Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

Evaluating Mathematical Literacy Among Pupils Using Early Grade Mathematics Assessment in East Sumba

Stevvileny Angu Bima[1]*, Iona Lisa Ndakularak[2], Mayun E Nggaba[3], Erwin Randjawali[4], Yulita Mila Pakereng[5]

[1*,2,3,4]Mathematics Education Study Program, Faculty of Teacher Training and Education,
[5]Management Study Program, Faculty of Economics, Business and Humanities,
Universitas Kristen Wira Wacana Sumba
*Corresponding Author. Email: stevvileny@unkriswina.ac.id

Abstract: This study aims to evaluate the level of mathematical literacy among elementary school-aged children in one of the schools in Lewa Paku District, East Sumba Regency. This research employed a mixed method of quantitative and qualitative approaches. The participants in this study were 20 students (10 students with good grades and ten students with poor grades in class), teachers, the school principal, and the head of the Education Office of East Sumba. The research instruments were mathematical tests adapted from the Early Grade Mathematics Assessment (EGMA), key informant interview guidance applied to all the participants, and observation during the learning processes. The quantitative data was analyzed using the descriptive technique, while the qualitative collected data was processed by data reduction, data display, and conclusion. The findings showed that the mathematical literacy of the fifth grade was in a low category. Factors affecting the student's math skills were less learning media, less conducive classes, limited, outdated, and unattractive printed textbooks, inadequate learning and teaching facilities, and less trained teachers. This research finding provides relevant and timely information to support students' achievement by adjusting policies, reforming curricula or programs, and instructional practices. Also, the policymaker can evaluate the effectiveness of the current education programs to decide on better interventions in supporting the students to improve their understanding of early math concepts.

Article History
Received: 17-02-2023
Revised: 12-03-2023
Accepted: 26-03-2023
Published: 07-04-2023

Key Words:
EGMA; Numeracy; Primary Students; Number Identification; Patterning.

How to Cite: Angu Bima, S., Ndakularak, I., Nggaba, M., Randjawali, E., & Pakereng, Y. (2023). Evaluating Mathematical Literacy Among Pupils Using Early Grade Mathematics Assessment in East Sumba. *Jurnal Paedagogy*, *10*(2), 379-388. doi:https://doi.org/10.33394/jp.v10i2.7418

https://doi.org/10.33394/jp.v10i2.7418

Introduction

Numeracy is an essential ability to use numbers and basic mathematical symbols to solve real-life practical problems. It is also necessary to analyze and present information in various forms and interpret it in predicting and making decisions (Kemendikbud, 2021). Poor numeracy is associated with economic vulnerability. Based on United Kingdom' National data, low numeracy skill contributes to low income; more deficient numeracy adults have fewer employment opportunities, cause lower-paying jobs, and end up in poverty (de Bruin & Slovic, 2021). Many low-paid countries lack math skills (Mabena et al., 2021). The students' mathematical skill and knowledge may impact their future academic and financial well-being. Furthermore, In the United Kingdom, it is also found that early mathematical ability has a statistically notable association with the socioeconomic status of an adult at the age of 42 years (Ritchie & Bates, 2013).

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

However, the COVID-19 pandemic has caused enormous chaos to the education system in human history; 1.6 billion students in more than 200 countries are affected (Pokhrel & Chhetri, 2021). The learners and the educators must adapt the transition of the learning system from face-to-face to online. Thus, e-learning tools have significantly facilitated students and educators during university and school closures (Subedi et al., 2020). Many countries experienced substantial problems with reliable Internet connections and digital education tools. While in many developing countries, economically backward students cannot afford online learning devices (Pokhrel & Chhetri, 2021). The presence of the COVID-19 pandemic since 2020 in Indonesia has brought a negative impact on the quality of education. One of the unavoidable effects is the decrease in students' numeracy.

Indonesia obtained a score of 397 related to the mathematical aspect, while the average global TIMSS score was around 5000 (TIMSS, 2019). This result shows that Indonesian students' numeracy achievements are still low. Like the score from a survey, Indonesia got 378 held by PISA (Programme for International Student Assessment) in 2000. PISA is an international student assessment program organized by the OECD to measure students' ability to use their literacy, math, and scientific skills (OECD, 2018). Poor numeracy must be addressed immediately since improving mathematical proficiency can worsen problems such as poor academic performance, low-wage jobs, and unemployment.

