

NUMERACY LITERACY OF STUDENTS USING I-SPRING 11 LEARNING MEDIA

Anisyah Abdullah¹, Riza Agustiani², Atika Zahra³, Agustiany Dumeva Putri⁴

¹Universitas Islam Negeri Raden Fatah, Jl. Prof. K.H. Zainal Abidin Fikri, Palembang, Indonesia.
abdullahanisyah04@gmail.com

²Universitas Islam Negeri Raden Fatah, Jl. Prof. K.H. Zainal Abidin Fikri, Palembang, Indonesia.
rizaagustiani_uin@radenfatah.ac.id

³Universitas Islam Negeri Raden Fatah, Jl. Prof. K.H. Zainal Abidin Fikri, Palembang, Indonesia.
atikazahra_uin@radenfatah.ac.id

⁴Universitas Islam Negeri Raden Fatah, Jl. Prof. K.H. Zainal Abidin Fikri, Palembang, Indonesia.
agustianyumevaputri_uin@radenfatah.ac.id

ABSTRACT

The low level of numeracy literacy in Indonesia is due to the material tested on TIMSS and PISA, which consists of questions in real-life context problems. Students are not accustomed to solving real problems and cannot analyze information in various forms. The lack of engaging learning materials contributes to students' boredom and makes it difficult for them to tackle numeracy and literacy challenges. This study investigates how well students can read and compute after using the iSpring 11 learning resources. Twenty students from class VII at State Junior High School 46 Palembang were the research subjects. The research method used is design research with a development study, which at the prototype stage uses the Tessmer model. The focus of discussion in this research is the results of the field test stage, where data collection techniques include tests and interviews. Data analysis techniques include test data analysis and interview analysis. This research demonstrates that students' numeracy literacy skills are excellent, with an average score of 88 after learning using the iSpring 11 learning media.

ARTICLE INFORMATION

Keywords

ISPRING 11
Learning media
Numeracy Literacy

Article History

Submitted Jan 27, 2024
Revised Jun 10, 2024
Accepted Jun 11, 2024

Corresponding Author

Riza Agustiani
Universitas Islam Negeri Radan Fatah
Jl.Prof. K.H. Zainal Abidin Fikri
Email: rizaagustiani_uin@radenfatah.ac.id

How to Cite

Abdullah, A., Agustiani, R., Zahra, A., & Putri, A.D. (2024). Numeracy Literacy of Students Using I-SPRING 11 Learning Media. *Kalamatika: Jurnal Pendidikan Matematika*, 9(1), 83-98.

<https://doi.org/10.22236/KALAMATIKA.vol9no1.2024pp83-98>

INTRODUCTION

In teaching mathematics, real-world problems have been included in the curriculum. These problems can be connected to numeracy literacy because their forms are similar to words that can be converted into symbols or numbers and vice versa. The Ministry of Education and Culture (2017) defines numeracy literacy as using numbers and symbols related to basic mathematics to solve real-world problems in various contexts. After that, one can analyze the information and interpret the results to make predictions and decisions. According to a different viewpoint, numeracy literacy refers to an individual's capacity for employing reasoning (Ekowati et al., 2019). According to Meeks et al. (2014), numeracy literacy is the capacity that guides students toward comprehending the applications of mathematics in daily life and making sound decisions.

Good numeracy literacy occurs when students meet the following three requirements: (1) the ability to use a variety of numbers and symbols associated with basic mathematics to solve real-world problems in a variety of contexts; (2) the capacity to analyze data presented in various formats (graphs, tables, charts, etc.); and (3) the capacity to interpret the findings of analyses to make predictions and draw conclusions (Han, Susanto, et al., 2017). Students must possess strong numeracy abilities to effectively plan and manage tasks, estimate and apply knowledge, and make wise judgments (Hayati & Supriyadi, 2022).

