



Analysis of Learning Obstacles in Numeracy Literacy on Decimal Number Material for Seventh Grade Junior High School Students in Hulu Sungai Tengah Regency

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Abstract

Numeracy literacy is a fundamental skill required by students to apply mathematical concepts in everyday life; however Indonesian students still face obstacles, particularly with decimal numbers. This research aims to analyze learning obstacles in numeracy literacy on the topic of decimal numbers. The method used is descriptive qualitative with triangulation techniques in data collection. The research result identify three interrelated categories of obstacles, namely ontogenetic obstacles in the form of limited mental readiness and prerequisite understanding, epistemological obstacles in the form of errors in decimal operations, and didactic obstacles that include conventional learning and reliance on a single textbook. Didactic obstacles play a central role in exacerbating the other two obstacles. This study concludes that learning design based on the GASING method has the potential to be an effective pedagogical alternative in reducing those learning obstacles.

Keywords: learning obstacles, numeracy literacy, decimal numbers.

INTRODUCTION

In response to the low competencies of Indonesian students in international surveys, numeracy literacy has become one of the main focuses in the implementation of the Merdeka Curriculum. The results of the 2018 Program for International Student Assessment (PISA) show that Indonesian students have numeracy skills below the average of the Organization for Economic Co-operation and Development (OECD, 2019). In this regard, the Merdeka Curriculum places literacy and numeracy as important general skills because the ability to think using language and mathematics is necessary in various aspects of life, including social, professional, and personal (Yayuk et al., 2023).

Decimal numbers are one of the important topics in elementary school mathematics learning, as they serve as a bridge between the concepts of whole numbers and fractions and explain how this material can be used in everyday life. Mastery of the concept of decimals is very important for many things in daily life, such as measurement, financial transactions, and solving other practical problems (Aprilia & Wardana, 2024). However, research shows that elementary school students still face obstacles and make errors in learning decimal numbers. This particularly applies to understanding how to determine decimal numbers between two whole numbers, converting fractions to decimal numbers, and performing addition operations with decimal numbers (Johar et al., 2016). These obstacles become even more challenging because decimals require a deep understanding of the base-ten number system, where each digit's position has a different value according to its place. As a result, incorrect learning can lead to persistent misconceptions (Pulungan, 2023).

Another study shows that out of 30 fourth-grade students asked to solve decimal multiplication problems, 22 could not answer correctly and accurately. This is especially true for students who cannot find the position of the decimal point in the results of decimal multiplication calculations (Juwanto et al., 2024). Additionally, based on the analysis of students' difficulties in solving decimal fraction problems, it was found that students face difficulties at various stages of problem-solving, namely difficulty understanding the problem (11.6%), difficulty understanding the question (20.2%), difficulty planning a solution (21.1%), difficulty executing the plan (15.1%), and difficulty reviewing (14%) (Budiarti & Purnamasari, 2022). Various factors, both internal and external, are responsible for these obstacles. Internal factors include low cognitive ability, lack of motivation to learn, and psychomotor issues. External factors include limited learning media, less varied teaching methods, and an uncomfortable learning environment (Safari & Simanjuntak, 2025). These issues indicate that appropriate and systematic learning interventions are necessary to help students overcome obstacles in understanding decimal numbers.

One important step in designing effective mathematics instruction is identifying learning obstacles, as learning obstacles can hinder the optimal

achievement of learning objectives. According to Brousseau (1983), learning obstacles consist of three types: ontogenic, which are obstacles related to students' mental readiness and cognitive maturity; epistemological, which are obstacles caused by students' understanding and mastery of concepts that only relate to certain contexts; and didactical, which are obstacles caused by the didactic system such as the sequence of learning materials or presentation in teaching. Research shows that if learning obstacles can be effectively overcome, then learning objectives can be fully achieved (Juwanto et al., 2024). Thus, identifying learning obstacles is not just about recognizing problems; it is an important foundation that can help students learn in a meaningful and effective way.

