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Analytical Study: Exploring the Numeracy Literacy Skills of PGSD Students

Bernadetha Rizki Kaize[1], Ni Nyoman Rediani[2], Herrio Tekdi Nainggolan[3], Syahfitriani Br Ginting[4]
[1,2,3,4] Fakultas Keguruan dan Ilmu Pendidikan, Universitas Musamus, Merauke, Indonesia

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ABSTRAK

Penelitian analitis ini mengeksplorasi keterampilan literasi numerasi mahasiswa Program Pendidikan Guru Sekolah Dasar (PGSD) di Universitas Musamus. Tujuan utama dari penelitian ini adalah untuk menilai tingkat literasi numerasi antara para pendidik tersebut dan mengidentifikasi calon faktor-faktor yang mempengaruhi kompetensi mereka. Mengingat pentingnya keterampilan numerasi dalam pendidikan yang komprehensif, memahami kemampuan siswa PGSD menjadi krusial untuk pengembangan program pelatihan guru yang efektif. Penelitian ini menggunakan data kuantitatif dari tes numerasi standar. Sampel terdiri dari mahasiswa PGSD semester 2 di Universitas Musamus, yang mewakili beragam latar belakang dan prestasi akademik. Analisis kuantitatif berkisar pada keterampilan pengukuran dasar numerasi, keterampilan pemecahan masalah, dan penerapan konsep matematika dalam situasi nyata. Temuan awal menunjukkan adanya variasi yang signifikan dalam keterampilan numerasi di kalangan mahasiswa PGSD semester 2, dengan perbedaan terkait dengan pengalaman pendidikan sebelumnya dan latar belakang sosial-ekonomi. Data menunjukkan bahwa meskipun beberapa siswa memiliki keterampilan numerasi yang kuat, yang lain masih mengalami kesulitan dengan konsep dasar, yang menyoroti kebutuhan akan intervensi yang tepat sasaran. Selain itu, penelitian ini menemukan sikap positif secara umum terhadap numerasi, meskipun disertai kecemasan dan rasa kurang percaya diri dalam mengajar matematika. Penelitian ini menekankan pentingnya meningkatkan keterampilan numerasi dalam program pendidikan guru. Dengan memperkuat keterampilan numerasi mahasiswa PGSD, penelitian ini bertujuan untuk berkontribusi pada tujuan yang lebih luas dalam meningkatkan kualitas dasar pendidikan dan menciptakan generasi siswa yang terampil dalam numerasi dan percaya diri..

ABSTRACT

This analytical research explore the numeracy literacy skills of students in the Primary School Teacher Education (PGSD) program at Musamus University. The main objective of this study was to assess the level of numeracy literacy among these future educators and to identify factors that influence their competence. Given the importance of numeracy skills in comprehensive education, understanding the skills of PGSD students is crucial for the development of effective teacher training programs. This study used quantitative data from a standardized numeracy test. The sample consisted of 2nd semester PGSD students at Musamus University, representing a diverse range of backgrounds and academic achievements. The quantitative analysis focused on measuring basic numeracy skills, problem solving skills, and application of mathematical concepts in real-world situations. Preliminary findings indicate significant variation in numeracy skills among PGSD students in the second semester, with differences related to previous educational experiences and socio-economic backgrounds. The data showed that while some students had

strong numeracy skills, others still struggled with basic concepts, highlighting the need for targeted interventions. In addition, the study found a generally positive attitude towards numeracy, although accompanied by anxiety and lack of confidence in teaching mathematics. This study highlights the importance of improving numeracy skills in teacher education programs. By strengthening the numeracy skills of PGSD students, this study aims to contribute to the wider goal of improving the quality of basic education and creating a generation of numerate and confident students

Corresponding Author:

Bernadetha Rizki Kaize
Fakultas Keguruan dan Ilmu Pendidikan, Universitas Musamus,
Merauke, Indonesia
Email: kaizedetha@unmus.ac.id

1. INTRODUCTION

The need for mapping the quality of education through assessment reform is crucial for improving the quality of the learning process. One of the policies implemented by the Ministry of Education and Culture is the replacement of the National Examination (UN) with the National Assessment (AN). This policy is based on coordination with various relevant agencies and institutions and refers to the results of PISA, which indicate that student's abilities at the primary and secondary education levels are still adequate [1]. Assessment is necessary to enhance the quality of education, as student achievement should not be measured solely by mastery of the material. Instead, success is determined by achieving competencies that encompass knowledge, attitudes, and skills. In the 21st century, students must also develop a range of life skills, including learning and innovation, technological and informational literacy, and the ability to contribute to society, all of which are essential for meeting the challenges of this era [1], [2].