According to Megawati and Sutarto (2021), low literacy skills cause most students to struggle when learning mathematics. The findings of the PISA and TIMSS tests support the notion that Indonesia is among the nations in Southeast Asia with the lowest numeracy literacy rates. This is evident from Indonesia's participation in TIMSS and PISA scores, which are still unsatisfactory, particularly in attaining competency in mathematics. According to Schleicher (2019), Indonesia's PISA score was 386 out of 490 on average in 2015 and 379 out of 489 on average in 2018. In contrast, Indonesia scored 395 out of 500 on the TIMSS in 2016, the global average (Kemendikbud, 2017). These figures indicate that the literacy rate is low because the contents examined on TIMSS and PISA contain questions that are contextual difficulties in real life, and student numeracy is still low. However, because they are not accustomed to handling actual problems, students find it challenging to analyze material in various formats (Ambarwati & Kurniasih, 2021).

According to the findings of the researchers' observations and interviews at State Junior High School 46 in Palembang, students struggle with literacy and numeracy problems, making it difficult for them to analyze the problems presented. One reason for this struggle is a lack of understanding of learning resources, which leads to boredom. Similar findings have been reported by Sukmawati, Sugiyono, and Burhanuddin (2021), who hypothesize that the lack of auxiliary media by the teacher and students' difficulties in understanding the problem, figuring out what is known and being asked about the problem, and creating mathematical sentences that include writing down the steps to the correct solution are the causes of students' low numeracy literacy skills. This is because they are accustomed to answering questions directly by counting. Therefore, an effective teaching strategy must be used to increase students' interest in learning and help them grasp numeracy literacy.

There are various strategies to help students grasp concepts more efficiently and become more engaged in their studies. One such strategy is employing learning media, particularly media-based learning technology, to teach mathematics to students. Saleh and Isa's (2015) research on the division of fractions with integers highlights the need for instructors to utilize appropriate and valuable learning resources during the teaching process. As a result, to meet learning objectives and engage in enjoyable, creative learning, teachers must produce multimedia. According to Andriani and Hutagalung (2021), teachers must be proficient in using technology to make learning easier, faster, and more visually appealing for students. Many teachers incorporate technology into their lesson plans to encourage students and make mathematics learning more engaging (Rossano et al., in Bata & Pranoto, 2023).

According to Ishaq et al. (2019), technology's portability and wide accessibility allow students to learn various subjects independently and freely, in their own time and location, during the teaching and learning process that incorporates it into the curriculum. Amiyati (in Tyaningsih, 2015) asserts that the entire history of media and technology has impacted education. Technological advancement is one of the main pillars for developing an engaging learning process. With the availability of Assisted Learning media, computers (PBK) can enhance students' comprehension of fractional concepts and encourage them to grasp the content more quickly.

iSpring is one computer program that can merge data by modifying files presented in Flash format (Budiharti & Waras, 2018). Media learning can be created with the use of software

called iSpring. iSpring is a type of media that includes several components, such as audio, visual, and audio-visual, as stated by Ramadhani et al. (in Masitoh et al., 2022). According to Surjono (2017), interactive learning media is defined as any form of media that combines text, images, graphics, sound, video, and animation in an integrated and synergistic way with the aid of computers or similar devices to achieve learning objectives where users can actively interact with the media. In addition to being accessible through computers, this interactive media can also be converted into Android-based interactive multimedia using the Build 2 website application APK (Aryanti & Marwan, 2020).

Based on earlier studies, Alifia (in Masitoh et al., 2022) concluded that using the visual elements of the learning material, iSpring-based learning media helps enhance student motivation to study and increase attentiveness in the classroom. The study conducted by Masitoh et al. (2022) found that although the participants in iSpring learning media already had audio and video, the laptops they used were not Android-based. Therefore, the feature of utilizing devices where the learning media will be in the form of applications sets this research apart from that research. Additionally, the information in the media primarily consists of fractions divided by whole numbers. With this technology, students can comprehend abstract fraction content and work through difficulties with numeracy literacy.

Based on the background information provided above, the researcher investigated the numeracy literacy skills of students in class VII at State Junior High School 46 Palembang by developing iSpring 11 learning materials.

