



ANALYSIS OF ELEMENTARY STUDENTS' LEARNING OBSTACLES IN UNDERSTANDING FRACTIONS: A CASE STUDY IN SOUTH CENTRAL TIMOR REGENCY

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Abstract. Fraction material presents considerable difficulty for students due to the presence of learning obstacles. The purpose of this study is to describe the profile of learning obstacles experienced by elementary school students in understanding fractions in South Central Timor (TTS) Regency, as well as the dominant factors contributing to these obstacles. A qualitative case study design was employed. The participants consisted of 200 sixth-grade elementary school students and 10 elementary school teachers from South Central Timor Regency, East Nusa Tenggara Province. Data were collected using triangulation, combining diagnostic tests and semi-structured interviews. Data analysis followed the Miles and Huberman framework, comprising three stages: data reduction, data display, and conclusion drawing/verification. The findings revealed three types of learning obstacles: epistemological, ontogenic, and didactic. Epistemological obstacles include difficulties with modeling fractions, equalizing denominators, and applying the "flip and multiply" procedure in division. Ontogenic obstacles encompass lack of concentration, math anxiety, low working memory capacity, and the tendency to treat fractions as whole numbers in addition and subtraction. Didactic obstacles stem from limitations in teaching media, overly hasty symbolic transitions, and uncreative, decontextualized learning methods. Overall, the contributing factors to these obstacles include conceptual, cognitive, psychological, environmental, and instructional factors.

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INTRODUCTION

Fractions are one of the basic mathematical concepts that elementary school students need to master. A strong understanding of fractions will serve as a foundation for students as they learn more complex mathematical concepts in subsequent levels of education, such as measurement, geometry, algebra, and data analysis (Unaenah et al., 2023). However, in reality, fractions are often a nightmare for elementary school students. Many students have difficulty understanding fractions, which ultimately leads to low academic achievement in mathematics (Astuti et al., 2024).

The difficulty elementary school students have in understanding fractions is a global issue, not just in Indonesia. Several international studies show that in Malaysia, 173 students demonstrated a low level of intuitive understanding of fractions (Singh et al., 2021). Students in Ghana made conceptual and procedural errors due to the inaccuracy of the teaching methods used by teachers (Kukulaje, 2024). Students in the United Arab Emirates were unable to distinguish between numerators and denominators (Jarrah et al., 2022). Students in Turkey have difficulty interpreting the concept of fractions from pictures, number line representations, and equivalent fractions (Ertuna, 2021). Based on research in South Sulawesi, Indonesia, students had misconceptions about the multiplication and subtraction of fractions. Elementary school students in Bandung had limited knowledge of basic concepts, arithmetic operations, and fraction problem solving (Hariyani et al., 2022). Students in Cirebon had low ability in understanding fraction concepts (Hartono et al., 2021).

Various national studies show that fractions are among the most difficult subjects for elementary school students in Indonesia to understand, especially in disadvantaged areas such as

East Nusa Tenggara (NTT) (Kemendikbudristek, 2023). According to the 2022 Minimum Competency Assessment in South Central Timor (TTS), only 28.5% of elementary school students achieved the Minimum Competency in Mathematics, with fractions showing the highest error rate. This situation is exacerbated by several factors specific to 3T areas, namely a). Pedagogical limitations of teachers (65%), with elementary school teachers in TTS admitting to having difficulty teaching fractions, b). Lack of learning media, with only 20% of schools having adequate teaching aids, c). Socio-cultural factors, with learning not yet linking the concept of fractions to the lives of the agrarian community in TTS (Badan Pusat Statistik (BPS), 2022; BPMP NTT, 2022).

Fractions are difficult for students to understand due to learning obstacles. According to Brousseau (2002), the theory of learning obstacles consists of three types, namely 1) ontogenic obstacles, 2) epistemological obstacles, and 3) didactical obstacles. Ontogenic obstacles are obstacles related to students' mental readiness to learn. These obstacles stem from students' lack of mental readiness to learn. These obstacles are closely related to students' mental development, which is age- and level-dependent. Ontogenic obstacles consist of three types, namely 1) psychological ontogenic obstacles, 2) instrumental ontogenic obstacles, and 3) conceptual ontogenic obstacles. Psychological ontogenic obstacles are students' unpreparedness to accept lessons due to psychological aspects. The causes of this obstacle include low student motivation in accepting lessons and low student interest in learning certain materials. Instrumental ontogenic obstacles are students' unpreparedness to learn certain material because they do not understand the technical aspects that are key to the learning process. Conceptual ontogenic obstacles arise from differences between the concepts in the learning design and those students understand based on their prior learning experiences (Fauzi & Suryadi, 2020; Lestari et al., 2025).