The study aims to assess the primary student's numeracy skills in one of the elementary schools in East Sumba using indicators from the Early Grade Mathematics Assessment (EGMA). Based on the minimum competency assessment results, the score of elementary schools in the Lewa Paku sub-district is relatively low. EGMA is used to design test questions to evaluate students' numeracy skills. EGMA is a tool used to assess children's skills and understanding in learning mathematics and has been widely used in several countries such as Sub-Saharan Africa, Latin America, the Caribbean, Asia, and the Middle East (Platas et al., 2016). The uniqueness of EGMA compared to other measuring tools lies in the content and design of the test features. The range assessed by EGMA includes mathematical knowledge and skills, which are set into six EGMA subsets; number recognition, addition and subtraction level one, number comparison, Number patterns, second-level addition and subtraction, and word problems. The EGMA is developed following the curriculum-based measurement (CBM) concept to provide reliable results responsive to instructional changes over time. CBM is a concise measure administered and scored quickly and can cover various parallel forms (Platas et al., 2016).

Research Method

The type of research used in this study was mixed methods, a mixture of quantitative and qualitative methods carried out simultaneously to obtain more comprehensive data. The quantitative approach used observation, questionnaires, and mathematical tests structured based on EGMA indicators. The type of test instrument was an objective test in the short answer form. While the qualitative tools were key informant interviews, the respondents were the head of the East Sumba district education office, students, teachers, and the school principal. In mathematics education research, questionnaires are expected to explore students' affective aspects, such as learning motivation, learning independence, responses, and student attitudes (Lestari, 2015).

The subjects of this study were 20-grade 5^{th} students, a 2nd-grade and a 5^{th}-grade teacher, and the principal. The sampling technique used was purposive sampling by determining the grade and selecting students who met the research criteria: ten students with

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

the best academic achievement and ten with the lowest academic achievement in the class. These considerations are based on the requirements listed in **Table 1** (Puspita Maulidina & Hartatik, 2019).

Table 1. Score and The Category

Score	Category
86 – 100	High
61 – 85	Moderate
0 – 60	Poor

The research began with a desk study to gather information about numeracy and EGMA from various references. Measurements on the numeracy test used the EGMA indicators described in **Table 2.** The next step was designing the research instruments, collecting data, processing/analyzing, and concluding. The analytical technique used in this research was descriptive statistical analysis for quantitative data. While analysis techniques for qualitative, data according to Miles and Huberman (2014), consist of three key steps: data reduction, data display, and conclusion. The triangulation of methods and sources was also carried out.

Table 2. EGMA Subtasks and Skill Description

Subtask	Skill Description
Number Identification	Students can identify the numbers of a given series of numbers
Quantity Discrimination	Students are given the two numbers, and they can determine the more significant numbers
Missing Number (Patterns)	Students are asked to solve number pattern problems
Addition and Subtraction Level 1	Students are asked to solve simple addition and subtraction problems
Addition and Subtraction Level 2	Students are asked to solve more challenging addition and subtraction problems
Word Problem	Students are asked to solve simple addition and subtraction word problems

Source: Tanoto Foundation (2019)

Results and Discussion

This section will discuss quantitative and qualitative findings based on the EGMA subtasks. The first subtask is number identification, which is the ability to identify numerals. Their numerosities become the indicator, so number identification must be taught in the early years of primary school (Ewing, 2016). In this indicator, students should correctly answer the place value in multidigit numerals (e.g., seventy-seven is correct to 77, not seven-seven). In this research, students were given a list of two-digit numbers from 10 to 99 and asked to say each number loudly. All students answered correctly for two-digit numbers, but 25% were wrong when given three-digit numbers from 100 to 500.