METHOD

This type of study employs the design research method called development research. The development research approach, also known as design research, is a thorough, methodical study that designs, develops, and assesses educational interventions (such as policies, procedures, learning resources, products, and systems) to address challenging issues in educational practice. Design research consists of two components: validation studies and development studies (Akker, 1999).

Development research is the methodology employed in this study, specifically the Development Study. The Development Study creates design concepts with a focus on usability. This research involves two development stages: the prototype development stage (the prototyping stage) and the preliminary study (the preliminary research). The preparatory phase

includes curriculum analysis, student analysis, and needs analysis. On the other hand, Tessmer's technique is used to conduct the formative evaluation and prototype creation stage concurrently.

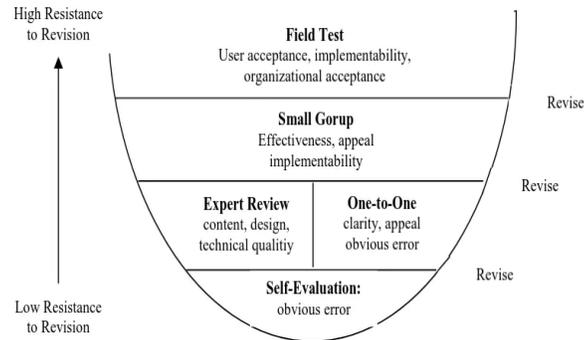


Figure 1. Formative evaluation design flow (Tessmer, 1993).

This research discussion focuses on students' numeracy literacy abilities, which can be assessed based on interview results and the completeness of students' scores after working on evaluation questions during the field test stage. At the field test stage, twenty seventh-grade students at State Junior High School 46 Palembang were evaluated by having them complete five test questions and an interview sheet. The first data collection method used test data to examine students' numeracy literacy skills as they completed assessment questions throughout the field test phase. The second method of gathering data was through interviews. The purpose of conducting unstructured interviews was to learn about students' strategies to answer the evaluation questions. The test data analysis for this research is as follows:

Using the established scoring rules, assign a score to each student's response for each question item.

Determine each student's overall score after completing all of the questions.

Use the following formula to determine each student's numeracy literacy ability:

$$NP = \frac{R}{SM} \times 100 \quad (1)$$

Information:

NP: Scores

R: Raw scores obtained

SM: Ideal student's maximum scores

Based on the average category numeracy literacy test value taken from Zahidah (in Putri et al., 2021), identify the numeracy literacy ability level category in the following table.

Table 1. Average Categories of Numeracy Literacy Ability Test Scores

Interval	Interval
Average scores $N \geq 85$	Very Good
$70 \leq$ Average scores < 85	Good
$50 \leq$ Average scores $N < 70$	Sufficient
Average scores $N < 50$	Less

RESULT AND DISCUSSION

Following instruction using the iSpring 11 learning materials created for the field test phase, students are given assessment questions designed to gauge their reading and numeracy literacy proficiency. Based on information from participant assessment results, students receive grades that meet incredibly high standards. The following evaluation results were obtained: 6 students (MAP, AD, IDA, AVC, KE, and RKP) received grades of 100; 6 students received scores of 95; 1 student received a score of 90; 3 students received a score of 85; 1 student each received scores of 80, 70, and 65; and one student received a score of 30. Examining the assessment questions from the field test stage, including numeracy literacy skills, yielded the following findings.

Table 2. Analysis Results of Evaluation Questions at the Field Test Stage

Interval	Categori	Frequency	Number of Scores
85 - 100	Very Good	16	155
70 - 84	Good	2	150
50 - 69	Sufficient	1	65
0 - 49	Less	1	30
	Total		1760
	Average		88
	Categori		Very Good

According to Table 2, students' numeracy literacy abilities were found to have average evaluation results in the field test stage. Based on information from participant assessment results, students receive grades that meet incredibly high standards. Evaluation questions are then used to determine the possible consequences, measured using numeracy literacy skills. Six students receive scores of 100, six receive scores of 95, one receives a score of 90, and three students receive scores of 85. Therefore, based on the examination of the assessment questions, it can be said that there could be a positive impact on students' numeracy and literacy skills. The following pie graph displays the findings of the students' numeracy literacy skills analysis based on percentages.