Epistemological obstacles arise when a person's knowledge of a concept is limited to a specific context and is not yet comprehensive. Epistemological obstacles are divided into three types: conceptual, procedural, and operational-technique (Dewi & Hakim, 2022; Isnawan & Suryadi, 2022). According to Kastolan, mistakes made by students in solving math problems include several things, among others: conceptual errors, which are mistakes made by students in interpreting terms, properties, facts, concepts, and principles; procedural errors, which are mistakes in arranging symbols; and technical errors, which are mistakes in calculating to answer a problem (Sari et al., 2022). Didactical obstacles are learning obstacles that originate within the school's learning system (Baharuddin, 2020). These obstacles occur due to errors in the learning process that originate in the school's learning system or in the strategies teachers use to teach certain mathematical ideas, such as incorrect presentation or teaching of concepts, sequencing factors, and/or curriculum stages. In addition, they are related to inaccuracies in the use of approaches, models, strategies, and learning methods, as well as the lack of appropriate teaching aids or learning media in accordance with the material being taught (Baharuddin, 2020; Isnawan & Suryadi, 2022).

Previous researchers have examined learning obstacles from an epistemological (Unaenah et al., 2023; Singh et al., 2021; Hariyani et al., 2022; Murniasih et al., 2020; Rohimah et al., 2022) and from a didactic perspective (Singh et al., 2021). There has been no comprehensive study covering the three characteristics of learning obstacles. Given the location of previous studies, the focus has been on students in Java (Murniasih et al., 2020; Diputra et al., 2023). However, no one has specifically researched this using a contextual approach in regions with unique characteristics such as TTS. Therefore, this study is important for uncovering the root causes of learning obstacles in TTS and for formulating solutions appropriate to the region's characteristics in NTT.

In the Indonesian context, not much research has been conducted on learning obstacles. Previous researchers have examined learning obstacles only from an epistemological perspective, and their research has been limited to Java. The purpose of this study is to describe the profile of learning obstacles experienced by elementary school students in understanding fractions in TTS Regency and to identify the dominant factors that contribute to the emergence of learning obstacles in fractions in TTS Regency, in order to support the achievement of Asta Cita 4 and SDGs 4. The benefits of this study include describing the profile of learning obstacles experienced

by elementary school students in understanding fractions in TTS Regency and identifying the dominant factors that contribute to these learning obstacles.

RESEARCH METHODS

The research method used in this study was a qualitative case study to analyze in depth the learning obstacles elementary school students face in understanding fractions. This approach was chosen because it enabled exploration of contextual data from complex phenomena (Cresswell & Cresswell, 2018). The subjects of this study were 200 sixth-grade elementary school students and 10 elementary school teachers in South Central Timor Regency, East Nusa Tenggara Province. The study was conducted from July 1 to August 15, 2025.

To analyze learning obstacles in understanding fractions among elementary school students, we used a fraction comprehension test, a semi-structured interview questionnaire for students and teachers, and an observation sheet. The fraction comprehension test consisted of five essay questions covering the concepts of fractions, addition, subtraction, multiplication, and division of fractions. Researchers used a questionnaire to interview students to explore their understanding, difficulties, and perceptions of learning obstacles in fractions, and to interview teachers to identify the obstacles they experienced in teaching fractions, the teaching methods they used, and the factors that caused learning obstacles. The data collection technique used triangulation, which is a combination of: 1) Diagnostic tests, 2) Semi-structured interviews for students and teachers.

Based on the test results, observations, interviews, and document analysis, the data was analyzed using the data analysis technique according to Miles and Huberman, which consists of three stages, namely: 1) Data reduction: filtering relevant data (patterns of student errors from diagnostic tests, interview findings, observations, and document analysis). 2) Data presentation: creating tables, diagrams, or descriptive narratives based on the categorization of learning obstacles according to Brousseau's theory (epistemological, didactic, ontogenetic). 3) Verification (conclusion): triangulation of sources (teachers, students, documents) to validate the findings (Encum Sumiaty, 2024; Huberman, 2014). To categorize students' understanding of fractions, compare the entries in Table 1.

Table 1. Categories of Student Ability Grouping

No	Rate	Student Errors Category
1	$X \geq 60$	Low
2	$40 \leq X < 60$	Moderate
3	$X < 40$	High

RESULTS AND DISCUSSION

Based on the results of the fraction comprehension test, the following data were obtained. Table 2 displays these results in detail.

