

# Gender and Educational Level: Analysis of Elementary School Teacher Numerical Skills

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## ARTICLE INFO

### Article history:

Received December 21, 2022

Revised December 22, 2022

Accepted March 25, 2022

Available online May 25, 2022

### Kata Kunci:

Literasi Numerasi, Instrumen Tes, Guru

### Keywords:

Literacy Numeracy, Test Instrument, Teacher



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## ABSTRAK

Berbagai profesi menuntut kemampuan numerasi minimal level 3, termasuk profesi guru, namun data kemampuan numerasi guru saat ini tidak tersedia. Numerasi adalah kecakapan untuk menerapkan konsep matematika untuk mengambil keputusan. Penelitian ini bertujuan untuk menilai kemampuan numerasi guru sekolah dasar berdasarkan gender dan jenjang pendidikan guru. Data kemampuan numerasi guru dapat digunakan oleh pihak sekolah sebagai data evaluasi pelaksanaan program literasi numerasi di sekolah. Pada penelitian ini menggunakan pendekatan deskriptif. Sebanyak 27 guru sekolah dasar menjadi subjek penelitian. Pengumpulan data menggunakan instrumen tes numerasi umum dan lanjutan, dengan 10 pertanyaan yang terbagi menjadi 3 pertanyaan numerasi umum dan 7 pertanyaan numerasi lanjutan. Data yang terkumpul dianalisis dengan teknik analisis statistik deskriptif melalui penghitungan frekuensi, rata-rata, dan kecenderungan data. Hasil penelitian kemudian disajikan dalam bentuk histogram dan dinarasikan. Hasil dari penelitian ini adalah kemampuan numerasi guru sekolah dasar tergolong sedang. Guru perempuan memiliki kemampuan numerasi lebih baik dibandingkan laki-laki. Guru dengan jenjang pendidikan S2 memiliki kemampuan numerasi lebih baik dibandingkan dengan jenjang pendidikan S1. Kemampuan numerasi guru perlu ditingkatkan, khususnya pada guru laki-laki yang memiliki kemampuan numerasi lebih rendah daripada guru perempuan. Pengembangan profesional guru pada bidang literasi numerasi guru perlu ditingkatkan dan pengembangan tes literasi numerasi diperlukan untuk mengukur kemampuan numerasi guru.

## ABSTRACT

Various professions demand numeracy skills of at least level 3, including the teaching profession, but teacher numeracy ability data is currently not available. Numeracy is the ability to apply mathematical concepts to make decisions. This research aims to assess the numeracy ability of elementary school teachers based on gender and teacher education level. The school can use data on teacher numeracy skills to evaluate the implementation of numeracy literacy programs in schools. In this study, use a descriptive approach. A total of 27 primary school teachers were the subject of the study. Data collection used general and advanced numeracy test instruments, with 10 questions divided into 3 general numeracy questions and 7 advanced numeracy questions. The collected data was analyzed using descriptive statistical techniques by calculating frequency, average, and data trends. The study results were then presented in the form of a histogram and narrated. The result of this study was the numeracy ability of elementary school teachers classified as moderate. Female teachers have better numeracy skills than men. Teachers with S2 education levels have better numeracy skills than those with S1 education levels. Teacher numeracy skills need to be improved, especially in male teachers who have lower than female teachers. Professional development of teachers in the field of teacher numeracy literacy needs to be improved, and the development of numeracy literacy tests was required in order to measure teacher numeracy skills.

## 1. INTRODUCTION

Literature is a life skill. Literacy is defined as a unity of reading, writing, numeracy, and critical thinking skills (Lestari et al., 2021; Ratnasari, 2020). Literacy is not only the ability to read and write (Baiduri, 2019; Ratnasari, 2020). Numeracy skills also include numeracy literacy (Anderha & Maskar, 2021;

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Nudiati & Sudiapermana, 2020). Numeracy is the ability and desires to interact with data in numbers in various aspects of life used to determine a decision and solve a problem (Alberta, 2013; Hendrawati et al., 2020; Maulidina & Hartatik, 2018). Numeracy is the ability to understand mathematical and probabilistic concepts (Peters, 2012; Rohim, 2021). Probabilistic is the skill of seeing opportunities in decision-making. Skill in the use of mathematical concepts such as numbers and formulas in solving problems encountered in everyday life can be called numeracy literacy accuracy in making decisions based on table analysis or graphs can also be called numeracy literacy (Ayuningtyas & Sukriyah, 2020; Basri et al., 2021). The ability to use logic can also be referred to as numeracy literacy (Ekowati et al., 2019; Prime & Suswandari, 2021). Logic in question is how a person understands statements by using mathematical language in everyday life and expressed directly or hammering the writing media.

