



Assesing Basic Numeracy Skills in The Community of Renzo Edupark UBJ Cibadak Sukabumi: A Case Study

Dian Anggraeni Maharbid¹, Awiria², Markum³

^{1,2,3} Bhayangkara Jakarta Raya University, Bekasi, INA
dian.anggraeni@dsn.ubharajaya.ac.id

Abstract. This case study delves into the fundamental numeracy skills of the community residing in the Renzo Edupark UBJ Cibadak Sukabumi area, focusing on the critical role numeracy abilities play in achieving sustainable development. The research examines the numeracy competencies of community members and identifies potential areas for improvement, which are essential for advancing the overarching goal of sustainable development. By assessing the numerical aptitude of this specific community, we gain valuable insights into their capacity to make informed decisions and participate in economic, social, and environmental development endeavors. The sample is drawn from the afflicted population with 37 participants participating in this study. The research steps start by identifying research questions, selecting cases, collecting data, analyzing data, and reporting findings. The findings provide a foundation for developing targeted educational programs, policies, and community initiatives aimed at enhancing numeracy skills. Ultimately, this study highlights the importance of empowering the Renzo Edupark UBJ Cibadak Sukabumi community with the mathematical skills necessary to drive local sustainable development efforts and contribute to a brighter future for the region. The result showed that the numeracy skills of those who live in the Renzo Edupark UBJ Cibadak Sukabumi area remain low. Only a few people know and understand the term numeracy and apply it to various mathematical problems.

Keywords: Numeracy, Renzo Edupark UBJ, Sukabumi, Sustainable Development.

1 Introduction

Numeracy is the ability to understand, reason with, and apply numerical concepts in real-world situations. It is the quality or state of being numerate, which involves the ability to work with numbers and understand mathematical concepts. Numeracy skills include basic arithmetic operations such as addition, subtraction, multiplication, and division, as well as number sense, operation sense, computation, measurement, geometry, probability, and statistics. Numeracy is a fundamental component of education and is essential for accessing education, empowering individuals, providing life skills, and addressing the needs of the job market [1]. It is also crucial for achieving the UN's

Sustainable Development Goals and is increasingly recognized as a critical skill set for personal and professional success.

Numeracy skills are crucial in various aspects of life, including healthcare, education, and socioeconomic status. The significance of numeracy skills is also evident in education, as the development of numeracy competence is deemed important during the early years of a student's life [2]. Numeracy proficiency has been linked to the opportunity for numeracy practice, with both aspects mutually reinforcing each other. Numeracy skills are also fundamental for higher-order thinking and reasoning skills, such as critical thinking and problem-solving[3]. Moreover, numeracy skills are crucial for interpreting numbers and solving everyday problems, such as those encountered during shopping or while using public transportation.

Numeracy skills play a significant role in contributing to sustainable development in various ways by fostering innovation, empowering individuals, providing the basis for sustainable societies, contributing to economic and social outcomes, and ensuring access to learning and opportunities. These skills are essential for achieving the UN's Sustainable Development Goals and are crucial for addressing global sustainability challenges[4].

Numeracy in education plays a significant role in promoting human security by enabling access to education, fostering empowerment and participation, imparting essential life skills, and addressing the needs of vulnerable populations. It equips individuals with the knowledge and skills necessary for their personal and collective security within educational contexts [5], [6].

Numeracy skills are essential for elementary school students as they enable access to education, foster empowerment, and participation, impart essential life skills, prepare students for the future, and provide a foundation for higher mathematics [7], [8].

According to some research, Indonesian students' numeracy skills have been declining, and the learning outcomes of Indonesian children in 2014 were lower than in 2000 [9], [10]. The low ability in numeracy extends to adult respondents, most of whom were unable to solve basic fraction problems. The research also revealed that students' abilities did not experience significant improvement when they were growing up and studying at the junior secondary school and senior secondary school levels. The cultivation of numeracy literacy in schools is crucial, and careful planning is necessary to ensure that it runs smoothly [11]. Students encounter difficulties in resolving mathematical problems, such as difficulty in finding keywords from problems in questions, modeling the problem into mathematical form, and deciding how to resolve the problem [12].