Table 2. Fraction Ability Test Results

Questions	Answer Categories					
	Perfect		Less than perfect		Incorrect	
	Quantities	Percentage	Quantities	Percentage	Quantities	Percentage
Questions 1	59	29,5%	78	39%	63	31,5%
Questions 2	69	34,5%	77	38,5%	54	27%
Questions 3	71	35,5%	83	41,5%	46	23%
Questions 4	65	32,5%	93	46,5%	42	21%
Questions 5	50	25%	97	48,5%	53	26,5%

On question 1, 29.5% of students answered correctly (perfectly), while 70.5% answered incorrectly in the imperfect and incorrect answer categories. Question number 2: 34.5% of students answered correctly (perfectly), while 65.5% answered incorrectly in the categories of imperfect and wrong answers. Question number 3: 35.5% of students answered correctly (perfectly), while 64.5% answered incorrectly in the categories of imperfect and wrong answers. Question number 4: 32.5% of students answered correctly (perfect), while 67.5% of students



answered incorrectly in the categories of imperfect and wrong answers. Question number 5: 25% of students answered correctly (perfect), while 75% of students answered incorrectly in the categories of imperfect and wrong answers. After determining the students' abilities with data fractions, they were categorized by error rate, as shown in Figure 1.

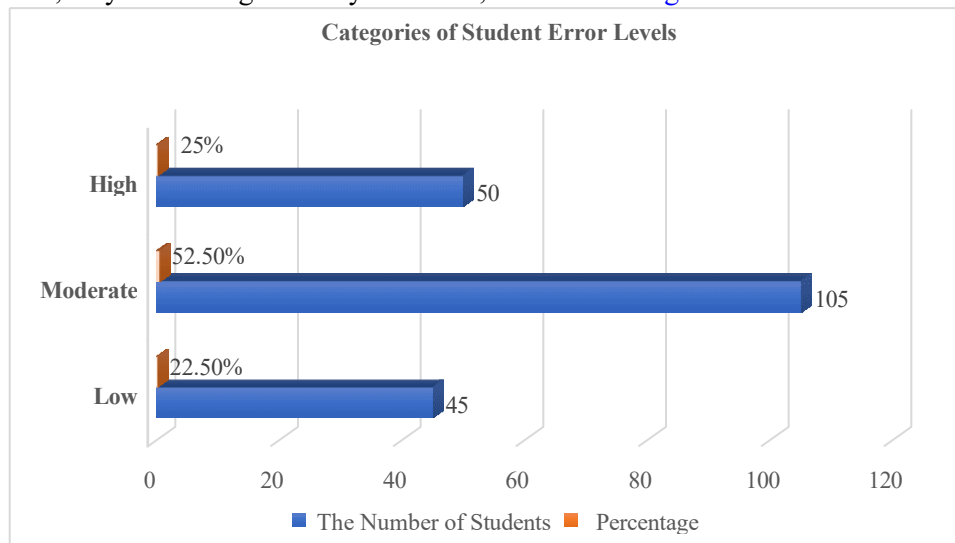


Figure 1. Categories of Student Error Levels

Based on a fraction comprehension test administered to 200 elementary school students, the most common student error category was moderate, affecting 105 students (52.5%). This shows that many students scored between 40 and 60. The low-level student error category included 45 students, or 22.5%. This category consists of students with scores between 60 and 100. Meanwhile, the high-level error category comprised 45 students (25%) who scored below 40. Based on the level of student errors, the analysis of these learning obstacles is presented in the explanation below.

This study shows that elementary school students in South Central Timor Regency face learning obstacles in understanding fraction concepts, which are categorized into three types: epistemological, ontological, and didactic.

1. Epistemological obstacles

An epistemological obstacle is a barrier caused by students' limited understanding of a specific context (Baharuddin, 2020). Epistemological obstacles experienced by students are categorized into three types: conceptual, procedural, and operational.

a. Conceptual Epistemological Obstacles

Conceptual epistemological barriers arise from difficulties in understanding and accepting new basic concepts or ideas because they conflict with deeply ingrained old concepts in learners' thinking. The findings regarding the types of conceptual epistemological barriers experienced by elementary school students were categorized into several aspects of the meaning of fractions: parts of a whole, addition and subtraction of fractions with different denominators, multiplication of fractions, and division of fractions.