Relationships, arithmetic, and numeracy are three essential dimensions in numeracy literacy (Mahmud & Pratiwi, 2019; Prime & Suswandari, 2021; Purpura & Lonigan, 2016). The relationship is a person's skill in distinguishing the number of objects; then arhythmic is a skill in performing counting operations. Lastly, counting is the skill in knowing many objects that are calculated (Basri et al., 2021; Mahmud & Pratiwi, 2019). Thus, numeracy skills contain numeracy, relationships, and arithmetic operations. Numeracy skills need to be instilled early on in children. Children usually learn Numeracy skills in math subjects (Mahmud & Pratiwi, 2019; Rohim, 2021). In the 2013 curriculum, elementary school students get math learning with an accumulation of 6 hours of lessons per week (Nuraeni et al., 2020; Sulistyani & Deviana, 2019). Some elementary mathematical materials that include basic numeracy such as numbers, measurements, geometry, odds, and basic arithmetic (Ginsburg et al., 2006; Sulistyani & Deviana, 2019).

Unfortunately, the ability of elementary students in terms of numeracy literacy is still relatively weak. Research conducted by Maulidina School in Sidoarjo Regency found that 35% of students have a low ability on math skills, 40% of students are moderately capable, and 25% are competent (Maulidina & Hartatik, 2018). Furthermore, a study conducted by Maghfiroh at a school in Gresik found that students were not used to reading books; when faced with math problems, they have not been able to solve them with their understanding (Maghfiroh et al., 2021). The government is working to establish a numeracy literacy program to overcome this problem. The government's seriousness is embodied in a National Literacy Movement (GLN) program. Literacy, numeracy literacy, science literacy, financial literacy, digital literacy, and cultural literacy and citizenship became the basis of the National Literacy Movement in the implementation of literacy in Indonesia (Anderha & Maskar, 2021; Nudiati & Sudiapermana, 2020; Ratnasari, 2020). The performance of this GLN covers a wide range of activities, for example, the provision of literacy facilities by the government such as reading parks and libraries, increasing the types and number of science sources, and expanding the scope of literacy activity participants. Through GLN, the government expects educators to increase literacy activities and the general public to participate in this GLN program (Ayuningtyas & Sukriyah, 2020; Harifa et al., 2021).

But the reality that occurs in the field is that numeracy literacy programs have not been implemented optimally through GLN. Ekowati's research (2019) mentioned that some indicators of numeracy literacy are still not met in the implementation of learning in schools (Ekowati et al., 2019). In addition, the common understanding of teachers in the application of literacy movements becomes an inhibitory factor in literacy programs in schools (Batubara & Ariani, 2018; Hidayat et al., 2018). Implementing literacy in elementary school is still not optimal because of the lack of passion for reading students towards reading books in school (Ekowati et al., 2019; Hidayat et al., 2018). Lack of reading books and teachers' lack of focus in running literacy programs become an inhibiting factor in implementing literacy in schools (Batubara & Ariani, 2018; Hidayat et al., 2018). To assess literacy, in 2020, the Ministry of Education launched a National Assessment (AN) program instead of national examinations. One component of the assessment is numeracy literacy. Aljabar, geometry, numbers, measurements, data and uncertainties become numeracy content in the AKM program (Ayuningtyas & Sukriyah, 2020; Rohim, 2021). The results of this assessment will be maximized if learning leads to numeracy literacy development activities. For that, teachers are expected to grow the resource of student reason in every learning. Thus, teachers must have a high knowledge of numeracy literacy to be able to help students in developing their abilities. In the 21st century, almost all professions, including teachers, demand numeracy skills of at least level 3 (Hango, 2014; Westwood, 2021).

