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Numeration literacy of PGMI UIN Raden Intan Lampung students in solving mathematical problems

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Abstract

This study aims to describe the numeracy literacy skills of PGMI students at UIN Raden Intan Lampung in solving math problems. Referring to the results of international surveys, one of which is PISA, Indonesian students' achievements are still below the global average score. Therefore, PGMI as one of the study programs, is expected to be able to produce qualified MI teachers. As prospective teachers, PGMI students must have the ability to think at a high level. The data obtained shows that the numeracy literacy skills of students still need to be analyzed further to determine the level of numeracy literacy skills. The research method used is the qualitative descriptive analysis method. The instruments used were descriptive tests and interviews. Data analysis used in this study uses the following steps: Data Reduction, Data Display, and Verification. The subjects in this study were 91 PGMI students in the class of 2020. The results showed that the numeracy skills of PGMI UIN Raden Intan Lampung class 2020 students in solving math problems were sufficient. This is shown in the research results that only 22.09% of students can use various kinds of numbers and symbols in the first indicator, 13.08% of students can analyze information displayed in various forms in the second indicator, and only 4.36% can interpret all analysis questions to make the right decision in the third indicator.

Keywords: numeracy literacy; mathematics; mathematical problems

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I. Introduction

Teachers are professional educators with very important functions, roles, and positions in achieving the Ministry of Education and Culture's vision in 2025, namely to create intelligent and competitive Indonesians (Izzati et al., 2023) PGMI (Madrasah Ibtidaiyah Teacher Education) as one of the study programs is expected to be able to produce quality MI teachers. As prospective teachers, PGMI students must have high-level thinking skills. Teachers are obliged to develop the fundamental skills of their students. The Muscat Agreement is an agreement agreed upon in 2014 by delegates to the Global Education for All meeting held by UNESCO in Muscat, Oman. One of the targets is for all countries to ensure that by 2030, all students are educated by qualified, professionally trained, motivated and supported teachers. This includes developing fundamental skills. One of the abilities that students must have as prospective teachers is numeracy skills. Zainul Mustofa's journal entitled "Vocational school

students' numeracy competency in terms of gender and various difficulties" revealed that numeracy ability prioritizes the analysis of numbers in reaching a solution (Hartatik, 2020). In Bloom's taxonomy, this ability is at level C4. The importance of numeracy skills must be distinct from the data often displayed on print and digital media screens. Almost all data in the economic, social, political and security fields is often presented numerically.

Numeracy, literacy and science are considered fundamental skills that students must understand. Fundamental skills or basic abilities are abilities that every individual must have and will play a very important role in being able to live their life. There are 3 types of basic abilities that every individual must master, namely literacy, numeracy and science. The reason is that teachers, as educational facilitators, must also have these fundamental skills. Teachers must practice these fundamental skills to teach their students these basic abilities.

Numeracy is the knowledge and skills (a) to use various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life (b) to analyze information displayed in various forms (graphs, tables, charts, and so on) (c) use that interpretation to predict and make decisions (OECD, 2016). Mathematics is an essential science because it teaches students to think clearly and systematically, preparing them to face the challenges of real life (Susantri et al., 2023). Meanwhile, the definition of numeracy quoted from the Ministry of Education and Culture's Center for Assessment and Learning 2020 is the ability to think using concepts, procedures, facts and mathematical tools to solve everyday problems in various types of contexts that are relevant to individuals as Indonesian citizens and global citizens.

Numeracy is one of the skills designated by UNESCO in 2006 as one of the determinants of a nation's progress (Kemendikbud, 2017). When we can master numeration well, we will be sensitive to it. When we can apply this sensitivity, of course, we will be able to manage our natural resources, and our human resources will be able to compete with other countries so that we will become a strong nation. In other words, increasing numeracy ability is directly proportional to the progress of a nation. Therefore, efforts are needed to improve numeracy ability.