Quantity Discrimination

The second subtask is number discrimination; students were asked to write down the name of the students in Table 3 whose test score was the lowest. From the test results, only five pupils (25%) answered correctly, 15% did not respond, and the majority (45%) answered Novi, which in this case, the value of 91.01 is the third lowest score after Tan and Alan. It shows that the ability of fifth-grade elementary school students in numbers comparison and identification are still relatively low. Students lacking mathematical skills will have more difficulty working on numerical comparison cases than their classmates who do not have

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

problems with numerical literacy (Barham et al., 2019). It would be better to introduce the concept of comparing numbers with an approach that does not use number symbols first but uses objects around the students (Rousselle & Noel, 2007). Like using dried leaves by providing a set of eight leaves and six leaves, students can quickly tell which group of leaves is more than asking them to do with mathematical symbols (e.g., "8" and "6"). In addition, teachers can also use pictures to stimulate students to do number discrimination analysis. Pictures can contribute to enhancing the mathematical concepts of elementary school students. Pictures provided by the teachers or in the available books can invoke the mathematical thinking of children (Van Den Heuvel-Panhuizen & Doig, 2014).

Table 3. Test scores of 5 students (Numeracy Test Questions - Number Discrimination)

Number	Students	Score
1	Alan	89,76
2	Novi	91,01
3	Ama	91,52
4	Tan	89,09
5	Rambu	91,43

Number Patterning

Patterning is a crucial early math ability since it can support students' numerical skills, such as multiplication (Rittle-Johnson et al., 2019). Identifying the missing number is fundamental competency in early math thinking (Papic & Mulligan, 2007). Thus, students must master the ability to detect number patterns, which can predict their math achievement. The number-detecting skill can assist students in identifying, extending, and describing predictable sequences in both math symbols and objects (Zippert et al., 2020). They were given five items using EGMA indicators to identify students' ability to fill in the missing number. Three questions consisted of numbers increasing from left to right, shown in Figure 1, with items one, three, and four increasing by fives, ones, and tens, respectively. Then, another question composed of numbers decreasing by two from left to right. The final question is a visual image of several groups of buttons that continue to increase by twos from left to right, and students are required to fill in the number of buttons in the 12th group. These questions consist of two-and three-digit numbers.

Figure 1 also shows the percentage of students who answered correctly for each question. It can be seen that the item increased by five. Only 10% of the children are correct from the first item, 60% for the third item, and 65% for the fourth. If the average of the three items is taken, 45% of children answer correctly from this type of question. In addition, 40% of students answer correctly for the decreasing number pattern. Then related to the question of visual images, only 30% of students responded, but they answered incorrectly.

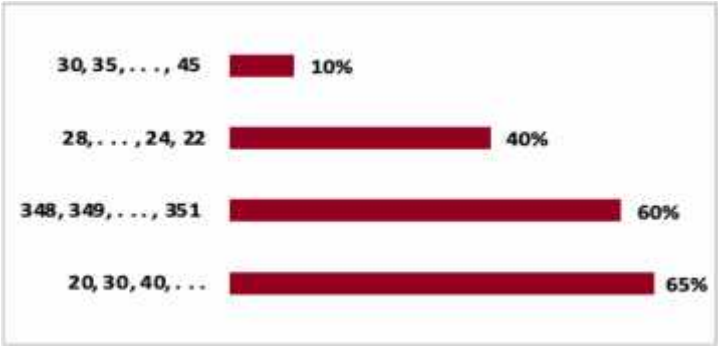

Figure 1. Percentage of Students Based on Correct Answers to the Pattern Questions

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

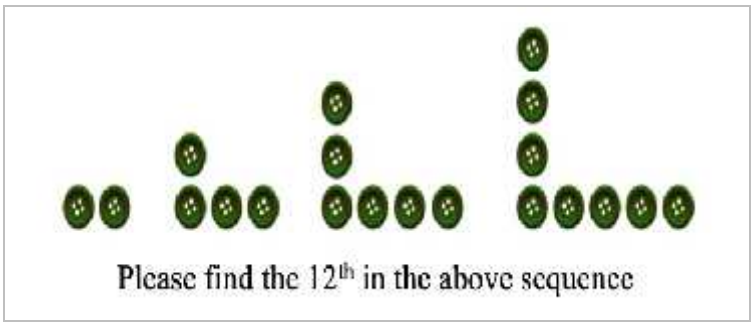

Figure 2. Pattern Question

Based on each student's answer in this section, 25% gave wrong answers for all items, 15% answered with one correct question, 20% correctly answered two of the five questions, and 40% responded to students who answered three questions correctly. The average score of students answering the five questions is 35 out of 100, with a minimum score of zero (no correct answer) and a maximum of 60 (3 of 5 correct answers). Based on the average score and Table 1, student understanding regarding number patterns is categorized as low.