Literacy is a basic competency that individuals must have in order to be productive and able to face the challenges of the 21st century. One of these literacies is numeracy literacy, which is a skill that is very much needed to face the changing times, especially for the younger generation [1], [3], [4]. Numeracy literacy involves an individual's ability not only to perform basic operations such as addition, subtraction, multiplication, and division, but also to manage and solve problems related to measurement, geometry, data, and numbers in various contexts [5]. Calculating a monthly budget or planning a vacation requires numeracy literacy skills. Reading and interpreting health, political, and educational information presented in graphs, charts, and tables also depends on numeracy literacy. In the workplace, the construction of buildings and bridges requires these skills as well. Additionally, nurses use unit conversions to verify the accuracy of medication dosages; sociologists draw conclusions from data to understand human behavior; biologists develop computer algorithms to map human genes; and lawyers use statistical evidence and arguments involving probability to persuade judges [3].

The younger generation must possess numeracy literacy skills, as it is one of the essential competencies needed in everyday life. Numeracy literacy refers to an individual's ability to use

reasoning and critical thinking to interpret and comprehend information. It involves engaging in activities that involve manipulating symbols or mathematical language in everyday situations, whether through written or spoken communication [6], [7]. Numeracy literacy skills play a crucial role in enhancing the various competencies that students need to acquire and develop. These skills go beyond understanding numbers and basic arithmetic operations; they encompass the application of mathematical concepts in everyday life and the ability to solve problems effectively. By fostering numeracy literacy, students can strengthen their logical, analytical and critical thinking skills, which are essential for making informed decisions and interpreting quantitative data. In addition, numeracy literacy fosters understanding in areas such as science, economics and technology, thereby broadening learners' knowledge and preparing them for future success. [6], [8]. To overcome the problem of low numeracy literacy skills in students, a task-based learning approach was chosen as the solution. This method aims to increase student involvement in the learning process by providing challenging and relevant tasks that require numeracy skills. Through task-based learning, students are expected to be able to explore various sources of information, be able to analyze data, and be able to solve problems independently in everyday life and together with others. [6], [9], [10].

Based on the explanation presented above, the application of task-based learning is expected to have a positive impact on students' abilities, especially on numeracy literacy skills in critical thinking in everyday life. Therefore, this study aims to assess the effect of task-based learning on these abilities. Unlike previous studies, this study specifically focuses on the variables of critical thinking and numeracy literacy, with the aim of providing new insights and knowledge about the effectiveness of this learning approach in the classroom. [4].

This research is expected to make a significant contribution to the development of more effective teaching methods, helping school education better prepare students for the challenges of the current digital and globalized era. Additionally, it aims to provide valuable educational insights and knowledge in shaping policies and promoting innovative teaching practices in schools. In the context of science and technology (IPTEK), this study seeks to encourage the adoption of advanced and relevant technology and methodologies in teaching. By analyzing the tasks assigned to students and the impact of task-based learning on critical thinking and numeracy literacy, this research is anticipated to discover new ways to leverage technology in supporting the teaching and learning process. Furthermore, it will create opportunities to integrate digital tools and resources into more effective learning experiences, while reinforcing the foundational knowledge and skills necessary for student success in a technology-driven society. [6], [8], [11].

2. METHOD

The research conducted uses a quantitative descriptive research approach. Descriptive research is a systematic investigation that explains phenomena and events according to existing conditions or occurrences. In descriptive research, the researcher does not manipulate or apply specific treatments to the research sample, allowing all activities/events to occur naturally within a sufficiently large population. Qualitative descriptive research aims to gather data without any manipulation or other interventions [4], [12]. Descriptive research is conducted to obtain information about the phenomenon of numeracy literacy. This study is carried out in three stages: the preparation phase, the implementation phase, and the final phase [13], [14]

The preparation phase of the research includes: 1) Identifying the research problem and related assumptions; and 2) Developing a research instrument in the form of a test. The implementation phase of the research involves: 1) Distributing the test to assess the numeracy literacy skills of PGSD students at Musamus University. The final phase of the research consists of: 1) Analyzing and processing the data; 2) Drawing conclusions based on the research results; and 3) Presenting the research findings in the form of a report. The research sample consists of 29 second-semester students selected specifically based on their characteristics, as they are expected to have mastered numeracy literacy skills. Second-semester PGSD students were chosen because they represent a young generation that has recently entered adulthood in their thinking, having graduated not long ago from high school. The data collection methods used in this study include interviews, observations, and tests.

Interviews were conducted to gain an overview of the student's confidence in their numeracy literacy abilities. These interviews were held with second-semester PGSD students, focusing on various teaching technologies and methods. By understanding the impact of task-aspects of problem-solving processes in their daily lives, and the teaching methods employed by instructors, including learning media, teaching models, and evaluation methods. It is hoped that these interviews will provide insights into how the teaching methods used by instructors can influence the numeracy literacy skills of students as future elementary school teachers.