The School Literacy Movement (GLS) has been promoted since 2015, by the Minister of Education and Culture Regulation Number 23 of 2015 on Character Development. To ensure Indonesia's success in the twenty-first century, Indonesians and educational institutions must master six basic literacies: language literacy, numeracy literacy, scientific literacy, digital literacy, financial literacy, and cultural and civic literacy. This literacy ability must be balanced with the development of abilities such as critical thinking/problem-solving, creativity, communication, and teamwork [13]. However, many young people in society continue to struggle with basic literacy and numeracy abilities. This problem can be caused by several circumstances, including

(1) limited access to education; many Indonesians still lack access to adequate education, particularly in rural and remote places. (2) There is a low literacy rate. (3) Inadequate educational quality. (4) Lack of learning interest and motivation: People's interest and drive to learn can be influenced by a variety of circumstances, including home environment, school environment, and a lack of appreciation for education. (5) A scarcity of resources. People's reading and numeracy abilities can suffer from a lack of resources such as books, instructional media, and technology. (6) Language barriers: Because Indonesia has a diversity of regional languages, learning literacy and numeracy in the official language can be difficult.

According to data from the Sukabumi Regency Education Office, School Examination (US) scores for elementary schools in the Sukabumi Regency in the 2019/2020 school year reached an average of 65.73. Apart from that, data from the Ministry of Education and Culture shows that in 2020, the average National Examination (UN) score for elementary schools in Sukabumi was 56.61. However, no data has been found regarding the numeracy abilities of the community. Based on this, the researcher will conduct research with the title "Assessing Basic Numeracy Skills in the Community of Renzo Edupark Ubj Cibadak Sukabumi: A Case Study"

2 Method

The research strategy utilized in this study is a case study or research conducted by looking directly at the field. Because a case study is a method that explains an object over a specific length of time, selecting the region is critical. The research area was chosen on purpose or based on specific considerations tailored to the research objectives. The reason for selecting Renzo Edupark-Sukabumi was that data on the numeracy abilities of the Sukabumi community, in particular, had not been found. The sample is drawn from the afflicted population with 37 participants participating in this study. The research steps start by identifying research questions, selecting cases, collecting data, analyzing data, and reporting findings [14], [15]. The first stage is to select a clear and specific research question or objective that the case study will address. In this case, it is to discover how Renzo Edupark may help sustainable development and a brighter future for society. The second step is to identify situations in which numeracy is a necessary ability for sustainable development. This study emphasizes the significance of providing the Renzo Edupark UBJ Cibadak Sukabumi community with the essential mathematics skills to drive community sustainable development activities and contribute to the region's brighter future. Data collection was gathered from the numeracy skill test. All data was then quantitatively evaluated and qualitatively reported using Ms. Excel and SPSS. The following are the indicators in this research:

Table 1. Instrument of Numeracy Skill.

Component	Instrument	Aspect	Instrument Code
Understanding Numeracy	Test	Introduction to the concept of Numeration	A3, A4
		Introduction to Numbers	C3
		Understanding Mathematical Operations	C1, C2, C4, C5

Component	Instrument	Aspect	Instrument Code
		Problem Solving	C5
		Use of Mathematics in Everyday Life	C5, C6
		Understanding Data and Statistics	C6
		Identifying Mathematical Patterns and Relationships	C4, C6

The categories of numeracy skills for people in the Renzo Edupark UBJ Cibadak Sukabumi area are based on the percentage of success in answering numeracy questions (see Table 2) and numeracy skill level will be analyzed by referring to each indicator.

Table 2. Numeracy Skill Category.

Percentage (%)	Category
71 – 100	High
41 – 70	Medium
0 – 40	Low

3 Result

Numeracy is not synonymous with mathematical skill. Both are built on the same information and skills, but the distinction is in how these knowledge and talents are empowered. The mere knowledge of maths does not imply numeracy competence. Numeracy includes the ability to apply mathematical principles and procedures in real-world circumstances. The problem is frequently unstructured, has multiple solutions or none at all, and is tied to non-mathematical elements [16].

In simple terms, numeracy can be defined as the ability to apply number concepts and calculation operation skills in everyday life. Numeracy literacy also includes the ability to translate quantitative information that surrounds us. In short, numeracy literacy is the ability or skill to develop knowledge and skills to use mathematics confidently in all aspects of life. Numeracy literacy includes knowledge, skills, behavior, and positive behavior. The research results are as follows:

Respondents consisted of 37 people from the Renzo Edupark UBJ Cibadak Sukabumi area who were parents of students at SDN 10 Cibadak with an age range of 20 - 54 years (see Fig.1) with work backgrounds of more than 90% being housewives (see Fig.2)