Research on numeracy ability according to gender and education level has been done by several researchers. Studies stating that the numeracy ability of women in adulthood is lower than that of men (Borgonovi et al., 2021; Cook, 2018). On the other hand, Suryadarma stated that women's numeracy skills are better than men at school age (Suryadarma, 2013). Furthermore, studies conducted by Hango showed numeracy skills in people who pursued S1 and S2 education; there was no significant difference (Hango, 2014). A subsequent investigation conducted by Sebastião revealed that the financial literacy and

numeracy skills of people with S2 education are better than S1 education (Sebastião, 2019). Unfortunately, research on teachers' numeracy skills is still not available. The teacher is one of the keys to the success of the development of student numeracy literacy (Fiangga et al., 2019; Patriana et al., 2021). To be able to carry out his role well, then the teacher must also master literacy. Data on teacher numeracy skills is essential to know so that the school can follow up properly in implementing numeracy literacy programs in schools. Based on this, it is necessary to analyze the numeracy knowledge of elementary school teachers, to identify the numeracy skills of teachers. The results of this study are expected to be the basis for further research related to the development of numeracy literacy of elementary school teachers.

## 2. METHOD

The study aimed to measure the numeracy knowledge of primary school teachers. Descriptive approaches were used in this research to achieve research objectives. The descriptive approach is used to examine situations based on current circumstances (Siyoto & Sodik, 2015; Williams, 2007). The descriptive approach aims to observe a phenomenon in real terms based on the data collected (Hardani et al., 2020; Riastini et al., 2021). This research was conducted in SD Negeri 3 Banjar Jawa, Buleleng Subdistrict, Buleleng Regency. A total of 27 teachers in SD Negeri 3 Banjar Jawa were participants in this study, with details as many as 20 teachers having an education level of S1 and 7 teachers had s2 education. Teachers with male sex numbered 12 people and female teachers numbered 15 people. The sample used in this study is the entire population of 27 teachers or referred to as saturated sampling techniques (Siyoto & Sodik, 2015; Sugiyono, 2013). The data on the study was collected using test techniques. Tests are a series of questions used to measure cognitive abilities and other abilities possessed by the measured subjects (Alhamid & Anufia, 2019; Retnawati, 2016). The question used on this instrument was adopted from common and advanced numeracy scale instruments by Lipkus (Lipkus et al., 2001). The questions given to respondents amounted to 10 questions. The question consists of two parts, namely, general numeracy and advanced numeracy. General numeracy consists of 3 questions, while advanced numeracy consists of 7 questions. The measurement scale applied to the test instrument is the Guttman scale. The Guttman scale has the hallmark of clear and stable answers (Siregar, 2014; Sugiyono, 2013). The correct respondent's answer will be given a score of 1, while the score of 0 for the wrong answer. The validity of the instruments used is seen from the correlation of the instrument with the construction of global numeracy. Correlation analysis uses a tetrachoric correlation matrix so that the average correlation of 0.45 SD = 0.14. The collected data is analyzed statistically descriptively to get conclusions from the data that has been collected by looking at the value of variable distributions (Hardani et al., 2020; Siyoto & Sodik, 2015). Based on data from the tests disseminated, respondents analyzed the percentage of correct answers. The analysis results in the form of score frequencies obtained are then presented in the form of diagrams.

## 3. RESULT AND DISCUSSION

### Result

To see the numeracy skills of elementary school teachers in SDN 3 Banjar Jawa, diagrams are used to illustrate the difference in scores from tests that have been done. Total score distribution can be seen in Figure 1.