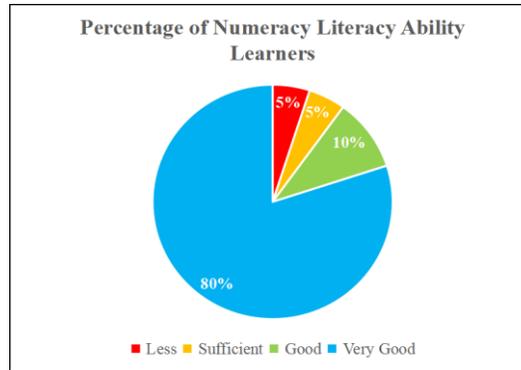


Figure 2. Percentage of Numeracy Literacy Ability of Learners

The data presented in Figure 2 illustrates the distribution of students' numeracy literacy skills. Specifically, 80% of students have excellent literacy skills, 10% have good literacy skills, 5% have adequate literacy skills, and 5% have literacy skills below the learning outcomes using learning media with iSpring 11.

The analysis of participants' responses to evaluation questions as indicators of their numeracy literacy skills is discussed. The first indicator, which can be found in questions Nos. 1 and 5, is the ability to use various numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life.

Question Number 1: Dad was watching football with his friends at home. Because it was a rainy day, Mother served Bandrek (ginger milk) to Father and his friends. Mother has a supply of $\frac{1}{2}$ liter of Bandrek at home. The Bandrek will be served to my father and 5 of his friends. How many liters of Bandrek can you serve to your father and each of his friends?

<p>① Dik: Ibu memiliki $\frac{1}{2}$ liter bandrek dirumah. Bandrek tersebut akan hidangkan untuk ayah dan teman-teman Ayah yg berjumlah 6 orang.</p> <p>Dit: Berapa liter isi' gelas yg dapat 'ibu hidangkan untuk ayah dan teman ayah?</p> <p>Jawab: $\frac{1}{2} : 6 = \frac{1}{2} : \frac{6}{1} = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$</p>	<p>Given:</p> <ul style="list-style-type: none"> * Mother has a supply of $\frac{1}{2}$ liter of Bandrek at home. * The Bandrek will be served to 6 people <p>Question: How many liters of Bandrek can you serve to your father and each of his friends?</p> <p>Answer = $\frac{1}{2} : 6 = \frac{1}{2} : \frac{6}{1} = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$</p>
--	--

Figure 3. Answer to Question Number 1, Indicator 1

To facilitate understanding of questions involving numbers and symbols, students engaged in this activity worked on question number 1 and provided the correct answer. Initially, they clarified their understanding of the question. Then, using the formula for dividing fractions by whole numbers, they answered the question by dividing the available bandrek by the total number of recipients mentioned in question 1.

The researcher then proceeded to analyze question 5, which is similar to question 1 in that it is an indicator of numeracy literacy.

Question Number 5: Maksuba is a Palembang layered cake often served during holidays and traditional wedding ceremonies.



Figure 4. Maksuba Cake

Based on the philosophy, Maksuba symbolizes appreciation for people we respect. The essential ingredients for making Maksuba are eggs, milk, and sugar. What makes it unique is that, besides chicken eggs, you can also use duck eggs in the recipe, resulting in a delightful cake with a dense texture.

During Eid al-Fitr, Ani made three pans of Maksuba cake to serve. On the first day of Eid, Ani cut one pan of Maksuba cake into four equal pieces. When Ani visits their houses later, these pieces will be given as souvenirs to her family. Ani plans to distribute pieces of Maksuba cake to Grandma Ana, Grandma Ina, Aunt Zizah, and Aunt Uti's houses. After receiving the Maksuba cake from Ani, Aunt Zizah will share the pieces with her five children. How many pieces of Maksuba cake will each of Aunt Zizah's children receive?