The GASING method (Easy, Fun, and Enjoyable) by Surya (2013) is an alternative learning approach that can address these issues. It is designed as a step-by-step approach to learning mathematics, which helps students understand concepts from the concrete stage, then the abstract, and finally the mental calculation stage, so they truly grasp the concept before performing calculations. The GASING method emphasizes the use of props and real-world exploration to concretize abstract concepts, so that students not only memorize procedures but also gain significant conceptual understanding (Kusuma et al., 2019). This aligns with the need to study decimal numbers, which require a deep understanding of how numbers are used in real-world situations and their place value. Previous studies have shown that the GASING method significantly improves students' mathematics learning outcomes compared to conventional teaching methods (Armianti et al., 2016).

Various preliminary studies and empirical research show a very concerning phenomenon of students' difficulties in understanding decimal numbers. Preliminary studies show that 73.3% of students cannot answer questions correctly and accurately, especially regarding determining the position of the decimal point in decimal number calculations (Juwanto et al., 2024). Previous research revealed that fourth-grade students experience misconceptions in understanding the concept of determining decimal numbers between two whole numbers, converting fractions to decimal numbers, and performing addition operations with decimal numbers, which are caused by a lack of varied questions and insufficient time using teaching aids (Johar et al., 2016). Data shows that students' difficulties in understanding decimal numbers are a common issue among elementary school students in various regions and have similar characteristics. Therefore, this issue requires special attention and systematic learning interventions to resolve it.

Although research on learning obstacles in mathematics has been extensively conducted, very few studies specifically integrate the analysis of learning obstacles in decimal number material from the perspective of numeracy literacy, which is a priority in the Merdeka curriculum. Nevertheless, numeracy literacy is the ability to use various mathematical symbols and numbers to analyze data and solve problems in real-life situations, a competence that is very important for students' readiness to face the

challenges of the 21st century (Yayuk et al., 2023). Therefore, this study integrates the analysis of learning obstacles in decimal number material within the framework of numeracy literacy. In addition, this study investigates the possibility of using the GASING method as an alternative learning design that can systematically reduce these obstacles. It is hoped that this research will provide theoretical and practical contributions to the development of decimal number learning designs that focus on strengthening students' numeracy literacy.

METHOD

This research uses a descriptive qualitative approach to describe and analyze learning obstacles based on Brousseau's theory, which includes ontogenetic, epistemological, and didactic obstacles (Brousseau, 2002). The subjects in this study are 32 seventh-grade students from a Junior High School (SMP) in Hulu Sungai Tengah Regency. The selection of research subjects was based on the consideration that the subjects had completed the learning of decimal number material at the elementary school level, so that any remaining learning obstacles could be identified more comprehensively.

This study uses triangulation techniques in data collection to obtain valid and reliable data. The research instruments used in this study consist of diagnostic test questions and interview guidelines. The diagnostic test questions are designed to identify students' learning obstacles in the topic of decimal numbers. The questions are made in the form of essays so that students can demonstrate their thinking process and problem-solving methods. This question was validated by mathematics education experts, specifically two mathematics education lecturers. The interview guidelines were designed openly to give students the opportunity to talk about what they know and the obstacles they face. This study uses the qualitative data analysis model (Miles et al., 2014), which includes data reduction, data display, and conclusion drawing/verification. To interpret the percentage of student responses, the percentage category guidelines according to Arikunto are used, namely: 1%-25% is categorized as very few, 26%-49% as a small portion, 50%-75% as a majority, and 76%-99% as almost all (Arikunto, 2012).

Based on the recapitulation of the diagnostic test results given to 32 students (table 1), an overview of the students' achievement levels on each question item was obtained. The assessment is categorized into three response indicators: correct (\checkmark), incorrect (\times), and not answered (-). Based on the analysis of students' answers to the first question, it appears that only a few students were able to provide the correct answer. On the contrary, most students still show errors in understanding the concepts and procedures of operations on decimal numbers. These findings indicate a strong tendency that students experience conceptual obstacles in solving the given problems.

In question 2a, it appears that most students were able to provide the correct answer. However, a small number of students still made mistakes in their responses,

and there were still a few students who did not respond to the given question. Question 2b shows a trend consistent with the previous question. Most students were able to answer correctly, but there were still some students who made mistakes, and a few students did not provide an answer. In question 2c, the students' work shows that the majority of students were able to complete the question correctly. However, there are still some students who have not demonstrated a complete understanding, as seen in their less accurate answers. All students made an effort to provide answers, so no blank responses were found on this question item.