The results of the questionnaire that the researchers distributed showed that 83.3% of all respondents thought that mathematics was a lesson that was difficult to understand. 52.9% of all respondents answered that mathematics lessons were difficult to understand because of many calculations, while 47.1% thought that mathematics lessons were difficult to understand. 44.4% of students answered that they needed to remember the definitions of prime numbers, composite numbers, LCM and FPB, which are the subject matter of the Basic Concepts of Mathematics course. The data obtained shows that students' numeracy literacy abilities still need to be analyzed further to determine the level of their numeracy literacy abilities. Researchers feel that the success of teachers in carrying out their duties and fulfilling government demands for their positions is determined based on the experience and abilities possessed by the teacher. Therefore, researchers want to examine the level of numeracy skills of PGMI students as prospective teachers in the future.

Previous research that is relevant to this research is conducted by (Asriyati & Hulukati, 2022) with the title "Numeracy Literacy Skills of Students in Solving Mathematical Problems." The results of this study indicate that the numeracy literacy skills of PGMI IAIN Sultan Amai Gorontalo Semester 5 students in solving mathematical problems are sufficient in using various kinds of numbers or symbols to solve daily life problems and analyze information displayed in various forms such as graphs, tables, charts, diagrams and so on. In general, the results of this analysis cannot be used by students to predict and make decisions appropriately. This is shown in the results of only 11.84% of students

being able to use various kinds of numbers and symbols in the first question, 21.05% of students can analyze information displayed in various forms, and only 9.21% can interpret the entire question analysis to make the right decision.

Based on the explanation above, it is important for teachers, especially prospective teachers in the 21st century, to have numeracy literacy skills to prepare themselves for their future profession. Therefore, researchers conducted research entitled "PGMI Students' Numeracy Literacy Ability in Solving Mathematical Problems".

II. Research Method

The research used in this research is descriptive qualitative. Qualitative research aims to describe and analyze phenomena individually or in groups. Apart from that, qualitative research can also be interpreted as research whose findings are not obtained through statistical procedures or other calculation forms and aims to reveal symptoms contextually by collecting data from natural settings using the researcher as a key instrument.

Sampling in this study used a purposive sampling technique, namely a sampling technique with certain considerations. Apart from that, this research also uses a snowball sampling approach, where research participants are asked to help researchers identify other potential subjects.

Data analysis used in this study uses the following steps: Data Reduction: Data reduction is the process of selecting, focusing on simplifying, abstracting, and transforming rough data that emerges from field notes. In this study, researchers classified or sharpened the problem through brief exposure, reducing unnecessary things and organizing data so that the conclusion was verified. The second is Data Display. Display data al, also known as data presentation, is a series of activities that include organizing data into a certain form so that it will appear to be seen as a whole. In qualitative research, data presentation can be done in brief descriptions, charts, relationships between categories, flowcharts, and the like. In this study, researchers used data presentation in the form of narrative text. The third step is verification; verification or conclusion drawing is the third step in qualitative data analysis. Verification is an attempt to find and understand an activity's meaning, explanation, cause and effect or conclusion. In conclusion, the organized and grouped data is then presented with a technique or pattern that can conclude. This conclusion will be used as information that can be presented in the research report and placed in the closing section.

Purposive sampling is characterized by samples that cannot be determined or drawn in advance, and the number of samples is determined considering the information needed. In this study, the research subjects were PGMI UIN Raden Intan Lampung students, class of 2020. The data collection techniques used were written tests and interviews.

III. Results and Discussion

The data obtained was then analyzed to determine the level of numeracy literacy skills students possess through test descriptions. The following is a description of the results of students' numeracy literacy skills:

Frequency Distribution of PGMI Students' Numeracy Literacy Ability

From the results of the student numeracy literacy skills test with a total of 91 students, the lowest score was 0, and the highest score was 54.17. For more details, see the following table:

Table 1. Frequency distribution of numeracy literacy test results

No	**Value**	Frequency		
		Absolute	**Relative**	**Cumulative**
1.	0-7	10	10	10
2.	8-15	12	15	22
3.	16-23	26	28	48
4.	24-31	14	16	62
5.	32-39	18	20	80
6.	40-47	10	10	90
7.	48-55	1	1	91

Total	91	100

Based on the table above, the most scores obtained by students are in the interval 16 - 23 with a percentage of 28% (26 students out of 91 students), while the scores obtained least by students are in the interval 48 - 55 with a percentage of 1% (1 student from 91 students). The average value of this data is 14.85. Thus, the number of students who get scores below the average is more than those who get scores above the average. This shows that the percentage of student scores that are below average is still very high.