<p>5. Diketahui: Ani membuat 3 loyang satu loyang di potong menjadi 4 keempat potong di bagi untuk nenek ana, nenek ina, bibi Zizah, dan bibi uti Dit: berapa bagian yang akan didapatkan masing-masing anak Bi Zizah (5 orang) Jawab: $\frac{1}{4} : 5 = \frac{1}{4} : \frac{5}{1} = \frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$</p>	<p>Given: * Ani made three pans of Maksuba cake to serve. * Ani cut one pan of Maksuba cake into four equal pieces for Grandma Ana, Grandma Ina, Aunt Zizah, and Aunt Uti's houses * Aunt Zizah will share the pieces of Maksuba cake given by Ani with her five children.</p> <p>Question: Aunt Zizah will share the pieces of Maksuba cake given by Ani with her five children</p> <p>Answer: $\frac{1}{4} : 5 = \frac{1}{4} : \frac{5}{1} = \frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$</p>
---	--

Figure 5. Answer Question Number 5 Indicator 1

The student initially formulates the known entities of the question. To simplify understanding of the problem, symbols and numbers are used. Afterward, divide one-fourth of the Maksuba cake to respond to the question. Bi Zizah's four children received pieces from Ani using the formula for dividing fractions by integers. Therefore, MAP receives a perfect score of 4.

Subsequently, the investigator examined questions 2 and 4 regarding the second indicator of numeracy literacy skills, which involves the ability to evaluate data presented in various formats (such as tables, charts, graphs, and others).

Question Number 2: Sultan invited his younger brother to buy Pempek Lenjer (fish cake) at Mang Dollah's stall. The Pempek Lenjer is cut into five pieces, as shown in Figure 6.



Figure 6. Pempek Lenjer

Then, Sultan shared the pieces of Pempek with his younger brother. How many shares did Sultan and his younger brother get?

2) dik: 1 Pempek di Potong 5
 dit: berapa jumlah bagian masing-masing? yang didapat Sultan dan adiknya
 jawab:
 $\frac{1}{5} : 2 = \frac{1}{5} : \frac{2}{1} = \frac{1}{5} \times \frac{1}{2} = \frac{1}{10}$

Given: *The Pempek Lenjer is cut into five pieces.

Question: How many shares did Sultan and his younger brother get? Answer: $\frac{1}{5} : 2 = \frac{1}{5} : \frac{2}{1} = \frac{1}{5} \times \frac{1}{2} = \frac{1}{10}$

Figure 7. Answer Question Number 2 Indicator 2

In this instance, MKA can analyze the data presented in the inquiry. To make the question more straightforward to understand, MKA applies what is known beforehand. Then, using the rule for dividing fractions by whole numbers, MKA divided one Pempek into five pieces as per question number 2. Consequently, MKA received a perfect score of 4. The researcher then moved on to question number 4.

Question number 4: Nyimas bought a pan of Kojo sponge cake and then cut it according to the picture at the store. The remainder will be distributed to neighbors, namely Kemas and Masayu.

No	Picture	Observed Element
a		Pieces of Kojo sponge cake from one pan
b		Pieces of Kojo sponge cake will be distributed to Kemas and Masayu

Figure 8. Pieces of Bolu Kojo

Based on the figure, analyze the information in the picture carefully. Then, calculate how many pieces each Kemas and Masayu will get according to the information provided in the picture above.

<p>4) diketahui = nyimas membeli satu loyang bolu kojo ditanya = berapa potong untuk masayu dan kemas Jawab = Gambar a = $\frac{1}{2}$ potong dibagi dua Gambar b: $\frac{1}{2}$ potong masing-masing kemas dan masayu mendapat $= \frac{1}{2} : 2 = \frac{1}{2} : \frac{2}{1} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$</p>	<p>Given: Nyimas bought a pan of Kojo sponge cake.</p> <p>Question : How many pieces will Kemas and Masayu get according to the information in the picture above?</p> <p>Answer: Figure a = $\frac{1}{2}$ part of cake, one cake is divided into 2 pieces. Figure b = $\frac{1}{2}$ part of cake</p> <p>Kemas and Masayu get: $\frac{1}{2} : 2 = \frac{1}{2} : \frac{2}{1} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$</p>
---	---

Figure 9. Answer to Question Number 4, Indicator 2

Students can examine the image mentioned in the question to answer this one. To facilitate understanding each question, note beforehand what is known about it. Subsequently, respond to the question by explaining what pictures A and B signify. The responses from the fourth question's participants using the formula for dividing fractions by integers are then shown. As a result, SA received a perfect score of 4.