Fractions as Parts of a Whole

Regarding the ability to understand fractions as parts of a whole, several errors were observed in modeling and determining the value of fractions. Figure 2 shows students attempting to model the visualization of a fraction's value without using a diagram and instead writing the fraction directly. The fractions shown in these figures are incorrect. In Figure 3, the student performs a subtraction operation, even though the problem does not require subtraction; it only requires determining the value of the fraction.

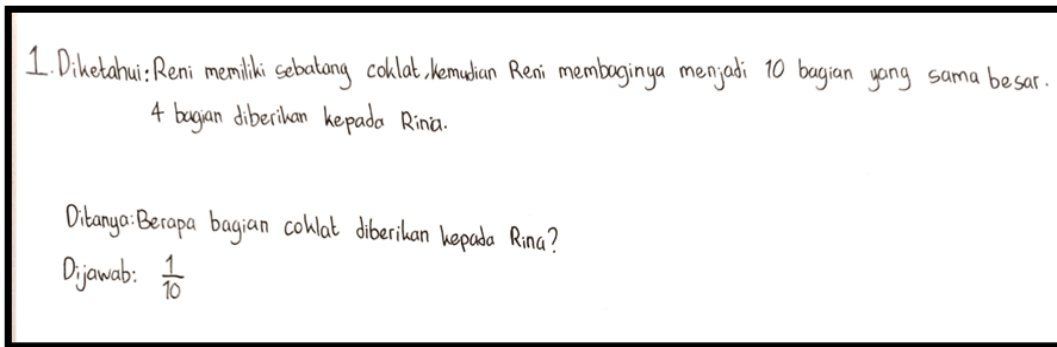


Figure 2. Student does not visualize of fraction shape

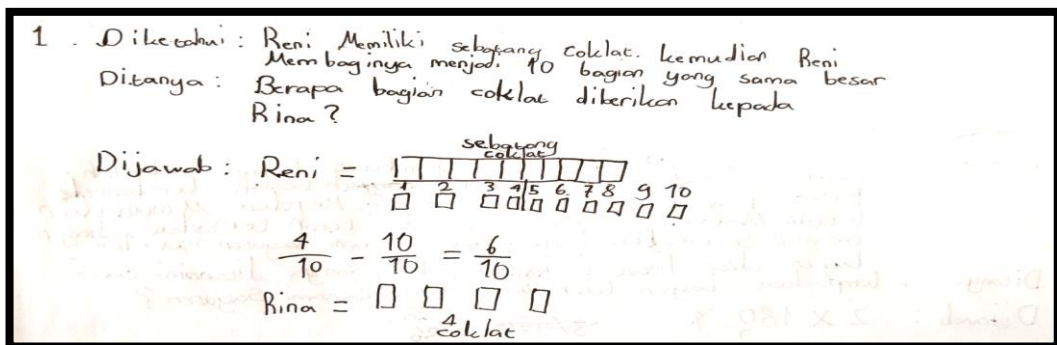


Figure 3. Problem Visualization of fraction shape

Addition of fractions with different denominators

Figure 4 shows students failing to complete addition problems involving fractions with different denominators. The students did not find a common denominator before performing the addition.

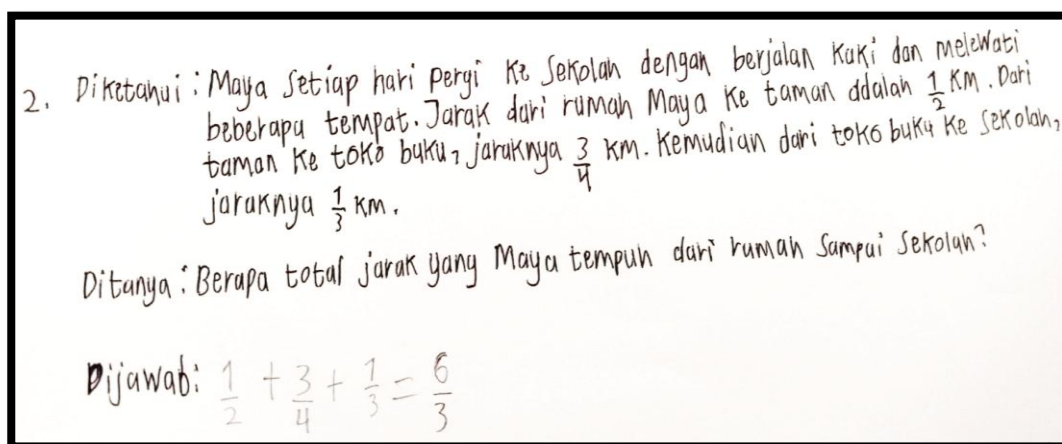


Figure 4. Problem addition operation of fractions with different denominators

Figure 5 shows that students have difficulty subtracting fractions with different denominators. Figure 5 shows that students attempt to subtract fractions with different denominators by subtracting the numerators and multiplying the denominators. This is incorrect because, according to the concept of subtraction of fractions with different denominators, the denominators must first be made equal.