Addition and Subtraction

The fourth subtask is addition and subtraction. Arithmetic (division, multiplication, addition and subtraction) is compulsory for later science education and mathematics (Engvall et al., 2020). In this section, the primary students are asked to work on six items: two one-digit number questions, two two-digit number questions, and two other combinations of one- and two-digit numbers. In working on addition and subtraction questions, students are not limited by time. The result shows that 100% of students answered addition and 90% answered subtraction questions correctly.

However, some students took up to more than one minute for the one-digit question and used their fingers to count. Students' ability to add and subtract is essential for evaluating math skills. In addition, accuracy and speed are unignorable aspects regarding addition and subtraction ability (Progressions for the Common Core State Standards in Mathematics, 2013). Some researchers argue that fluency in adding and subtracting one-digit numbers is crucial in supporting their later mathematical progress and predicting math achievement (Baker & Cuevas, 2018; Reikerås, 2006).

Table 4. Addition & Subtraction Questions to Evaluate Primary Students' Math Ability

No	Question	EGMA's Subtask
1	8 – 2 =	Addition and Subtraction Level 1
2	8 + 2 =	
3	10 – 5 =	Combination of Addition and Subtraction Levels 1 and 2
4	5 + 10 =	
5	20 – 10 =	Addition and Subtraction Level 2
6	10 + 20 =	

Word Problem

Mathematics cannot be separated from everyday life because it can be used widely in solving real-life problems (Jupri & Drijvers, 2016). Mathematics learning must be related to facts that students usually find in their lives so that it is not considered a complex and abstract lesson. Thus, students must be accustomed to working on arithmetic word problems in a way

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

constantly to understand the material comprehensively. In this study, the word problems comprised six items with increasing difficulty levels.

Table 5. shows the percentage of students who answered correctly. From all the given questions, the type of multiplicative Item that was most answered correctly; was 65% of students—then followed by items 1 and 2, where as many as 60% responded correctly respectively. For the other three items, less than 50% of students answered correctly; namely fifth Item was a division problem type which 40% answered correctly. The third Item was a compare type which only 30% of students answered correctly. The fourth Item is that only 5% of students can answer correctly. The average percentage of students answering questions precisely is 43%. Figure 3 shows that 5% of the test takers could not answer all the questions correctly if each student's answers were examined. Then 10% answered five questions correctly, and 25% (Mode) answered two items correctly. In addition, there were no students who answered all six questions correctly.

Based on the qualitative findings, students experienced difficulties in working on arithmetic problems in the form of word problems because they did not understand the questions given. The researchers found their reading literacy is relatively low, contributing to their mathematical word problem ability. Students are not familiar with story problems requiring analysis to solve them. Thus, students need help in transforming questions into what is known and what is being asked, so they get confused in doing social arithmetic.

In addition, students are not used to reading long questions because students are not familiar with word problems (Ndakularak et al., 2023). They also have difficulty digesting words and lack interest in learning mathematics. Furthermore, students are familiar with memorizing methods instead of analyzing story problems (Emanuel et al., 2021).

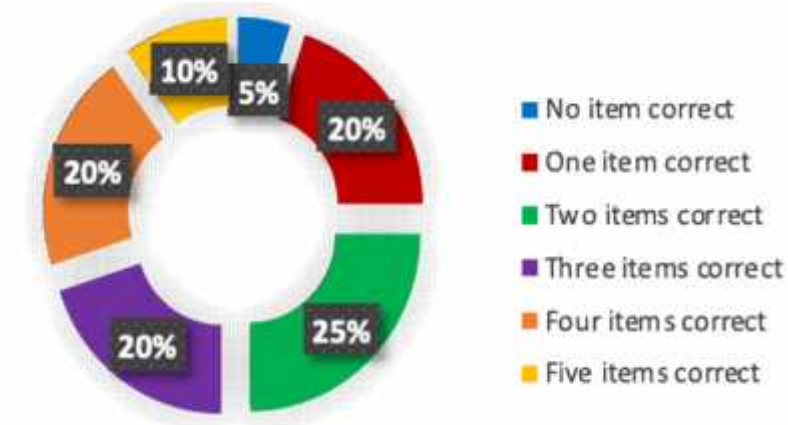

Figure 3. Percentage of Students Based on Number of Items Answered Correctly

The evaluation shows that the numeracy literacy skills of elementary school students in grade 5 in one of the elementary schools in the Lewa sub-district, East Sumba Regency, are categorized as low. The highest student score was 63.5, and the lowest was 23. The average score of the test results is 45, which is included in the poor category (based on Table 1). Only one student is included in the moderate category, while the others are categorized as low.