Subsequently, the researcher reviewed questions involving measures of literacy proficiency. The third quantification involves the ability to interpret and draw inferences from the analysis's findings. This indicator can be found in question number 3.

Question number 3: Acha bought two round pizza pans of the same size at a food outlet, as shown in the picture. He asked the pizza seller to cut the pizza into several equal pieces when ordering. The first pizza was cut into four equal pieces, and the second was cut into eight. Acha witnessed the seller's skill in dividing the pizza using a unique cutting tool so that both pizzas were divided equally according to his wishes. Upon arriving home, one slice of the first pizza was given to his younger brother and the remaining portions were given to his parents. For the second pizza, Acha ate two slices himself, and the remaining portions were given to his five friends. They enjoyed the pizza very much because it was truly delicious. Based on the information in the text, indicate each incorrect statement with a checkmark!

Acha's friends each get 3/20 of the second pizza	
Acha's parents each got 3/8 of the first pizza	
Acha's parents each got 3/4 of the first pizza	
The portion of the second pizza that Acha ate was 2/8	

<p>3) dua pizza: dipotong menjadi 4 potong</p> <p>Pizza 2: dipotong 8 potong</p> <p>Pizza 1 = dibagi: adik 1 potong sisanya untuk ayah dan ibu</p> <p>Pizza 2 = dimakan acha 2 potong sisa untuk 5 teman acha</p> <p>dit: Pernyataan yang salah</p> <p>adik aca = 1 potong</p> <p>atau sisanya = $\frac{3}{4}$ potong ayah dan ibu = $\frac{3}{4} : 2 = \frac{3}{4} \cdot \frac{1}{2} = \frac{3}{8}$</p> <p>aca = 2 potong</p> <p>Sisanya = $\frac{6}{8}$ untuk teman aca = $\frac{6}{8} : 5 = \frac{6}{8} \cdot \frac{1}{5} = \frac{6}{40}$</p> <p>Pernyataan salah adalah: 3</p>	<p>Given: *Pizza 1 is cut into four pieces</p> <p>* Pizza 2 is cut into eight pieces</p> <p>*Pizza 1 was given to the sister, and the rest was given to the father and mother</p> <p>*Acha ate two pieces of pizza and gave the rest to Acha's five friends</p> <p>Question: Based on the information in the text, put a tick mark on each incorrect statement!</p> <p>Answer:</p> <p>*Acha's Sister = 1/4 part of pizza, 3/4 part given to Mom and Dad</p> <p>*Acha = 2/8 part of pizza, 6/8 given to Acha's 5 friends</p> <p>Therefore, the incorrect statement is statement 3</p>
--	--

Figure 10. Answer to Question Number 3, Indicator 3

Question number three presents a challenge as it requires thorough problem-solving. One student managed to provide a correct response to this question. Students inform each other beforehand to facilitate the process of working on the questions. When tackling this problem, divide the work for Pizza 1 and Pizza 2 to ensure accurate and comprehensive answers. Once you know how many portions each person received, fill in the information one by one,

identifying any erroneous statements. Five individuals answered question number three perfectly, demonstrating their diligence and understanding of the question's requirements. While some students are proficient in dividing fractions with integers, they may struggle to identify incorrect statements. Interviews conducted by researchers with students about their comprehension of the assessment questions they worked on, including quotations from those interviews, confirm this.