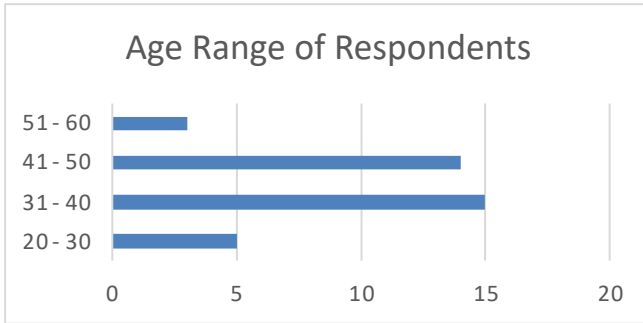


Fig. 1. Age range of respondents in renzo edupark UBJ Cibadak Sukabumi

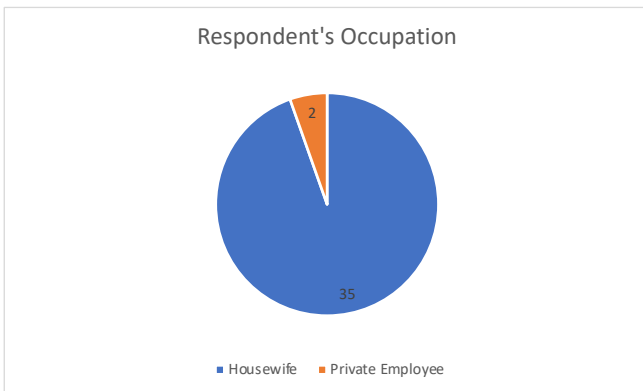


Fig. 2. Respondents' occupation in renzo edupark UBJ Cibadak Sukabumi

Numeracy refers to a person's ability to understand, use, and work with numbers and mathematics in a variety of contexts. It includes basic skills such as counting, measuring, solving math problems, and understanding concepts such as ratios, percentages, and probability. Numeracy is also important in managing personal finances, making decisions involving numerical data, and participating in various aspects of economic and business life. Numeracy skills help individuals become more independent in managing financial matters, measuring risks, and making data-based decisions. The numeracy skill of Renzo Edupark UBJ Cibadak Sukabumi based on the test of numeracy skill with the result as below:

Table 3. Numeracy Skill of Renzo Edupark UBJ Cibadak Sukabumi Community.

Aspect	Indicator	Result	Category
Introduction to the concept of Numeration	Knowing, understanding, using, and working with numbers and mathematical concepts	5%	Low
Introduction to Numbers	Understand the concepts of whole numbers, fractions, decimals, and percentages	38%	Low

Aspect	Indicator	Result	Category
Understanding Mathematical Operations	Able to perform basic mathematical operations such as addition, subtraction, multiplication and division correctly	55%	Medium
Problem Solving	Ability to identify mathematical problems in real situations	54%	Medium
Use of Mathematics in Everyday Life	Able to apply mathematical concepts to everyday life situations, such as shopping, cooking, or planning personal finances	36%	Low
Understanding Data and Statistics	Able to interpret data presented in graph or table form	19%	Low
Identifying Mathematical Patterns and Relationships	Ability to identify patterns, relationships, or mathematical rules in data or sequences of numbers	27%	Low
	Mean	34%	Low

According to Table 3, the numeracy skills of those who live in the Renzo Edupark UBJ Cibadak Sukabumi area remain low, with an average percentage growth for each component and indication of 34%. With details of each aspect as Introduction to the Concept of Numeration (5%), Introduction to Numbers (38%), Use of Mathematics in Everyday Life (36%), Understanding Data and Statistics (19%), and Identifying Mathematics Patterns and Relationships (27%).

With percentages of 55% and 54%, Understanding Mathematical Operations and Problem-Solving are the only two components that fall into the medium group. Meanwhile, there is not a single feature in the high category that the residents of the Renzo Edupark UBJ Sukabumi area can master.

In the aspect of introducing the concept of numeration, only one person knew the term numeration and could explain the concept of numeration correctly. Meanwhile, the other three people were not familiar with the term numeracy but could estimate the concept of numeration itself as something related to numbers or mathematical activities of counting (see Fig.3)

R01	4. Jika Ya, apakah itu numerasi? mengaplikasikan konsep simbol dalam matematika dasar untuk memecahkan masalah dalam kehidupan sehari-hari
R29	4. Jika Ya, apakah itu numerasi? kegunaan / kegunaan dalam menjelaskan sesuatu dengan angka
R31	4. Jika Ya, apakah itu numerasi? karena menghitung

Fig. 3. Respondent answer for instrument code A4

In Fig.3, it can be observed that R01 correctly understands the concepts of numeration, whereas R29 already knows and utilizes numbers but does not yet fully comprehend the concept of numeration in mathematics, and R31 just knows how to use mathematics in the concept of numeration procedurally.