RESULT AND DISCUSSION

Recap of the Diagnostic Test

Based on the analysis of the answers from 32 students on the three diagnostic test questions, the following summary of results was obtained:

Table 1. Table Recap of the Diagnostic Test

Student Name	Question 1	Question 2a	Question 2b	Question 2c	Question 3a	Question 3b
Student 1	X	✓	✓	✓	X	X
Student 2	X	✓	✓	✓	X	X
Student 3	X	✓	✓	✓	X	X
Student 4	X	✓	✓	✓	X	✓
Student 5	X	✓	✓	✓	X	-
Student 6	X	✓	✓	✓	X	✓
Student 7	X	✓	✓	X	✓	X
Student 8	-	✓	✓	✓	✓	✓
Student 9	X	✓	✓	✓	✓	✓
Student 10	-	X	X	-	X	-
Student 11	X	✓	✓	✓	✓	✓
Student 12	X	✓	✓	✓	X	-
Student 13	-	✓	✓	✓	X	X
Student 14	✓	✓	✓	✓	✓	X
Student 15	X	-	X	-	X	-
Student 16	X	X	✓	X	X	X
Student 17	X	-	X	-	X	-
Student 18	X	✓	X	-	-	X
Student 19	X	✓	-	-	X	-
Student 20	-	-	-	-	-	-
Student 21	-	✓	✓	✓	-	-
Student 22	X	X	-	-	-	-
Student 23	-	-	-	-	-	-
Student 24	X	✓	✓	✓	X	X
Student 25	X	✓	✓	✓	X	X
Student 26	X	✓	✓	✓	X	X
Student 27	X	✓	✓	✓	X	X
Student 28	X	X	✓	✓	X	X
Student 29	X	✓	✓	✓	X	X
Student 30	X	✓	✓	✓	X	X

Student 31	X	✓	✓	✓	X	X
Student 32	X	✓	✓	✓	X	X
Totally True	1	24	24	22	5	5
Percentage	3,13%	75%	75%	68,75%	15,63%	15,63%

Explanation: (✓) correct, (X) incorrect, (-) did not answer.

In question 3a, very few students were able to provide the correct answer. On the contrary, the majority of students showed errors in the problem-solving process, while a small number of students did not respond to the presented question item. These findings indicate a significant barrier in understanding the concept. In question 3b, a similar pattern emerges. Only a few students managed to provide the correct answer, while the majority of students still presented incorrect answers. Additionally, there are several students who did not respond, indicating there are obstacles in understanding or processing the question correctly.

Learning Obstacle

Here are the results of the diagnostic test analysis on students when answering the questions, clearly outlined below.

1. Ability to Perform Arithmetic Operations on Decimal and Fractional Numbers

Question number one tests the students' ability to perform addition operations with decimal numbers and fractions in the context of word problems. Students are asked to calculate the total water in Mario's bottle, which contains: 0.75 liters - $\frac{1}{2}$ liter + 1.25 liters. The results show that students made three types of mistakes: students incorrectly converted fractions to decimal form, misunderstood the problem by incorrectly determining the appropriate operation, and made errors in adding decimal numbers. The analysis results indicate that some students still experience difficulties in converting fractions to decimal form. Here is one of the students' work results that shows an error in converting fractions to decimal form.

Picture 1. Finding (1) epistemological barrier

A number of students still show errors in converting fractions, as seen in image 1. There is a student who converts the fraction to 0.25, whereas the correct value is 0.5. This error indicates that the students do not yet have a complete understanding of the basic relationship between fraction representation and decimal numbers. To further explore the students' mindset and the reasons behind the mistakes made, the researcher conducted in-depth interviews with the relevant students. Based on the interview results, students construct answers by visually associating numerical symbols, rather than based on an understanding of mathematical meaning. Students use the denominator in fractions and numbers in other decimal numbers as sources

for forming answers without considering the value relationship between fractions and decimals. This indicates a limitation in understanding the basic concept of number representation, which suggests the emergence of **epistemological obstacles**.

Research data also shows the presence of other obstacles faced by students in solving numeracy literacy problems. These obstacles are related to students' ability to interpret the context of the problem and determine the appropriate mathematical operations for the given situation.