Researcher: *“Among all the evaluation questions you worked on, which one do you find difficult?”*

DA: *“In my opinion, the question that is a little challenging is number 3 because we have to be careful when working on questions like number 3.”*

Researcher: *“Explain how you approach solving numeracy literacy questions.”*

DA: *“First, I clarify what is known so that the question is easy to understand, then I note what is being asked, and finally, I provide the answer.”*

Most students, as indicated by the findings from the evaluation questions completed during the field stage according to the researcher's test results, emphasized understanding the problem statement first in their responses. This approach ensures students achieve high scores and demonstrate strong numeracy literacy abilities. Research findings by Mauridina and Hartatik (2019) support the notion that robust numeracy literacy skills encompass proficiency across all three indicators. However, while students generally excel in responding accurately to questions using the first indicator, the third indicator reveals deficiencies in their problem-solving skills due to inadequate reading comprehension of the questions. This aligns with research by Sari (in Putri et al., 2021), which highlights that students struggle with numeracy literacy questions primarily because they fail to read and comprehend the questions thoroughly, lack understanding of the subject matter, and lack confidence in their ability to answer accurately.

CONCLUSION

Based on students' responses to the evaluation questions, it is evident that some students demonstrate good numeracy literacy by correctly answering questions 1 and 5, while others struggled with question 5 due to insufficient time to work on the evaluation questions. The second literacy measure in numeracy, found in questions 2 and 4, also showed that students could produce accurate and well-reasoned answers, particularly excelling in question number 4. Regarding the third indicator of numeracy literacy found in question number 3, although a small percentage of students provided correct responses, on average, students attempted but did not

fully complete the response, indicating this question's potential impact on students' numeracy and literacy skills. The first indicator of numeracy literacy proved to be more accessible, whereas the third indicator posed more challenges. These three indicators collectively assess numeracy literacy skills.

Overall, the analysis yielded an average score of 88, indicating significant potential benefits of this learning medium. Numeracy literacy skills were further categorized as follows: 80% of students met the criteria for excellent skills, 10% met good criteria, 5% met sufficient criteria, and 5% or fewer met the minimum requirements.

ACKNOWLEDGMENTS

We appreciate SMP Negeri 46 Palembang's cooperation and permission to allow researchers to conduct studies on developing educational materials and investigate students' reading and numeracy skills. The findings of this study are expected to be beneficial and applicable to educational practices across various schools aiming to enhance numeracy literacy levels among students in Indonesia.

REFERENCES

- Akker, J. (1999). Principles and methods of development research. In *Design approaches and tools in education and training* (pp. 1–14). Springer, Dordrecht.
- Ambarwati, D., & Kurniasih, M. D. (2021). Pengaruh Problem Based Learning Berbantuan Media Youtube Terhadap Kemampuan Literasi Numerasi Siswa. *Jurnal Cendeikia: Jurnalpendidikan Matematika*, 05(03), 2857–2868.
- Andriani, K., & Hutagalung, T. (2021). Development of Learning Media. *Proceeding ISLALE 2021 The 3th International Seminar on of Language, Art, and Literature Education*, (14), 138–145.
- Aryanti, R., & Marwan. (2021). Development of Interactive Multimedia Using Powerpoint Applications Combined With Ispring Suite Application. *Proceedings of the Sixth Padang International Conference On Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2020)*, 179(Piceeba 2020), 325–330. <https://doi.org/10.2991/aebmr.k.210616.049>