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

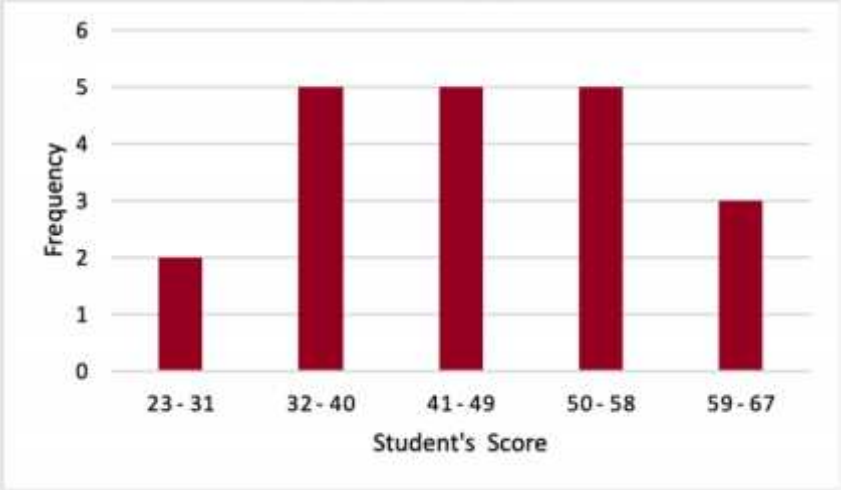

Figure 4. Student's Socre of Numeracy Literacy Ability Test Using EGMA (n = 20)

Based on the interviews, several factors need to be improved: the teacher's ability to teach students to work on math problems related to their daily lives. It was also confirmed by previous research, which stated that the teacher's ability to develop HOTS types was still relatively low (Aprilianti et al., 2022). As educators, teachers need to keep updating their knowledge and skills. It can provide a comprehensive understanding of problem-based mathematics learning to encourage student interest and curiosity in solving story problems (Rizky Anisa et al., 2021).

Table 5. Percentage of students who answered the numeracy tasks correctly (n = 20)

Item	Problem Type	Questions	% Student
1	Change	Two children were on the bus, and three others got on the bus. How many children are currently on the bus?	60
2	Combine	There are six children on the bus. Two of them are boys, and the others are girls. Thus, how many girls were on the bus?	60
3	Compare	Two children are on the blue bus, and eight are on the green bus. How many children must get on the blue bus, so the number of children on the bus is the same as the green bus?	30
4	Change	There are some kids on the bus. Then, there were two other children got on the bus. Now there are nine children on the bus earlier. Thus, how many children first get on the bus?	5
5	Sharing	There are 12 pieces, and four children share the cake equally. How many cookies does each child have?	40
6	Multiplicative	There are five seats on the bus, and two children occupy each seat. How many children were on the bus?	65

The following reason is the student's reading literacy skills which are still relatively low. The awareness of school members regarding the benefits of literacy skills in everyday life is still relatively low (Wiratsiwi, 2020). In Law No. 3 of 2017 concerning the

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

Bookkeeping System, it is said that reading literacy is the ability to interpret information critically. Children who are weak in reading literacy will impact their ability to analyze (Rizky Anisa et al., 2021). The interviews show that some students are struggling in reading, causing difficulty in understanding the word problem. It was also confirmed by the researchers' observations, where some children still spelled when reading story problems.

Based on the qualitative findings, students rarely practiced comparing numbers, number patterning, word problem, addition, and subtraction. There is only one book available for teachers, and no student handbooks, so they cannot access illustrated pictures to help them improve their mathematical concepts. The books in the library are outdated textbooks that have not been upgraded for more than five years. This situation narrows children's access to learning by using pictures from books. Teachers also admitted that they needed to prepare more pictures to stimulate students' math improvement. Another reason is that inadequate facilities such as a laptop for the teacher and a projector in the class are not provided, so teachers struggle to illustrate the mathematical concept. In addition, the teachers need to be more trained. They have never attended training in more than five years. The education office of East Sumba also confirmed that they rarely hold teacher training during the COVID-19 Pandemic. Overall, teaching strategies, learning media, the class situation, and old textbooks provided by the school are less attractive.