Jawaban:

$$1.60 \text{ liter}$$

$$0.75 \text{ liter} + 0.75 \text{ liter} = 1.50 + 1.10 = 1.60 \text{ liter}$$

Figure 2. Findings (2) epistemological barriers

A number of students show difficulties in understanding the meaning of word problems, resulting in errors in determining the correct mathematical operations. This is evident in the students' answers in Figure 2. The students added all the numbers in the problem without considering the context of the given problem. However, in the problem, it is explained that Mario drank some of the water from his bottle, which conceptually requires the use of subtraction, not addition. To investigate further, the researchers conducted interviews. The interview results showed that students misinterpreted important information in the story problem. Thus, the inability to understand the structure and meaning of this problem indicates the presence of an **epistemological barrier**.

The results of the data analysis also indicate the presence of another obstacle related to students' ability to perform calculation procedures with decimal numbers. Here is one example of a student's work that shows errors in performing decimal calculations.

Jawaban: 1.62

$$\begin{array}{r} 3.4 \\ + 1.25 \\ \hline 1.69 \end{array}$$

Picture 3. Finding (3) epistemological barrier

In Figure 3, the student's work shows the calculation of $3.4 + 1.25$ resulting in 1.69, indicating that the student made an error in completing the decimal addition. The answer produced does not show proper alignment of place values, so the calculation process does not reflect a correct mastery of the decimal addition procedure. This pattern of error indicates a limitation in the student's understanding of the concept of place value in decimal numbers. To obtain a more comprehensive picture, the researcher conducted a direct interview with the student. The interview results showed that the student did not yet understand the concept of place value in decimal numbers and tended to add the numbers as they would add whole numbers, that is, by ignoring the position of the decimal point. This mindset indicates that the student is

still at a stage of understanding that does not yet allow for conceptual and procedural operations with decimals. Thus, this error falls into the category of **epistemological obstacles**.

2. Ability to Compare and Order Decimal Numbers

Question number two tests students' ability to compare decimal numbers using weight data (34.8 kg; 34.7 kg; 35.2 kg; 35.1 kg; 34.9 kg) and determine the correct/incorrect statements as well as calculate the differences. Based on the students' work, it was found that some students still face difficulties in comparing decimal numbers. This obstacle is evident when students are asked to determine the true or false statements based on the presented weight data. Here is one of the students' work results shown in the picture below.



Figure 4. Finding (4) ontogenetic barrier

Based on Figure 4, it can be seen that the students answered "equally heavy" to the weight data that should be compared, even tho the decimal values in the table show differences between the data. The answer indicates that the students have not yet been able to understand the meaning of the difference in decimal values and have not linked the concept of place value with the context of comparing magnitudes. Students tend to view numbers globally without considering the differences in the digits behind the decimal point, resulting in less accurate conclusions. to strengthen these findings, the researcher conducted interviews with the students and found that they did not have an adequate initial understanding of the concept of place value and the order of decimal numbers, making them unable to determine which was larger or smaller. The error arose due to the absence of the prerequisite skills needed to compare decimal numbers. Thus, this indicates the presence of an **ontogenetic barrier**.

The following findings indicate that students encounter obstacles in calculating the difference between two decimal numbers in subtraction operations. This obstacle is evident when students are asked to determine the difference in weight based on the given data, but are unable to perform the decimal subtraction process accurately. Here is one of the students' work results shown in the picture below.

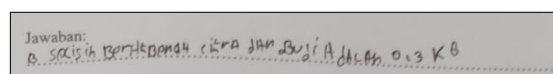


Figure 5. Finding (5) epistemological barrier

Based on Figure 5, it can be seen that the student stated the statement was correct and wrote the weight difference between Citra (35.2 kg) and Budi (34.7 kg) as 0.3 kg, whereas the correct subtraction result is 0.5 kg. This answer shows that the student is

not yet able to perform decimal subtraction operations correctly. This error indicates that the student is still experiencing difficulties in operating numbers in the decimal part. To further uncover the causes of students' errors in solving the problem, the researcher conducted direct interviews. During the interview to trace how the student arrived at that answer, he could not explain the process of subtracting $35.2 - 34.7$. This is due to the limitations in the students' knowledge structure in fully understanding the concept of decimal numbers. Thus, the obstacles faced by students reflect the presence of **epistemological barriers**.