3. Diketahui: Roni adalah siswa yang rajin belajar. Hari ini ia belajar di rumah pelajaran matematika selama $\frac{1}{2}$ jam dengan pelajaran sains selama $\frac{1}{3}$ jam.

Ditanya: Selisih lama waktu belajar Roni antara belajar matematika dan sains adalah jam.

Dijawab: $\frac{1}{2} - \frac{1}{3} = \frac{0}{6}$

Figure 5. Problem subtraction operation of fractions with different denominators

Figure 6 shows that students are having difficulty solving fraction multiplication problems because their answers are incorrect. The students made mistakes in determining the results of the fraction multiplication.

4. Diketahui: Siswa kelas 6 akan membuat kue untuk teman-temannya. Ia membutuhkan $\frac{2}{3}$ kg tepung terigu dan $\frac{1}{4}$ kg gula pasir. Berapa banyak tepung terigu yang akan digunakan?

Ditanya: Berapa banyak bagian tepung yang akan digunakan?

Dijawab: $\frac{2}{3} \times \frac{1}{4} = \frac{2}{12} = \frac{1}{6}$ kg

Figure 6. Problem multiplication operation of fractions

Figure 7 shows that students have misconceptions regarding the division of fractions. Students do not use the “reverse and multiply” procedure (reversing the divisor) when dividing.

5. Seorang pedagang minyak goreng membeli 15 liter minyak goreng dalam sebuah jerigen besar. Ia ingin mengemas ulang minyak goreng tersebut ke dalam botol-botol kecil berukuran $\frac{3}{4}$ liter. Berapa banyak botol kecil berukuran $\frac{3}{4}$ liter yang dibutuhkan?

Ditanya: Berapa banyak botol kecil berukuran $\frac{3}{4}$ liter yang dibutuhkan?

Dijawab: $\frac{3}{4} \times 15 = 15 \times 3 = 45$

Figure 7. Problem division operation of fractions

This type of epistemological barrier aligns with previous findings by Hartono et al. (2021), Rosid et al. (2022), Singh et al. (2021), Fauzi & Suryadi (2020), and Benu et al. (2019), which indicate that elementary school students have limited ability to understand the meaning of fractions. Specifically, when adding or subtracting fractions with different denominators, students struggle to equalize the denominators before performing the operation. In multiplication operations, students struggle to determine the most efficient Least Common Multiple (LCM) to equalize the denominators. This indicates a lack of conceptual understanding in fraction operations.

b. Procedural epistemological obstacles

Procedural epistemological obstacles arise when students have difficulty applying or understanding the correct steps, methods, or procedures for solving a particular problem or question. The following describes procedural epistemological obstacles in solving fraction problems: procedural errors occur when adding or subtracting fractions with different denominators. Students immediately write down the final answer without explaining the steps involved in performing these operations, as shown in Figure 8.

2. Diketahui: Maya setiap hari pergi ke sekolah dengan berjalan kaki dan melewati beberapa tempat. Jarak dari rumah Maya ke taman adalah $\frac{1}{2}$ km. Dari taman ke toko buku Jaraknya $\frac{1}{3}$ km. kemudian dari toko ke Sekolah, Jaraknya $\frac{1}{4}$ km.

Ditanya: Berapa total jarak yang Maya tempuh dari rumah sampai Sekolah.

Dijawab: $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{5}{4}$

Figure 8. Prosedural error in adding fraction

Procedural errors in problems involving the multiplication and division of fractions are evident in Figure 9, where students immediately write down the final answer without showing the steps used to solve the problem.

4. Diketahui: Siswa kelas 6 SDI akan membuat kebun sekolah. Mereka memiliki sebidang tanah berbentuk persegi panjang dengan luas 180 m^2 . Mereka memutuskan untuk menanam $\frac{2}{3}$ bagian dari tanah tersebut dengan tanaman sayuran. Dari bagian yang ditanami sayuran itu, $\frac{1}{4}$ bagian akan ditanami tomat, dan sisanya akan ditanami cabai.

Ditanya: Berapa luas bagian tanah yang akan ditanami sayuran?