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Statistics on Students' Numeracy Literacy Ability

The statistical results obtained regarding students' numeracy literacy abilities are as follows:

Table 2. Statistics of numeracy literacy

Statistics	Results
The lowest value is	0,00
The highest value is	54,17
Average	14,85
Median	13,02
Mode	11,98
Variance	92,14
Standard deviation	9,60

Based on the table above, it can be seen that the average student score is 14.85, with the highest score being close to 11.98. If we compare these numbers with the passing scores for mathematics courses, which generally range between 70 and 75, then the difference is very large. Thus, the majority of students do not have good numeracy literacy skills.

Percentage of students' Numeracy Literacy Ability based on indicators

The numeracy literacy ability in this research is based on three indicators, as explained in Chapter 2. The results of students' numeracy literacy ability scores based on the three numeracy literacy indicators are described in Table 4.3 as follows:

Table 3. Results of students' numeracy literacy ability scores based on three numeracy literacy indicators

No	**Indicator**	Ideal score	Student score	**Mean**	Percentage
1.	Able to use various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life.	8	76	1,77	22,09
2.	Able to analyze information displayed in various forms (graphs, tables, charts, etc.)	8	45	1,05	13,08

3.	Able to interpret the results of analyses that have been carried out to predict and make decisions	8	15	0,35	4,36
Total		24	136	3,16	39,53

Based on the table, it is known that each indicator has the same ideal value. This is because there are the same number of questions for each indicator, namely 3 questions. Each question item has a maximum score of 6. Table 4.3 also shows the percentage of students' general numeracy literacy abilities, namely with a 39.53% (average calculation) score. The highest percentage was obtained in the first indicator, which stated that students were able to use various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life, namely 22.09%, then the second highest percentage was obtained in the indicator second, which states that students can analyze information displayed in various forms (graphs, tables, charts, etc.), namely 13.08%, and the lowest percentage is obtained in the third indicator which states that students can interpret the results of the analysis that has been carried out to predict and take The conclusion is 4.36%.

Based on description and data analysis and supported by interviews that have been conducted. We will discuss numeracy literacy abilities, which consist of indicators of PGMI students' numeracy literacy abilities in solving mathematical problems. Three indicators of numeracy literacy skills for solving mathematical problems are being able to use various kinds of numbers and symbols related to basic mathematics to solve mathematical problems, being able to analyze information displayed in various forms (graphs, tables, charts, etc.), being able to interpret analysis results that have been done to predict and draw conclusions. Here is the discussion:

Able to use various kinds of numbers and symbols related to basic mathematics to solve mathematical problems

The ability of symbolic representation needs to be considered when using symbols or numbers related to mathematics. Representation is a sign, character, symbol or object that can describe, represent, or in other ways. According to Aliyanti, symbolic representation is an important basis for developing critical thinking skills when solving mathematical problems. Symbolic representation focuses on the formulas in mathematics, what variables must be known, and the use of mathematical symbols (Aliyanti et al., 2019).

Highly skilled students can write numbers and symbols related to fractions accurately and without errors. High-achieving students can use various numbers or symbols in basic mathematics (Maulidina & Hartatik, 2015). In line with Megawati and Sutarto's research, they stated that students with high abilities tend to use symbolic representation (Megawati & Sutarto, 2021). Subjects with medium and low abilities can use symbols or numbers related to basic mathematics because they experience errors in writing numbers and symbols in certain fraction problems. Due to the difficulty in using symbols as a whole when learning mathematics, misinterpretation of symbols often occurs. The inability of students with moderate and poor abilities to understand the meaning of the question content makes it difficult to use symbols (Murtiyasa & Wulandari, 2020). This aligns with Effendi, who said that understanding concepts will make it easier for students to understand problems (Effendi, 2017).

Able to analyze information displayed in various forms (graphs, tables, charts)

Analyzing information displayed in various forms is the second indicator of numeracy literacy skills. By addressing the issues raised in the question, one can solve mathematical problems as it requires the capacity to collect related data for analysis. One must identify and develop problem-solving tactics to reach the right

solution, build relationships in the material provided, and re-evaluate the results.