3. Ability to Apply Decimal Numbers in Real-Life Contexts

Question number three tests students' ability to apply the concept of decimal numbers in real-life situations, specifically the purchase of pertamax gasoline priced at Rp12,500.00 per liter. Students are asked to: (a) calculate the cost of purchasing 1.5 liters of gasoline and the change from Rp20,000.00, and (b) determine the purchasing ability if the price rises to Rp13,000.00 per liter. The results show that students still face difficulties in understanding the concept of "half" in the context of decimal numbers (1.5 liters), and some students also make mistakes in addition and subtraction operations to calculate the total cost and change.

The analysis results show that there are still students who face obstacles in understanding the concept of "half" as part of decimal numbers. This obstacle is evident when students are asked to calculate the cost of purchasing 1.5 liters of gasoline, where the number 0.5 must be understood as half a liter. The students' difficulty in understanding the concept of 1.5 liters affects the accuracy of the total cost and change calculations, as they have not yet fully grasped the meaning of decimal numbers in real-life contexts. Here is one example of a student's answer.

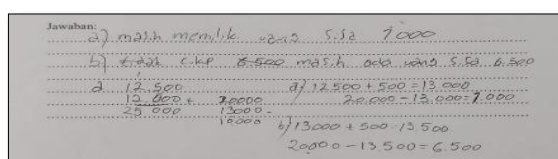


Figure 6. Finding (6) epistemological barrier

Based on the student's answer, which states that "half" of one liter equals 500, not 0.5. This answer shows that the student does not yet understand that decimal numbers represent half of a single unit. This mistake shows that the student is having difficulty linking the concept of decimal numbers with the representation of real quantities, so their understanding of parts of a whole is not yet accurate. To gain a deeper understanding, the researcher conducted interviews, and the interview results showed that students do not yet understand that "half a liter" means 0.5 liters, not the number 500 as a whole number. This error indicates that students do not connect the concept of 1 liter = 1.0 liters with the decimal fraction representation $\frac{1}{2} = 0,5$ so that there is a

misconception that "half" has a value equivalent to the number 500. This phenomenon indicates an error in transforming the understanding of fractions into decimal form. These findings fall into the category of epistemological obstacles.

The following findings highlight that there are still students experiencing difficulties in performing addition and subtraction in the context of calculating total costs and determining change, as shown in the following image.

a. masih ada sisa 2000
 $12.500 : 2 = 6.500 \text{ liter} = 18.000$

b. masih bisa dan ada kembalian 500
 $13.000 : 2 = 6.500 + 13.000 + 6.500 = 19.500 \text{ sisa } 500$

Figure 7. Finding (7) ontogenetic barrier

The student calculated the value of half a liter by dividing Rp12,500.00 by 2 and wrote the result as Rp6,500.00. However, the correct result is Rp6,250.00. This mistake indicates that the student has not yet grasped the concept of dividing whole numbers and tends to perform division in an unstructured manner. The next mistake occurs when the student calculates the cost of 1.5 liters of gasoline by adding Rp12,500.00 and Rp6,500.00 to get Rp18,000.00, whereas the correct result is Rp19,000.00. This indicates that the student is still experiencing difficulties with addition. To further understand the calculation errors made by the student, the researcher conducted an interview with the student. The student's explanation during the interview showed that he performed the calculations based on a procedure he considered correct, but without understanding the underlying mathematical process. He added Rp6,500.00 + Rp12,500.00 and maintained that answer because he thought it was "reasonable." This finding falls under ontogenetic barriers because the student has not yet mastered basic mathematical skills, such as simple division and addition of numbers with different place values. This obstacle is related to cognitive readiness and previous learning experiences.

Based on interviews with several students, the researcher found didactic obstacles that also affect students' performance in solving decimal number literacy numeracy problems. Didactic obstacles refer to constraints that arise from the learning process, including the way teachers deliver material, the presentation of example problems, and the practice opportunities given to students. Research findings indicate that some students experience difficulties in understanding fractions and decimal numbers because the previous learning process was not optimal. Other students also reported that they had not yet been taught decimal number literacy numeracy problems in their learning activities.