Dijawab: $\frac{1}{3}$

Figure 9. Procedural error in multiplication fraction

The procedural epistemological barriers identified include students writing down answers directly without explaining the steps involved in adding, subtracting, multiplying, and dividing fractions. Students failed to write down the solution process in detail. The obstacles identified in fraction operations—addition, subtraction, multiplication, and division—indicate that students immediately wrote down the final result without outlining the solution procedure. This is further supported by Ayuningtyas et al.'s (2024) research, which found that elementary school students lack an understanding of the procedures for multiplying fractions. According to Rosid et al. (2022), Encum Sumiaty (2024), and Eichhorn (2018), students are not yet able to solve problems involving the addition and subtraction of fractions using the correct steps.

c. Technical Epistemological Obstacles

Technical epistemological barriers are more specific and relate to difficulties in using the tools, techniques, or basic skills required to perform certain procedures. This is the most concrete level of barrier. Solving fraction problems requires basic skills such as addition, subtraction, multiplication, and division, as well as finding the Least Common Multiple (LCM) of several numbers. Based on the findings, it appears that students are unable to determine the Least Common Multiple before adding or subtracting fractions with different denominators. Students immediately add the denominators of the two fractions, as shown in Figure 10, and other errors include incorrectly determining the results of multiplication and division.

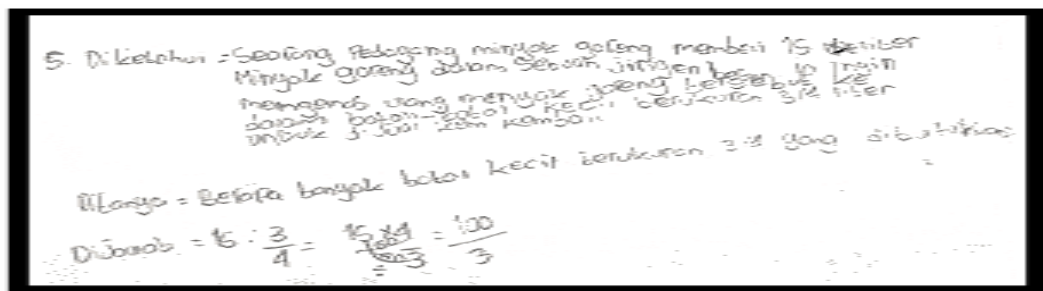


Figure 10. Final result error in division and multiplication of fraction

Technical epistemological barriers are more specific and relate to difficulties in using the tools, techniques, or basic skills required to perform certain procedures. This is the most concrete level of barrier. In the fraction operations unit, students must be able to understand how to perform basic operations such as addition, subtraction, multiplication, and division, as well as determine the least common multiple of several numbers. Based on the findings, students were unable to determine the least common multiple before performing addition and subtraction of fractions with different denominators. Some students also incorrectly determined the results of multiplication and division. These findings are also supported by research by [Hariyani et al. \(2022\)](#), [Fauzi & Suryadi \(2020\)](#), [Sagara \(2023\)](#), and [Eichhorn \(2018\)](#), which found that elementary school students do not yet comprehensively understand fraction operations.

2. Ontogenic obstacles

Obstacles are challenges related to students' mental readiness in learning fractions. The identified ontogenic obstacles are categorized into psychological, conceptual, and instrumental ontogenic obstacles.

a. Ontogenic Obstacle Psikologis

Based on interviews with students, it appears that difficulties in understanding fractions stem from a lack of motivation; students experience anxiety when learning mathematics and are not cognitively ready. Students prefer studying only easy mathematical concepts, but show no interest in learning difficult material. Additionally, students feel anxious about learning mathematics because there are many formulas to memorize, the learning environment is stressful, and the teacher's teaching style is monotonous. Students' cognitive readiness is low because they often forget the prerequisite material needed to solve fraction problems. This aligns with findings from another researcher, [Rohmah \(2025\)](#), who noted that students face difficulties in understanding concepts and principles, as well as in solving word problems.

b. Ontogenic Obstacle Instrumental

An ontogenic instrumental obstacle refers to a student's inability to learn a subject because they do not understand the technical aspects that are key to the learning process. Based on interview results, the types of ontogenic instrumental obstacles experienced by elementary school students are described as follows. The following is a transcript of an interview to identify ontogenic and instrumental obstacles to visual modeling fraction

Researcher : How did you convert the problem into a fraction?

Student : I divided the chocolate into ten squares.

Researcher : How many pieces of chocolate were given to Rina?

Student : I divided each square into four pieces ([Figure 11](#)).