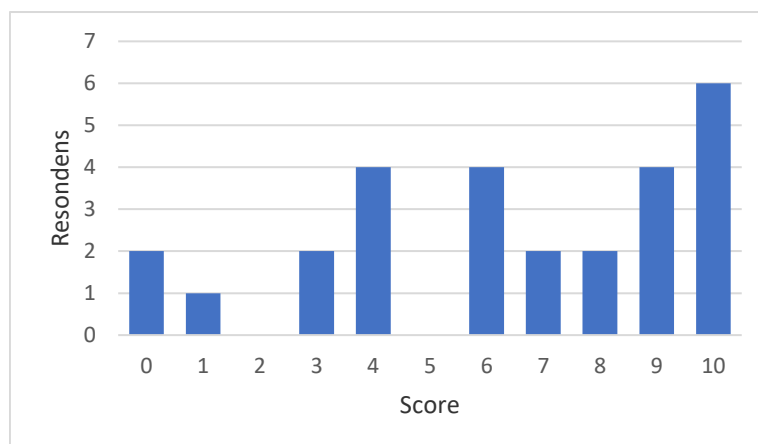


Figure 1. Distribution of Total Score

The data above shows that 22.2% of elementary teachers achieve a perfect score of 10. 7.4% of elementary teachers get the lowest score, which is 0. Score 10 is the most obtained score by elementary school teachers, as many as 6 people. A total of 9 elementary teachers get a score of less than 5. On the other hand, as many as 18 teachers get a score of more than 5. The average score obtained by teachers is 6.4 (medium category). Judging from gender, the numeracy ability of female teachers tends to be better than that of male teachers. Female teachers earned 7.4 points while men earned an average of 5 points. 33.3% of female respondents achieved perfect scores, while male respondents only 8.3% achieved perfect scores. The distribution of scores by gender can be seen in Figure 2.

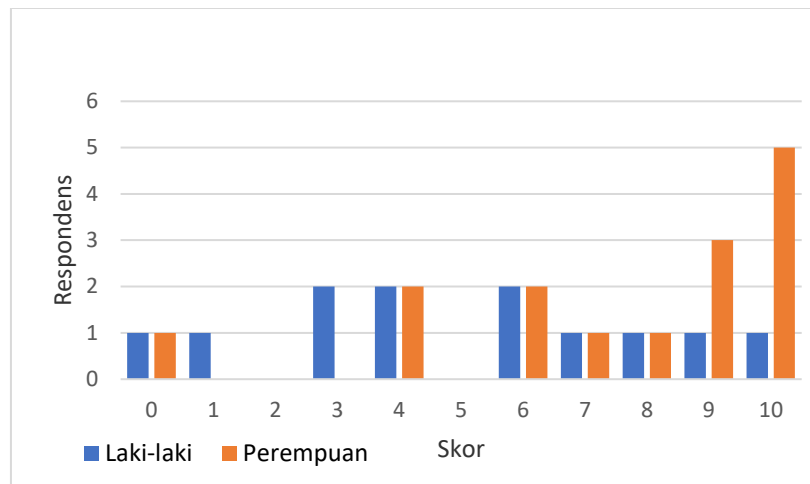


Figure 2. Distribution of Score based on Gender

Judging from the teacher education level, teachers with S2 education level have a fairly high average point of 8.1, while teachers with S1 education levels have a lower average point of 5.8. Respondents qualified S2, 71.4% got a maximum score, while S1 only 5%. The distribution of scores based on education level can be seen in Figure 3.

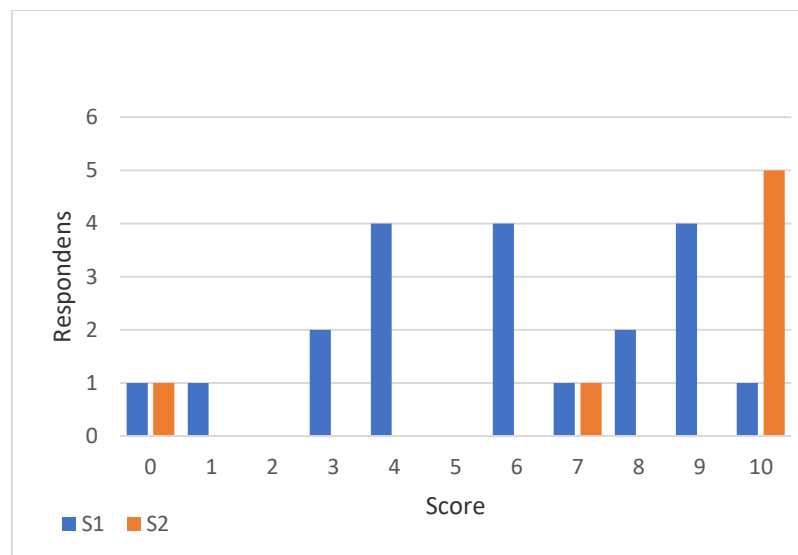


Figure 3. Distribution of Score based on Education Level

**Discussion**

Based on the study results, the numeracy ability of elementary teachers in terms of gender shows that women have better numeracy literacy than men. A similar opinion was also expressed by Suryadarma, who mentioned that the numeracy ability of women in Indonesia is better than men because this

phenomenon is an education system imposed in Indonesia that prefers girls over girls (Suryadarma, 2013). This phenomenon is supported by women's cognitive ability to understand a problem faster than men (Aini, 2017; Buranda & Bernard, 2018). Judging from education in the family environment, there is a misconception about numeracy literacy education in Indonesia. These concepts include, literacy and numeracy learning is entirely dependent on school, lack of knowledge that the family is a place of literacy and numeracy implementation, and literacy implementation is only limited to reading books (Indriyani et al., 2019; Meliyanti et al., 2021).