In order to obtain a more comprehensive picture of the didactic obstacles occurring in the teaching of decimal number literacy, the researcher subsequently conducted interviews with the classroom teacher. This interview aims to explore information related to the planning, implementation, and teaching strategies used by the teacher in teaching the material. Based on the interview results, the teacher stated that the learning process was carried out by fully referring to the textbook used in the

class. The teacher explained that the teaching strategy applied is a learning practice acquired since school days and tends to imitate the way previous teachers taught mathematics. This indicates that the learning is still oriented toward a conventional approach and is *teacher-centered*.

In explaining the arithmetic operations of decimal numbers, the teacher directly emphasizes the counting procedures, such as aligning the decimal points in addition and subtraction, as well as the rules for counting the digits behind the decimal point in multiplication and division. The explanation was more focused on procedures without reinforcing the basic concepts of decimal numbers and the meaning of each procedure performed by the students. In addition, the teacher stated that he does not use any learning resources other than textbooks and has not yet developed Student Worksheets (LKPD) specifically for decimal number material. The teacher also revealed that the discussion of numeracy literacy questions, especially story problems, has not yet become a main part of the learning process due to time constraints and the demands of completing other materials.

These findings indicate the presence of didactic obstacles stemming from the design and implementation of learning that does not provide sufficient space for students to build conceptual understanding gradually and contextually. Learning that focuses on procedures, has minimal variation in learning resources, and has not yet integrated numeracy literacy questions systematically has the potential to cause students to experience obstacles in relating the concept of decimal numbers to real-world problems. The findings of didactic obstacles in this study reinforce the urgency of implementing alternative learning designs that gradually build conceptual understanding. The GASING method is considered relevant because it aligns with constructivist learning theory, which encourages students to actively participate in the concrete, abstract, and mental calculation stages. This method directly addresses the shortcomings of learning that only emphasizes procedures without reinforcing concepts (Sulistiawati, 2019). Empirically, it has been shown that the application of the GASING method has a significant impact on the arithmetic abilities of fourth-grade elementary school students (Mutiarra et al., 2024). It also increases interest and learning outcomes in mathematics, raising the average interest from 69.2 to 86.3 and learning outcomes from 50.05 to 83.55 (Gou et al., 2024). Thus, a more contextual and meaningful didactic situation can be created thru the development of LKPD based on the GASING method for decimal number material, thereby systematically overcoming the ontogenetic, epistemological, and didactic obstacles found in this study.

CONCLUSION

This research successfully identified three categories of learning obstacles experienced by 32 seventh-grade junior high school students in decimal number literacy, namely ontogenetic, epistemological, and didactic obstacles. Ontogenic

obstacles are reflected in the low cognitive readiness of students to understand the decimal place value system. Epistemological obstacles are shown thru the emergence of misconceptions about the meaning of decimal numbers and errors in linking concepts with arithmetic operation procedures. As for didactic obstacles, they are related to teaching practices that still emphasize rote memorization of procedures, minimal variation in teaching strategies, and a lack of emphasis on concept reinforcement. These findings indicate that the low numeracy literacy of students in decimal number material is an issue that needs to be addressed thru appropriate learning interventions.

The results of this study imply that identifying learning obstacles thru diagnostic tests needs to be conducted from the beginning of the learning process to ensure students' conceptual readiness. Additionally, a structured learning design based on the GASING method has the potential to be an effective pedagogical alternative in reducing those learning obstacles thru the development of LKPD based on more contextual and meaningful didactic situations. Future researchers are advised to develop and implement didactic designs based on the GASING method more comprehensively in decimal number material.