The understanding of the mathematical aspect of numbers was 38% in Understanding the concepts of whole numbers, fractions, decimals, and percentages. This means that only 14 people in the Renzo Edupark UBJ community comprehend numbers. This is because the general public or respondents continue to have difficulty determining the value of an integer. Aside from that, people are still incapable of representing a mathematical problem using mathematical symbols (see Fig. 4).

R04	3. Tentukan apakah -15 lebih kecil dari -10 atau tidak! $-15 > -10$
R12	3. Tentukan apakah -15 lebih kecil dari -10 atau tidak! Ya. 15 lebih kecil 10
R31	3. Tentukan apakah -15 lebih kecil dari -10 atau tidak! Tidak 15 lebih besar dari 10
R36	3. Tentukan apakah -15 lebih kecil dari -10 atau tidak! - 15 lebih kecil dari -10

Fig. 4. Respondent answer for instrument code C3

In detail, R04 wrote the smaller mathematical symbols incorrectly. While R12 and R31 disagreed over the values -15 and -10, with the result R12 being correct and R31 being incorrect. Even though R12 and R36 have the correct answer, they are unable to write it in the form of a mathematical symbol representation. It indicates their numeracy skills remain basic or low.

Only 36% of respondents can apply mathematical principles to everyday life scenarios such as shopping, cooking, or organizing personal finances in the Use of Mathematics in Everyday Life category. In instrument C5, a problem in everyday life is presented in the form of shopping activities that are chosen to be more representative of the respondents' characteristics. In this regard, it was discovered that while respondents were able to answer the questions, their replies varied. In general, practically all respondents who responded did not write down their mathematical representation, merely a quick response except R33 who has been able to write down its mathematical representation, although not completely. Based on this, it can be generalized that the inhabitants of the Renzo Area can do procedural skills but need to enhance their comprehension of mathematical ideas (see Fig.5).

R18	<p>2. Jika Anda memiliki Rp500.000 dan ingin membeli 3 item makanan sebagai Rp13.000, Rp18.000, dan Rp20.000, berapa uang yang akan Anda peroleh setelah membeli ketiga item tersebut?</p> <p>Rp 10.000</p>
R29	<p>2. Jika Anda memiliki Rp500.000 dan ingin membeli 3 item makanan sebagai Rp13.000, Rp18.000, dan Rp20.000, berapa uang yang akan Anda peroleh setelah membeli ketiga item tersebut?</p> <p>hasil = 0</p>
R33	<p>Jika Anda memiliki Rp500.000 dan ingin membeli 3 item makanan sebagai Rp13.000, Rp18.000, dan Rp20.000, berapa uang yang akan Anda peroleh setelah membeli ketiga item tersebut? jawab:</p> <p> 500.000 $- 13.000$ $- 18.000$ $- 20.000$ </p>
R37	<p>uangnya habis karena sudah dibeli 3 item makanan tersebut</p>

Fig. 5. Respondent answer for instrument code C5

However, Fig.5 also includes aspects of problem-solving with indicators that can identify problems in real situations. It can be seen that as many as 54% of respondents were able to solve mathematical problems related to the real world. This indicates that if mathematical problems are presented by considering their meaningfulness, they will be easier to solve. Being able to solve difficulties in everyday life is a key aspect of numeracy.

Only 7 participants were able to represent data presented in graphical or table form as seen in Fig.6 when it came to Understanding Data and Statistics (19%). On instrument C6, the majority of respondents were unable to answer questions. Several others answered incorrectly without providing further explanation, making it difficult to examine the inaccuracies of the respondents, as seen in R05's response. Some have been able to read the data in the table and express it in mathematical form (R13 and R24) but not precise yet. Seven participants were able to understand the instructions in the questions and accurately read and write them in mathematical form. Answer R33 contains one of them. (see Fig 6.)