Students with high abilities can analyze information on the problems given completely. In line with Effendi and Lestari, students with high abilities tend to be better because they can analyze questions correctly. This is influenced by the learning style possessed by subjects with high abilities. Learning style is related to how students capture the information presented so that they can absorb the learning material optimally (Astriani, 2017). In line with the opinion expressed by Yuwono and Supanggih, if students know the characteristics of their learning style, the learning process will be more successful (Yuwono et al., 2018).

Subjects with moderate ability can analyze information on the problems given. Able to find out what is known and what is asked, but reluctant to write down what is needed to answer the problem. Students often need more confidence in determining problem-solving strategies (Anggraeni, 2019). Factors that can influence are the low motivation to learn that students have. Salma said that one way to increase students' learning motivation is to congratulate them after completing their assignments (Alhasni, 2020). Giving praise will raise the enthusiasm of students who were originally lazy, make them enthusiastic, and increase their self-confidence (Andriani & Rasto, 2019).

Low-ability subjects need to be more able to analyze information on the problems given. The difficulty experienced by this subject is that he needs help to choose what strategy to use to solve the problem. In other words, the subject needs help in determining what is known, asked about, and what is needed in the problem. Errors in understanding occur when students incorrectly write down what they know and what is asked and do not write down any information (Qusyairi & Sakila, 2018). In line with Yuwono, he stated that errors in understanding were due to students' incomplete understanding of the questions, so information related to the problem needed to be written down in the questions (Yuwono et al., 2018).

Able to interpret the results of analyses that have been carried out to predict and make decisions

The ability to interpret the results of the analysis to predict and make decisions, namely by being able to carry out calculations. In the third indicator, numeracy literacy abilities require that apart from numeracy skills, students' mathematical abilities also include the ability to solve problems logically and analytically. To show that a conclusion is correct (valid), students must be able to support it with previously known information. This is what reasoning logically means (Amrina et al., 2020). Meanwhile, according to Widdy, critical thinking skills are organized methods used in mental tasks, including problem-solving, judgment, persuasion, assumption analysis, and scientific investigation (Nugraha, 2018). Learning mathematics requires students to be able to think critically and rationally. Therefore, teachers must motivate students to do so by generating fresh ideas and encouraging them to delve deeper into concepts and problems (Amrina et al., 2020).

Students with high ability in the subject can explain the results of the analysis with the right answers and make correct conclusions. In line with Tahir, subjects with a high level of ability tend to be able to write answers correctly (Mohd et al., 2021). This can happen because of the independence of learning carried out by students. Learning independence is a good attitude for students to support better learning outcomes. Being responsible and learning independently without being forced by those around you is an example of student independence in learning.

Moderate ability subjects are quite capable of interpreting analysis results to predict and make decisions. This can happen due to need for more accuracy in determining the results of operations on fractions or drawing conclusions. Students need to be able to use the solution steps sequentially to avoid errors in carrying out calculations (As'ari, 2019). In line with Faijah,

when solving fraction operation problems in the calculation step, you must be careful to avoid making mistakes in getting the answer results (Faijah et al., 2022).

Low-ability subjects need to interpret analysis results to predict and make decisions. This happened because the subject experienced errors in determining the results of operations on fractions and drawing conclusions. Students often make mistakes when writing the final answer when applying calculation steps (Haka et al., 2021). In line with Utami's research, it is not only difficult to apply calculation steps, but another thing that can affect students with low abilities is the difficulty of concluding the end of the solution (Narayani, 2019). Several factors that cause students to have difficulty learning are low attitudes and interest in learning. This is in line with Agus Susilo's opinion that the main factor in learning difficulties experienced by students is the students' lack or lack of interest in learning (Susilo, 2020). As Agustini said, educators have a very important role in understanding or guiding students when they encounter difficulties by implementing social interactions because they support successful learning (Buchari, 2018).

IV. Conclusion

Based on the description of the analysis of the numeracy literacy skills of PGMI UIN Raden Intan Lampung Class of 2020 students on number pattern material, it can be concluded that students still need to improve their ability to understand questions. This is shown in the results that only 22.09% of students were able to use various kinds of numbers and symbols in the first indicator, 13.08% of students were able to analyze information displayed in various forms in the second indicator, and only 4.36% had the ability to interpret analyze all questions to make the right decision on the third indicator.

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