DAFTAR PUSTAKA

- Aprilia, D., & Wardana, M. D. K. (2024). Pengembangan Modul Pembelajaran Berbasis Literasi Numerasi di Kelas II Sekolah Dasar pada Kurikulum Merdeka. *Jurnal Pendidikan Guru Sekolah Dasar*, 1(3). <https://doi.org/10.47134/pgsd.v1i3.404>
- Arikunto, S. (2012). *Prosedur penelitian: suatu pendekatan praktik / Suharsimi Arikunto | OPAC Perpustakaan Nasional RI. In Jakarta: Rineka Cipta.*
- Armianti, A., Yani, I., Widuri, K., & Sulistiawati, S. (2016). Pengaruh Matematika GASING (Gampang, ASyik, dan menyenaNGkan) pada Materi Perkalian Bilangan Bulat Terhadap Hasil Belajar Peserta Matrikulasi STKIP Surya. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 7(1). <https://doi.org/10.15294/kreano.v7i1.5012>
- Brousseau, G. (1983). Les obstacles épistémologiques et les problèmes en mathématiques. *Recherches En Didactique Des Mathématiques*, 4(2).
- Brousseau, G. (2002). Theory of Didactical Situations in Mathematics. In *Theory of Didactical Situations in Mathematics*. <https://doi.org/10.1007/0-306-47211-2>
- Budiarti, S. I., & Purnamasari, V. (2022). Analisis Kesulitan Belajar Siswa Dalam Menyelesaikan Soal Pecahan Desimal Kelas V SD Negeri Kauman Blora. *MATAPPA: Jurnal Pengabdian Kepada Masyarakat*.
- Gou, M. F. T., Aje, A. U., & Seto, S. B. (2024). Metode Gasing Dalam Pembelajaran Matematika Untuk Meningkatkan Minat Dan Hasil Belajar Siswa. *Jupika: Jurnal Pendidikan Matematika*, 7(2). <https://doi.org/10.37478/jupika.v7i2.4624>
- Johar, R., Mahmud, F., Mahdalena, M., & Rusniati, R. (2016). MISKONSEPSI SISWA SEKOLAH DASAR PADA PEMBELAJARAN BILANGAN DESIMAL. *Sekolah*

- Dasar: Kajian Teori Dan Praktik Pendidikan*, 25(2).
<https://doi.org/10.17977/um009v25i22016p160>
- Juwanto, J., Fuadiah, N. F., & Sari, E. F. P. (2024). Learning Obstacle Pada Materi Perkalian Bilangan Desimal Pada Siswa Kelas Iv Sd Negeri Purwa Agung. *EL-Muhbib: Jurnal Pemikiran & Penelitian Pendidikan Dasar*, 8.
- Kusuma, M. W. K., Jampel, I. N., & Bayu, G. W. (2019). Pengaruh Metode Pembelajaran Matematika Gasing Terhadap Hasil Belajar Matematika. *Jurnal Pedagogi Dan Pembelajaran*, 1(1). <https://doi.org/10.23887/jp2.v1i1.19330>
- Miles, M. B. ., Huberman, A. M. ., & Saldaña, Johnny. (2014). *Qualitative data analysis : a methods sourcebook*. SAGE Publications, Inc.
- Mutiara, Rahman, H., & Hotimah. (2024). Pengaruh Metode Pembelajaran Matematika Gasing (Gampang, Asyik, Menyenangkan) Terhadap Kemampuan Numerasi Siswa Kelas IV SD. *Jurnal Metafora Pendidikan*, 2(1).
- OECD. (2019). PISA 2018 Results Assessment and Analytical Framework. In *OECD Publishing*.
- Pulungan, R. O. T. (2023). Learning Obstacle Siswa Sekolah Dasar Pada Materi Bilangan Desimal. *Journal of Professional Elementary Education*, 2(1).
<https://doi.org/10.46306/jpee.v2i1.25>
- Safari, Y., & Simanjuntak, A. N. (2025). Analisis Kesulitan Belajar Siswa dalam Memahami Bilangan Desimal dan Pecahan Sebagai Konsep Dasar Metematika. *Karimah Tauhid*, 4(7).
- Sulistiawati, S. (2019). Pembelajaran Matematika Gasing Ditinjau Dari Berbagai Perspektif Teori Belajar. *Teorema: Teori Dan Riset Matematika*, 4(1).
<https://doi.org/10.25157/teorema.v4i1.1932>
- Yayuk, E., Restian, A., & Ekowati, D. W. (2023). Literasi Numerasi dalam Kerangka Kurikulum Merdeka Berbasis Art Education. *International Journal of Community Service Learning*, 7(2). <https://doi.org/10.23887/ijcsl.v7i2.56278>

SHORT PROFILE

Novita Konnianty Lassi was born in Kupang on November 12, 1996. Completed a Bachelor's degree in Mathematics Education in 2018. Currently striving to complete the Master's program in Mathematics Education at Universitas Pendidikan Indonesia.