Contrary to previous opinions, Coke argues that men have superior numeracy abilities compared to women. His research took data from PIAAC (Programme for the International Assessment of Adult Competencies) 2012 in 20 countries. The advantages of male numeracy have different variations in each country (Cook, 2018). Similar findings were found by Borgonovi who mentioned men have advantages in numeracy ability, while women have an advantage in literacy ability (Borgonovi et al., 2021). Men outperform women in reasoning ability and have lower levels of math anxiety (Primi et al., 2018; Rossi et al., 2021). Math anxiety has great control over a person's performance in math-related work. Math anxiety is the stress or fear of mathematics (Ginet et al., 2018; Rossi et al., 2021). The greater the anxiety a person has, the more mathematical performance will decrease (Novak & Tassell, 2017; Rossi et al., 2021). When compared by gender, math anxiety experienced by women falls into a high category compared to the level of mathematical anxiety experienced by men (Maloney et al., 2012; Mier et al., 2019). Women's ability to use mathematics is also influenced by gender stereotypes such as "mathematics is only for men, not women" or the assumption that women's work does not use many mathematical concepts (Ginet et al., 2018; Rossi et al., 2021). Unfortunately, according to Rossi (2021), gender stereotypes will cause women to feel weak to mathematics and reluctant to take jobs that use mathematical concepts. Furthermore, according to Borgonovi, women's numeracy declines as they enter adulthood due to gender social roles, psychological traits, and cognitive development (Atasoy & Güçlü, 2020; Borgonovi et al., 2021). From the above statement it can be seen that the numeracy ability of women in Indonesia is better than men. Different in other countries that show better numeracy skills of men than women.

Judging from the level of education taken by teachers, teachers with S2 education levels have numeracy literacy greater than the level of S1 education. Basri also conveyed a similar opinion, numeracy ability in undergraduate students is still low (Basri et al., 2021). On the other hand, Hango stated that in graduates of S1 and S2 there is no significant difference in literacy and numeracy skills. The study results were obtained from PIAAC analysis in 2012 (Hango, 2014). Hango also argues that education determines a person's literacy and numeracy skills. The numeracy ability will be higher in line with the high level of education taken (Atasoy & Güçlü, 2020; Cook, 2018). On the other hand, Sebastião argues that students with s2 education have better financial literacy and numeracy skills than S1 education (Sebastião, 2019). Teachers with S2 education should have more knowledge than teachers with S1 education. In the 21st century, numeracy literacy becomes literacy that each individual must own..

Overall the numeracy ability of SDN 3 Banjar Jawa teachers is relatively moderate, so it is recommended to improve the numeracy ability of teachers to be even better. Judging from the gender analysis, male teachers need to be of particular concern to enhance teachers' numeracy skills. Improvement of numeracy skills can be made through the professional development of teachers or workshops in the field of numeracy (Anas et al., 2021; Fiangga et al., 2019). The involvement of stakeholders (education department) collaboratively and synergistically in the training of teacher numeracy skills is also considered necessary, considering that the institution overshadows the improvement of teacher quality. This research is inseparable from the limitations or deficiencies felt during the study. The limitation of this study is a case study, which only involves teachers in SD N 3 Banjar Jawa with a limited number of respondents. Furthermore, this study uses instruments from similar research.

#### 4. CONCLUSION

Based on the results of research and discussion, it shows that the numeracy ability of teachers in SDN 3 Banjar Jawa is good enough. The numeracy ability of male teachers needs to be improved so that numeracy skills between male and female teachers do not exist gaps. The numeracy ability of teachers with S1 education levels is good enough, then teachers with S2 education levels have good numeracy skills. The results of this research are recommended to be used as a reference for teachers in the professional development of teachers. The professional development of teachers needs to be improved, especially in numeracy literacy. In addition, teacher numeracy literacy measurement also requires measuring tools, so the development of numeracy literacy tests for elementary teachers is needed.

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