Conclusion

Based on the research findings, the mathematical literacy of fifth-grade students in one of the elementary schools in East Sumba Regency evaluated by EGMA is in a low category. It is caused by some factors students and teachers face, such as less learning media, less conducive classes, limited, outdated, and unattractive printed textbooks, inadequate learning and teaching facilities, and less trained teachers.

Recommendation

Schools should encourage the teachers to be more active in updating knowledge by participating in free training related to teaching strategies, providing teaching, and learning facilities, and getting students used to practicing math problems using analysis (word problems). The education authorities should hold regular teacher training (no training since the COVID-19 pandemic) and procure textbooks and school facilities that support learning and teaching. Lastly, parents should motivate children to study mathematics at home and establish communication with schools regarding children's needs.

Acknowledgment

We would like to express our gratitude to the Regional Research and Development Agency of East Sumba Regency, which supported us by being our research sponsor so the project could run smoothly.

References

Aprilianti, W., Hamdu, G., & Mulyadiprana, A. (2022). Kemampuan Guru Sekolah Dasar dalam Mengembangkan Soal Tes Literasi Numerasi Berbasis Education for Sustainable Development. *EDUKATIF : JURNAL ILMU PENDIDIKAN*, *4*(1), 1408–1416. https://doi.org/10.31004/edukatif.v4i1.2139

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

Baker, A. T., & Cuevas, J. (2018). The Importance of Automaticity Development in Mathematics. *Georgia Educational Researcher*, *14*(2). https://doi.org/10.20429/ger.2018.140202

Barham, A. I., Ihmeideh, F., Al-Falasi, M., & Alabdallah, A. (2019). Assessment of first-grade students' literacy and numeracy levels and the influence of key factors. *International Journal of Learning, Teaching and Educational Research*, *18*(12), 174–195. https://doi.org/10.26803/ijlter.18.12.11

de Bruin, W. B., & Slovic, P. (2021). Low numeracy is associated with poor financial well-being around the world. *PLoS ONE*, *16*(11 November). https://doi.org/10.1371/journal.pone.0260378

Emanuel, E. P. L., Kirana, A., & Chamidah, A. (2021). Enhancing students' ability to solve word problems in Mathematics. *Journal of Physics: Conference Series*, *1832*(1). https://doi.org/10.1088/1742-6596/1832/1/012056

Engvall, M., Samuelsson, J., & Östergren, R. (2020). THE EFFECT ON STUDENTS' ARITHMETIC SKILLS OF TEACHING TWO DIFFERENTLY STRUCTURED CALCULATION METHODS. *Problems of Education in the 21st Century*, *78*(2), 167–195. https://doi.org/10.33225/pec/20.78.167

Ewing, B. (2016). The identification of teaching interactions used in one-to-one teaching of number in the early years of schooling. *Cogent Education*, *3*(1). https://doi.org/10.1080/2331186X.2015.1132525

Jupri, A., & Drijvers, P. (2016). Student difficulties in mathematizing word problems in Algebra. *Eurasia Journal of Mathematics, Science and Technology Education*, *12*(9), 2481–2502. https://doi.org/10.12973/eurasia.2016.1299a

Lestari, T. (2015). *Kumpulan Teori Untuk Kajian Pustaka Penelitian Kesehatan*. Nuha Medika.

Mabena, N., Mokgosi, P. N., & Ramapela, S. S. (2021). FACTORS CONTRIBUTING TO POOR LEARNER PERFORMANCE IN MATHEMATICS: A CASE OF SELECTED SCHOOLS IN MPUMALANGA PROVINCE, SOUTH AFRICA. *Problems of Education in the 21st Century*, *79*(3), 451–466. https://doi.org/10.33225/pec/21.79.451

Miles, M.B, Huberman, A.M, & Saldana, J. (2014). *Qualitative Data Analysis*, A Methods Sourcebook, Edition 3. USA: Sage Publications. Terjemahan Tjetjep Rohindi Rohidi, UI-Press.