R05	<p>1. Amatilah diagram batang berikut yang menunjukkan jumlah buku yang dibaca oleh beberapa siswa dalam sebulan.</p> <p>Berapa buku yang dibaca masing-masing siswa?</p> <p>8 buku</p>
R13	<p>Berapa buku yang dibaca masing-masing siswa?</p> <p>$12 + 10 + 8 + 6 = 36$</p>
R24	<p>Berapa buku yang dibaca masing-masing siswa?</p> <p>8 buku</p>
R33	<p>Andi 12 buku / bulan Bunga 10 buku / bulan Siti 8 buku / bulan Caca 6 buku / bulan</p>

Fig. 6. Respondent answer for instrument code C6

4 Conclusion

The numeracy skills of those who live in the Renzo Edupark UBJ Cibadak Sukabumi area remain low. Only a few people know and understand the term numeracy and apply it to various mathematical problems. The people of the Renzo Edupark UBJ Cibadak Sukabumi area have numeracy skills even though they are still in the low category. The challenge in the numeracy skills of the Renzo Edupark Area community is the ability to represent mathematical problems in mathematical form. There is a need to increase numeracy skills to support sustainable development in the Renzo Edupark UBJ area.

References

1. Kus, M.: Numeracy. *Brock Education Journal* 27(2). (2018)
2. Purnomo, H., Sa'dijah, C., Hidayanto, E., Permadi, H., Anwar, L.: Development of instrument numeracy skills test of minimum competency assessment (MCA) in Indonesia. *International Journal of Instruction* 15(3), 635-648. (2022).
3. Marhami, M., Rohantizani, R., Muhammad, I., Samsidar, S., Anggraini, I.: Pre-service mathematics teachers' numeracy in Acehese culture-based minimum competence assessment. *Jurnal Elemen* 9(1), 109-119. (2023).
4. UNESCO.: Literacy and Numeracy from a Lifelong Learning Perspective Sustainable Development Goal (SDG) 4 calls on countries to 'ensure inclusive and equitable. (2017). [Online]. Available: <http://www.unesco>.
5. Muhammad, R., Yusha', M. A., Lawal, M. N. I.: Science, technology and mathematics (STM) education for human security and sustainable development. *IOSR Journal of Mathematics* 13(6), 67-72 (2017).
6. Achor, E. E.: Security and human capital for sustainable educational development In Nigeria: Re-inventing education across curriculum. *Zuba Journal of Educational Studies* 5(1), 3-19 (2021).
7. Imron, I., Pramono, S. E., Rusilowati, A., Sulhadi, S.: Program literasi dan numerasi dalam perspektif pendidikan guru penggerak. In *Prosiding Seminar Nasional Pascasarjana*, 6(1), 1131-1139. (2023).
8. Yustitia, V., Siswono, T. Y. E.: Numeracy of prospective elementary school teachers: a case study. In *Journal of Physics: Conference Series*, 1918 (4), p. 042077. IOP Publishing. (2021).
9. N. Alia A, E. S. Novita.: Fighting Learning Crisis, Building Foundational Skills Program Rise Di Indonesia. (2022). [Online]. Available: <https://rise.smeru.or.id/en/blog/fighting-learning-crisis-building-foundational-skills>
10. Luhur, B.: Moving up a grade but not learning: research reveals 3 bad achievements of education in Indonesia since 2000. (2021) [Online]. Available: <https://rise.smeru.or.id/en/blog/moving-grade-not-learning-research-reveals-3-bad-achievements-education-indonesia-2000>
11. Rohmah, A. N., Sutarna, S., Hidayati, Y. M., Fauziati, E., Rahmawati, L. E.: Planning for cultivation numerical literacy in mathematics learning for minimum competency assessment (AKM) in elementary schools. In *Elementary School Forum (Mimbar Sekolah Dasar)*, 9(3), 503-516. (2022). Web site: <https://ejournal.upi.edu/index.php/mimbar/index>.
12. Kusumadewi, C. A., Retnawati, H.: Identification of elementary school students' difficulties in mathematical problem-solving. In *Journal of Physics: Conference Series* 1511(1), 012031. IOP Publishing. (2020).

13. Rachman, B. A., Firdaus, F. S., Mufidah, N. L., Sadiyah, H., Sari, I. N. Peningkatan kemampuan literasi dan numerasi peserta didik melalui program kampus mengajar angkatan 2. *DINAMISIA: Jurnal Pengabdian Kepada Masyarakat*, 5(6), 1535-1541. (2021)
14. Cronin, C.: Doing your literature review: traditional and systematic techniques. *Evaluation & Research in Education*, 24(3), 219–221 (2011).
15. Creswell, J. W.: Designing a mixed methods study in primary care. *The Annals of Family Medicine*, 2(1), 7-12 (2004).
16. Kemendikbudristek.: Modul literasi numerasi di Sekolah Dasar. Kemendikbudristek, Jakarta (2021).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