- Bata, J., & Anggipranoto, E. V. B. (2023). Pengembangan Aplikasi Virtual Reality untuk Pembelajaran Bangun Ruang Kelas V Sekolah Dasar menggunakan Model Addie. *Jurnal Ilmiah Ilmu Pendidikan*, 6(2), 826–832.
- Budiharti, R., & Waras, N. S. (2018). Analysis of student's scientific attitude behaviour change effects blended learning supported by I-spring Suite 8 application. *Journal of Physics: Conference Series*, 1022(1). <https://doi.org/10.1088/1742-6596/1022/1/012024>
- Ekowati, D. W., Astuti, Y. P., Utami, I. W. P., Mukhlisina, I., & Suwandayani, B. I. (2019). Literasi Numerasi di SD Muhammadiyah. *ELSE (Elementary School Education Journal) : Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar*, 3(1), 93. <https://doi.org/10.30651/else.v3i1.2541>
- Han, W., Susanto, D., Dewayani, S., dkk. (2017). *Materi Pendukung Literasi Numerasi*. Jakarta Timur: Kementrian Pendidikan dan Kebudayaan.
- Hayati, M., & Supriyadi, E. (2022). Pembelajaran Literasi Dan Numerasi Di Smp Islam Nurul Yaqin Dalam Pembelajaran Seni Budaya. *Papanda Journal of Mathematics and Sciences Research (PJMSR)*, 1(1), 47–53.
- H.D. Surjono.(2017). *Multimedia Pembelajaran Interaktif*. Yogyakarta : UNY Press.
- Ishaq, K., Zin, N. A. M., Rosdi, F., Abid, A., & Farooq, U. (2019). Effectiveness of Literacy Numeracy Drive (LND): A Students' Perspective. 3rd International Conference on Innovative Computing, ICIC 2019, (978). <https://doi.org/10.1109/ICIC48496.2019.8966738>
- Mahmud, M. R., & Pratiwi, I. M. (2019). Literasi Numerasi Siswa Dalam Pemecahan Masalah Tidak Terstruktur. *KALAMATIKA Jurnal Pendidikan Matematika*, 4(1), 69–88. <https://doi.org/10.22236/kalamatika.vol4no1.2019pp69-88>
- Masitoh, L., & Pamungkas, Aan Subhan, S. (2022). Pengembangan Multimedia Interaktiif Berbasis Ispring Pada Pembelajaran Geometri Ruang Di Sekolah Dasar. *Jurnal Keilmuan Dan Kependidikan Dasar*, 14(02), 131–148.

- Maulidina, A. P., & Hartatik, S. (2019). Profil Kemampuan Numerasi Siswa Sekolah Dasar Berkemampuan Tinggi Dalam Memecahkan masalah Matematika. *Jurnal Bidang Pendidikan Dasar (JBSD)*, 3(2), 1–6.
- Meeks, L., Kemp, C., & Stephenson, J. (2014). Standards in literacy and numeracy: Contributing factors. *Australian Journal of Teacher Education*, 39(7), 106-139. <https://doi.org/10.14221/ajte.2014v39n7.3>
- Megawati, L. A., & Sutarto, H. (2021). Analysis Numeracy Literacy Skills in Terms of Standardized Math Problem on a Minimum Competency Assessment. *Unnes Journal of Mathematics Education*, 10(2), 155–165. <https://doi.org/10.15294/ujme.v10i2.49540>
- Putri, B. A., Utomo, D. P., & Zukhrufurrohmah. (2021). Analisis Kemampuan Literasi Numerasi Peserta Didik SMP dalam Menyelesaikan Soal Cerita Aljabar. *Jurnal Review Pembelajaran Matematika*, 6(2), 141–153.
- Schleicher, A. (2019). *PISA 2018: Insights and Interpretations*. OECD Publishing.
- Saleh, M., & Isa, M. (2015). Pembagian Pecahan Terintegrasi Dengan Konsep Lain Melalui Pendidikan Matematika Realistik Indonesia. 4(1), 55–64.
- Sukmawati, L., Sugiyono & Burhanuddin, A. (2021). Analisis Literasi Numerasi Melalui Penggunaan Media Lidmatika Untuk Menyelesaikan Soal Cerita Materi Perkalian Kelas III SD Negeri 1 Temon Tahun Pelajaran 2020/2021. 1–9.
- Tessmer, M. (1993). *Planning and conducting formative evaluations improving the quality of education and training (pertama)*. Kogan Page.
- Tyaningsih, R. Y. (2015). Pengembangan Media Pembelajaran Berbantuan Komputer Pada Materi Geometri Ruang Berbasis Van Hiele Levels Untuk Siswa Sma Kelas X Semester 2. 1(2), 171–186.

