Category Student | Many Students |
|-------|-------|------------------|---------------|
| 1. | V | Normal | 28 |
| 2. | V | Slow Learner | 5 |
| Total | | | 33 |

The procedure used in this study refers to the following chart

FIGURE 1. Research Procedure



3. RESULTS AND DISCUSSION

Interviews were conducted to obtain data on the understanding of inclusive elementary school teachers about numeracy literacy, mathematical self-concept, implementation of learning to facilitate students' level of literacy and mathematical self-concept, barriers and learning models used. Interviews were conducted with 5 inclusive elementary school teachers, one of which is a special assistant teacher. In general, the teachers said that

they did not understand literacy and numeracy well. The teacher defines literacy as the habit of reading, numeracy is related to numbers. Calistung deals with numbers and story problems, geometry, algebra. Without literacy and numeracy, learning cannot be carried out. In learning the teacher provides daily problems that are suitable for students with special needs in inclusive elementary schools. The implementation of learning is carried out to facilitate the numerical literacy skills of students with special needs by providing opportunities for students to express opinions, ask questions, encourage students to have ideas, concepts, opinions. To understand the level of mathematical self-concept of students with special needs in SD Inclusion, more emphasis is placed on understanding basic concepts. Lower grade students learn to use concrete media related to daily activities. Upper class students have started learning semi-abstract. Elementary school students are still at the stage of concrete operational thinking, so they need learning media. Learning without media and just imagining will give a different understanding when learning using media. So in learning in elementary schools, media is needed. For example for a mathematical concept: addition usually uses pebbles or sticks. addition, multiplication using grouped grains or soybeans. Learning media in the form of quizzes, or games, or learning while playing will greatly help students' understanding. The obstacles that exist in the implementation of learning to facilitate the level of mathematics self-concept of students with special needs in inclusive elementary schools include:

- a. Students' ability to understand the material
- b. Environmental factors make students less confident.
- c. Students are less interested, parents are less supportive
- d. There is no media for reading at home

3.1. Student Interview Results

In this study, interviews were conducted with 19 students, consisting of 14 normal students and 5 students with special needs at the Inclusive Elementary School. The results of interviews in general, students say that counting is important, but they do not/do not know about numeracy literacy. They said that they enjoyed learning to count and trying to master math. Learning to count at school is fun for them because they can learn with friends and teachers. They still have difficulty in learning to count in class, but most of them do not want to share their difficulties with the teacher. Even though the teacher has given the opportunity to provide opportunities for students to ask questions. When studying at home, assisted by parents, relatives or friends. There are

various kinds of learning facilities that students have in studying at home. Some say it is easier to learn by using a mobile phone, some use a calculator, and some even use an abacus. When asked about learning to read, most of them did not enjoy reading and most of them did not have books to read. They said they were happy if they could complete the task independently.

When asked questions about learning models that make them enjoy learning to count, students' answers varied, some said the teacher explained clearly, used videos, used LCD projectors, concrete objects, but most said they liked using books.

3.2. Results of Students' Mathematics Self-Concept Questionnaire

The Mathematics Self-Concept Questionnaire was carried out by 9 students of SD Inclusion. The result is as follows

TABLE 2. Results of the Mathematics Self-Concept Questionnaire

| Respondent | Total score | | Total score |
|-----------------|-------------|----------|--------------|
| | POSITIVE | NEGATIVE | |
| 1 | 34 | 24 | 2,76 |
| 2 | 30 | 27 | 2,8 |
| 3 | 34 | 27 | 2,85 |
| 4 | 36 | 33 | 3,28 |
| 5 | 28 | 25 | 2,52 |
| 6 | 30 | 28 | 2,76 |
| 7 | 33 | 25 | 2,76 |
| 8 | 33 | 29 | 2,95 |
| 9 | 33 | 26 | 2,81 |
| Total | | | 25,49 |
| Average | | | 2,83 |
| Category | | | Good |

From the results of the table above, the average value is 2.83 and is included in the GOOD category.

3.3. Literacy and Numeracy Ability Test Results

The test contains 5 story questions, given to 33 students with the aim of measuring their numeracy literacy skills. Student responses/answers were

analyzed according to indicators of literacy and numeracy abilities, namely students' ability to state what is known and asked, student's ability to make mathematical sentences or write formulas, student's ability to complete/perform calculations and student's ability to make decisions/conclusions. The results of the data analysis are presented in the following table

TABLE 3. Literacy and Numeracy Ability Test Results

| Indicator | The average number of students answered correctly | % | Criteria |
|-----------------------------------|---|-------|----------|
| Can state what is known and asked | 3 | 9 | poor |
| Can make math sentences | 6 | 18,18 | poor |
| Can do calculations | 14 | 42,42 | poor |
| Can draw conclusions | 10 | 30,30 | poor |

TABLE 4. Percentage of Literacy and Numeracy Achievement

| No. | Class | Student Category | Good | Sufficient | Poor | Number of students |
|------------|-------|------------------|-------|------------|-------|--------------------|
| 1. | V | Normal | 6 | 10 | 12 | 28 |
| 2. | V | Slow Learner | | | 5 | 5 |
| Total | | | 6 | 10 | 17 | 33 |
| Percentage | | | 24,24 | 31,57 | 47,36 | |

From table 4. shows that the number of students who do not master literacy skills is still high, namely 47.36% of 33 students.