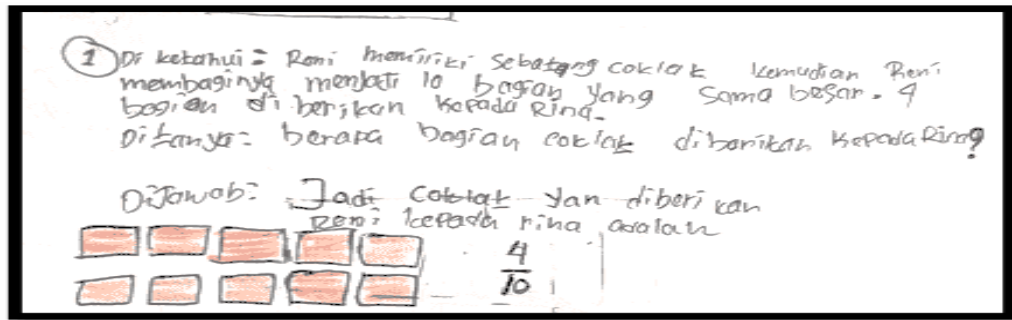


Figure 11. Visualization error of a square shape in fractions

Based on the interview results and the drawings in Figure 11, the students demonstrated an inability to accurately represent fractions in pictorial models. The ontogenic conceptual obstacle is a barrier that arises from a discrepancy between the concepts in instructional design and those that students understand based on their prior learning experiences. When solving fraction problems, students use the concepts of integer operations to add and subtract fractions.

c. Conceptual Ontogenic Obstacle

A type of conceptual ontogenic barrier experienced by elementary school students, in which students are suspected of solving addition and subtraction problems involving fractions using whole-number operations.

Researcher: How do you solve problems involving the addition of fractions with different denominators?

Student : Add the numerators and denominators (Figure 12).

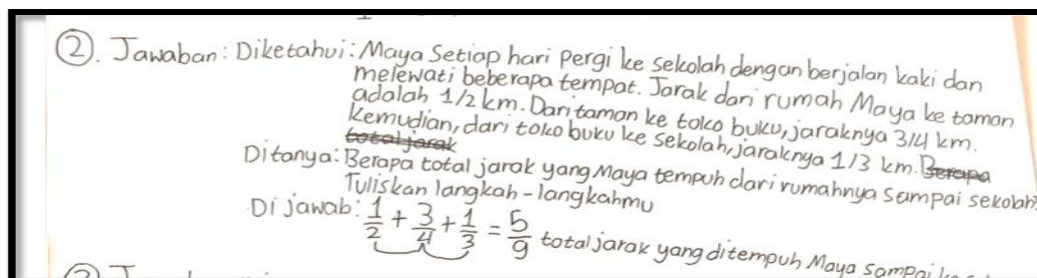


Figure 12. Adding fractions with different denominators using the concept of whole numbers

Researcher: Why did you do it that way?

Student : Because in addition, we add all the numbers together.

Researcher: How do you solve a subtraction problem involving fractions with different denominators?

Student: By subtracting the numerators (Figure 13).

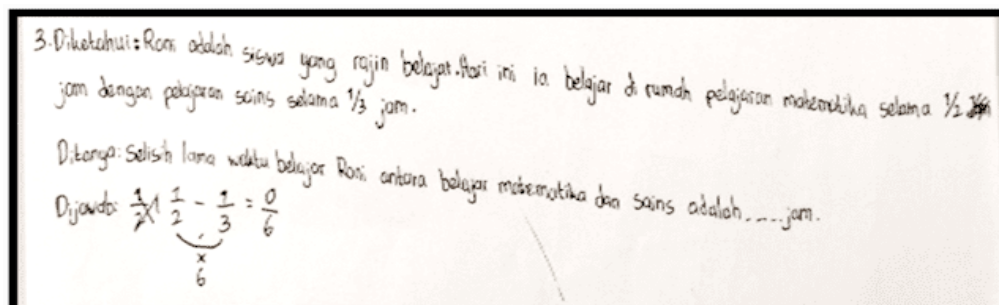


Figure 13. Subtracting fractions with different denominators using the concept of whole numbers

A conceptual ontogenic obstacle is a barrier that arises from a discrepancy between the concepts in the instructional design and those that students understand based on their prior learning experiences. When solving fraction problems, students use whole-number operations to add and subtract fractions.