Ndakularak, I. L., Randjawali, E., Nggaba, M. E., Bima, S. A., Ina, Y. T., Ishak, D. D., Rinawati, Y., Wira, U. K., Sumba, W., Penelitian, B., Pengembangan, D., Kabupaten, D., & Timur, S. (2023). PROFIL KEMAMPUAN NUMERASI SISWA SEKOLAH DASAR KELAS TINGGI DI MALUMBI KABUPATEN SUMBA TIMUR. *Jurnal Ilmiah Kependidikan*, *4*(1), 17–27. https://doi.org/10.37478/jpm.v4i1.2383

Papic, M., & Mulligan, J. (2007). *The Growth of Early Mathematical Patterning: An Intervention Study*. https://www.researchgate.net/publication/255616732

Pendidikan, K., Teknologi Direktorat, D., Paud, J., Dasar, P., & Menengah, D. P. (2021). *MODUL LITERASI NUMERASI DI SEKOLAH DASAR*.

Platas, L. M., Ketterlin-Geller, L. R., & Sitabkhan, Y. (2016). Using an Assessment of Early Mathematical Knowledge and Skills to Inform Policy and Practice: Examples from the Early Grade Mathematics Assessment. *International Journal of Education in*

Vol. 10 No. 2 : April 2023
E-ISSN: 2722-4627
pp. 379-388

Mathematics, Science and Technology, *4*(3), 163. https://doi.org/10.18404/ijemst.2088

Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, *8*(1), 133–141. https://doi.org/10.1177/2347631120983481

Progressions for the Common Core State Standards in Mathematics (draft). (2013). http://commoncoretools.me.Draft,7/02/2013,commentatcommoncoretools.wordpress.com.

Puspita Maulidina, A., & Hartatik, S. (2019). PROFIL KEMAMPUAN NUMERASI SISWA SEKOLAH DASAR BERKEMAMPUAN TINGGI DALAM MEMECAHKAN MASALAH MATEMATIKA. In *Jurnal Bidang Pendidikan Dasar (JBPD)JBPD* (Vol. 3, Issue 2). http://ejournal.unikama.ac.id/index.php/

Reikerås, E. K. L. (2006). Performance in solving arithmetic problems: A comparison of children with different levels of achievement in mathematics and reading. *European Journal of Special Needs Education*, *21*(3), 233–250. https://doi.org/10.1080/08856250600810633

Ritchie, S. J., & Bates, T. C. (2013). Enduring Links From Childhood Mathematics and Reading Achievement to Adult Socioeconomic Status. *Psychological Science*, *24*(7), 1301–1308. https://doi.org/10.1177/0956797612466268

Rittle-Johnson, B., Zippert, E. L., & Boice, K. L. (2019). The roles of patterning and spatial skills in early mathematics development. *Early Childhood Research Quarterly*, *46*, 166–178. https://doi.org/10.1016/j.ecresq.2018.03.006

Rizky Anisa, A., Aprila Ipungkarti, A., & Kayla Nur Saffanah, dan. (2021). Pengaruh Kurangnya Literasi serta Kemampuan dalam Berpikir Kritis yang Masih Rendah dalam Pendidikan di Indonesia. In *Conference Series Journal* (Vol. 01).

Subedi, S., Nayaju, S., Subedi, S., Shah, S. K., & Shah, J. M. (2020). Impact of E-learning during COVID-19 Pandemic among Nursing Students and Teachers of Nepal. In *International Journal of Science and Healthcare Research (www.ijshr.com)* (Vol. 5). www.ijshr.com

Tanoto Foundation. (2019). Hasil Pengukuran dan Peningkatan Literasi dan Numerasi Program Pintar. https://smeru.or.id/sites/default/files/events/ujang_-_literasi.pdf

Wiratsiwi, W. (2020). *PENERAPAN GERAKAN LITERASI SEKOLAH DI SEKOLAH DASAR*. http://jurnal.umk.ac.id/index.php/RE

Van Den Heuvel-Panhuizen, M., & Doig, B. (2014). *Picture books stimulate the learning of mathematics*. http://hdl.handle.net/10536/DRO/DU:30021539

Zippert, E., Douglas, A.-A., & Rittle-Johnson, B. (2020). Finding patterns in objects and numbers: Repeating patterning in pre-K predicts kindergarten mathematics knowledge Preschoolers' Math Exploration During Peer Play View project. *Article in Journal of Experimental Child Psychology*. https://doi.org/10.1016/j.jecp.2020.103965