Literacy is the ability of students to understand, use, evaluate, find information from various types of texts to be used in solving problems and developing their ability to contribute productively in society. Numeracy is the ability of students to use concepts, procedures, facts, and mathematical skills to solve everyday problems in various types of relevant contexts. Numerical literacy should be owned since children start learning. Literacy and numeracy are skills that are learned in various subjects, not only Indonesian (for literacy) and Mathematics (for counting).

Teachers understand the importance of reading and writing for elementary school students, they call numeracy literacy with Calistung. For example, to be able to solve math story problems, students need the ability to understand written information in math story problems, this means students have to learn literacy and arithmetic. Even though teachers don't really understand literacy and numeracy, teachers still have to encourage students to have these abilities. From the results of student interviews, it is known that basically students do not know about numeracy literacy. Students still have difficulty in learning mathematics, but students rarely convey it to the teacher. Although students do not know about literacy and numeracy, students still have to learn and have numeracy literacy skills from an early age.

The results of the student self-concept questionnaire showed that students' self-perceptions

in mathematics learning achievement were in the good category. This means that the student's response to learning mathematics is good.

The implementation of the inclusive school system is a good effort to build an inclusive society. In inclusive schools, normal students study together with students with special needs in the hope that they can respect each other and uphold the values of diversity as a reality of life. For children with special needs, special assistant teachers are provided. The implementation of inclusive schools for children with special needs should create a friendly learning environment, which allows all students to learn comfortably and pleasantly. In the learning process, the teacher does not discriminate against the material given. In learning the teacher has tried to achieve the students' numeracy literacy skills, but due to the weak comprehension skills of students, it is only natural that the achievement of numeracy literacy skills is not optimal.

To overcome difficulties in numeracy literacy skills, in inclusive schools teachers facilitate learning with concrete and real problems related to everyday life. The teacher starts the lesson by reading a book. Learning is mostly done with play-learning activities which are then followed by various activities to develop basic literacy skills assisted by media that can help students learn. Students enjoy learning mathematics at school, and being explained by the teacher, using books. In learning someone is assisted by parents, friends or relatives.

A meaningful understanding of literacy and numeracy requires a student-centered learning

process and takes longer than learning that only “burdens” students with information that is less meaningful and only memorized. Obstacles that arise in learning are the lack of parental support, lack of reading habits, low student interest in learning. The teacher has tried to carry out the learning process well. However, students still have difficulty in solving math problems. Various learning activities are carried out according to the readiness of teachers/educators, starting with discussions or questions and answers to stimulate critical and creative reasoning abilities, to more complex activities such as role playing, making various works, and other learning play activities. Learning activities must be able to support the development of students to build a love of reading and literacy.

There were 33 literacy and numeracy test participants, consisting of 28 normal students and 5 students with special needs (Slow Learners). Analysis of student responses to the literacy ability test can be concluded:

- a. The number of students who can write down information from story questions about what is known and what is asked is 3 students or 9% of the total test participants. To be able to write about what is known and asked about a story problem, students must be able to understand the story problem. To be able to understand a story problem, students must be able to read well. This means that it can be concluded that there is a possibility that students have difficulty in understanding the problem or have difficulty in understanding the reading.
- b. The number of students who can write mathematical formulas or sentences, 6 students (18.18%). To be able to write mathematical formulas or sentences, students must understand the basic concepts of the mathematical material contained in the given story problems.
- c. The number of students who can complete the calculation correctly, 14 students (42.42%). If it is seen that there are 14 students (42.42%) can complete the calculation correctly, this means that there are students who can solve the problem, but students are not accustomed to writing down the information given from story questions. Students read the questions and then answer immediately. This means that students solve story problems without writing formulas, mathematical sentences. There is a possibility, some students
- d. see their friends' answers, so they are not complete in writing them.

The number of students who can make conclusions is 10 students (30.3%). Meanwhile, only 10 students were able to draw conclusions from the calculation results. This can happen because students feel they have finished after doing the calculations. To be able to make conclusions, students must have good logical thinking and be able to convert mathematical sentences into verbal sentences. This means that students already have good literacy skills.

Based on the results of the analysis of student responses to the numeracy literacy test, it can be concluded that the factors that influence the achievement of numeracy literacy skills for students with special needs in inclusive elementary school are the lack of students' ability to understand story problems, lack of reading and writing skills and lack of understanding of basic mathematical concepts.

This conclusion is supported by the results of interviews with teachers, which can be concluded that there are obstacles in the implementation of learning to facilitate the level of numerical literacy of students with special needs in SD Inclusion, including:

1. Students are lazy to read and lack interest in reading.
2. Lack of reading book facilities.
3. Low self-confidence
4. Students have the mindset that they are less able to count. So the challenge for the teacher how to make students happy by counting
5. During the pandemic, students prefer to play games with their mobile phones.

From the results of interviews with 19 students, most students said that learning mathematics/counting was important, but they found it difficult to learn in class. Most students do not want to ask the teacher about their difficulties. Difficulties in learning experienced by normal students are also experienced by students with special needs.

4. CONCLUSION

The factors that affect the achievement of numeracy literacy skills for ABK students in inclusive elementary schools are the lack of students' ability to understand story problems, lack of reading and writing skills, lack of understanding of basic mathematical concepts, and learning media that can facilitate the literacy and numeracy skills of

children with special needs in inclusive primary schools are not sufficient.

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