Observations were carried out to monitor the learning process in the classroom and to assess students' responses to the prepared questions. The data from these observations are expected to offer valuable input for decision-making based on the research findings. Testing is the primary method employed in this study. The test questions were developed based on six indicators established by the Ministry of Education and Culture (Kemendikbud), which include: estimating and calculating with whole numbers, using fractions, decimals, and percentages, recognizing and using patterns and relationships, employing spatial reasoning, using measurement, and interpreting statistical information. These six indicators were further developed into 30 literacy questions with cognitive levels ranging from C2 to C5.

Data analysis in the research is conducted interactively, following a methodology that requires the active involvement of the researcher in all stages of qualitative data analysis until completion [14]. This approach consists of three main components: data reduction, data presentation, and conclusion drawing. The data reduction stage includes the selection, simplification, abstraction, and transformation of raw data that emerges from field notes, which involves summarizing, coding, and theme exploration. Next, data presentation includes transforming the results of the analysis into a more easily understandable format, such as matrices, graphs, and diagrams. The final stage is conclusion drawing, which involves decision-making based on the analyzed data and revealing "what" and "how" the research findings are. Furthermore, this research employs descriptive data analysis techniques using the Guttman scale and percentage statistical techniques to calculate the frequency of respondents' answers on each research subindicator. This approach provides a robust framework for systematically organizing data into numerical or percentage forms that are closely related to the research object [4]. The research using this analytical method allows for in-depth understanding and valid interpretation of research data.

Tabel. 1

No	Percentage Range Limits	Evaluation Category
1	0-20	Very Low
2	21-40	Low
3	41-60	Medium
4	61-80	High
5	81-100	Very High

3. RESULT AND DISCUSSION

The study aimed to assess the numeracy literacy skills of PGSD students in the second semester of Musamus University with a sample size of 29 out of 32 students. The results of the study from observations of the answer filling process showed that students completed the questions relatively quickly, which was around 15-30 minutes. The results of the observations also showed that students had a certain level of fear of mathematics. Fear and lack of confidence in answering these questions arose because for students, mathematics was considered a less enjoyable and challenging subject. This condition was reinforced by the results of interviews with students, where students expressed their appreciation for mathematics. This condition can be associated with the teaching methods used, which may not have been effective enough when they were in high school to make mathematics or other subjects interesting enough to attract students' interest. The results of the interviews showed that teachers from elementary school to high school rarely used teaching aids or fun teaching methods; instead, they relied more on explaining learning materials to students, but in numeracy literacy learning on campus they had increased confidence because the teaching methods used by lecturers were more different so that there was an increase in understanding of numeracy. This condition is likely to have an impact on the final results of the learning process. To strengthen the results of observations and interviews, an analysis of reading and writing literacy tests was conducted. Overall data analysis shows that numeracy literacy skills are still relatively high. For more detailed details, please see the following table 2.

Table 2.

No	Percentage Range Limits	Freuency	Percentage	Evaluation Category
1	0-20	0	-	Very Low
2	21-40	1	3,4%	Low
3	41-60	3	10,2%	Medium
4	61-80	10	34,5%	High
5	81-100	15	51,6%	Very High

From the analysis results in Table 2 , it can be concluded that the numeracy literacy of PGSD Semester 2 Musamus University students is still in the high category, with 51.6% of students getting scores between 81-100. This assessment is based on students' answers to the tests that have been prepared. After the calculation, it was found that there were students who had difficulty in the numeracy literacy indicators, especially indicator 5 which concerns measurement and students who answered incorrectly when asked questions such as "1 hour is how many minutes" and they also had difficulty converting units. Of the 5 questions related to

measurement, only 2 students answered one of them incorrectly. Next is indicator 2 which concerns the use of fractions, decimals, and percentages. students are able to add decimal numbers and determine fractions when combined with various units around them. Next is indicator 3, namely recognizing and using patterns and relationships. students are able to identify patterns in the numbers given. Indicator 4 is spatial reasoning ability, namely understanding geometric shapes and structures. Many students answered correctly when asked questions related to connecting geometric concepts with objects around them, but some of them had difficulty mentioning angles. Indicator 6 is interpreting statistical information. Students are only able to arrange measurement results sequentially and can understand the meaning behind the data. Of the six literacy indicators, the component "Estimating and calculating with integers" has a relatively high score. Of the 29 students, 15 answered correctly.

However, there is one question in this category that was only answered incorrectly by 2students. representation, indicating that students' understanding of numerical positions is not optimal.

4. KESIMPULAN

The results of the study indicate that students' numeracy literacy skills are classified as high. This can be seen from the scores obtained by each student. This study also identified that among the six components of numeracy literacy measured in this study, the indicator that needs attention is the use of measuring instruments, which includes topics such as length, time, area, and so on. This condition is supported by findings from other research methods, where it was found that teachers have a relatively low level of awareness in using concrete teaching materials. This is one of the factors that causes low students' numeracy literacy skills.

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