3. Didactical obstacles

Didactic obstacles are barriers in the learning process that stem from the school's educational system itself (Baharuddin, 2020). Didactic obstacles arise from the teaching process and the school environment. The didactic obstacles identified include: limited teaching materials, overly rushed symbolic transitions, inappropriate pacing of the curriculum, shortcuts in procedures, lack of contextualization, uncreative teaching methods, and insufficient learning facilities. The obstacle of limited teaching media arises because teachers use only one model or teaching medium (e.g., cakes or fruits). This limits students' understanding in other contexts, such as fractions of a set of objects or the number line. The transition to symbols is rushed, with teachers moving too quickly from manipulatives to abstract operations/symbols (numbers), so students do not understand the meaning and use of fraction symbols. Some students are not yet able to distinguish between the numerator and the denominator.

It was also found that the progression of the material did not align with the concepts of prerequisite topics, such as finding the LCM; equivalent fractions were not taught thoroughly, so students were not yet able to perform more complex operations involving the addition and subtraction of fractions with different denominators. In instruction, shortcut procedures were provided; teachers directly taught formulas or procedures (shortcuts) without first establishing a strong conceptual foundation, for example, in the division of fractions. Additionally, a lack of contextualization—where learning was not sufficiently linked to students' daily lives in the TTS context (e.g., dividing harvest yields, dividing land)—made the material feel foreign. There are no learning resources or teaching materials relevant to the context in South Central Timor Regency, NTT. Teaching methods lack creativity, with teachers relying heavily on lecture-based methods. Furthermore, there is a scarcity of learning facilities, including a limited supply of textbooks and other learning materials provided by schools to support teachers in classroom instruction. These findings align with the research by Murniasih et al. (2020), Sagara (2023), Lestari et al. (2025), Isnawan & Suryadi (2022), and Eichhorn (2018), which identified barriers for teachers in teaching fractions, including the lack of media use to help students understand the meaning of fractions and misconceptions in teaching fractions due to language use.

Based on the findings of this study, several dominant factors experienced by elementary school students in South Central Timor (TTS) Regency contribute to learning obstacles in fractions. These factors do not exist in isolation but are interrelated and create significant learning obstacles. These factors include students' cognitive factors, psychological factors, the learning environment, and teacher competence.

In terms of cognitive factors, students demonstrated a lack of readiness to think about prerequisite material. Students have not yet fully mastered prerequisite concepts for fractions, such as multiples, the least common multiple (LCM), and the operations of multiplication and division. Difficulties with these prerequisite concepts act as barriers to students' learning of fractions. Students experience misconceptions about adding and subtracting fractions with different denominators. They tend to view the addition and subtraction of fractions with different denominators as identical to the addition of whole numbers. Students do not equalize the denominators; instead, they immediately solve the problem according to the numerical operation they observe. Additionally, due to limitations in their ability to abstract, elementary school students remain at the concrete operational stage of thinking. The concept of fractions is abstract, making it difficult to understand without visual or manipulative representations. Psychologically, elementary school students still hold a negative paradigm regarding mathematics. During mathematics lessons, students feel anxious and lack motivation. Motivation increases when the mathematical material is easy to understand. However, if the material is difficult, students tend to say they cannot do it and feel bored during the lesson.

Factors related to the learning environment include limitations in learning materials. Teachers and schools in TTS Regency often face limitations in learning materials that lack contextual relevance, whether physical (such as paper cutouts and fraction blocks) or digital. Learning materials could be developed based on the local wisdom of the TTS region. This makes it difficult for teachers to visualize fraction concepts, which ultimately limits students' learning



experiences. Teacher competency factors indicate teaching methods that lack context and variety. Teachers tend to use conventional methods, such as lectures, without incorporating collaborative approaches like discussions, peer tutoring, games, or concrete examples relevant to students' lives. Consequently, the concept of fractions becomes abstract and difficult to understand. Learning does not connect with the local context of South Central Timor Regency.

CONCLUSIONS AND SUGGESTIONS

This study successfully identified the learning obstacles elementary school students face in understanding fractions in South Central Timor Regency. There are three types of learning obstacles: epistemological, ontogenetic, and didactic. Epistemological obstacles include difficulty modeling and determining fraction values, failure to equalize denominators before performing addition and subtraction operations with different denominators, and failure to apply the “flip and multiply” procedure (flipping the divisor fraction) when performing division. Ontogenic obstacles include lack of concentration and attention, math anxiety, low working memory capacity, students' inability to represent fractional values, and students' tendency to solve addition and subtraction problems using whole-number operations. Didactic obstacles include limitations in teaching media, overly hasty symbolic transitions, inappropriate material progression, lack of contextualization, uncreative learning methods, and minimal learning facilities. Factors that cause learning obstacles in students include conceptual and learning factors, student cognitive factors, psychological factors, and learning environment factors.

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