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Low Understanding of Mathematical Concepts and Local Culture: A Case Study of Elementary School Students in Tanah Laut Regency

Rendahnya Pemahaman Konsep Matematika dan Budaya Lokal: Studi Kasus Siswa Sekolah Dasar di Kabupaten Tanah Laut

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Abstract

This research aims to identify the level of students' understanding of mathematical concepts and mastery of local culture as a basis for the development of a local culture-based learning model, as well as to determine the factors causing the low level of understanding of concepts and lack of local culture in mathematics learning. This research employs a mixed-method approach with a quantitative design supplemented by qualitative data. The subjects include 24 fifth-grade students at an elementary school in Tanah Laut Regency. Data collection techniques include mathematics concept comprehension tests, local cultural understanding tests, and documentation. The results showed that only 20.83% of students achieved a high category in understanding two-dimensional shapes, while understanding of local culture was very low only 4.167% of students able to identify cultural elements accurately. The implications of this study suggest that contextual teaching materials based on local culture need to be developed to help students better understand mathematical concepts while fostering a love for their own culture.

Keywords: *Conceptual Understanding; Elementary School; Local Culture; Mathematics.*

Abstrak

Penelitian ini mengidentifikasi tingkat pemahaman konsep matematika dan penguasaan budaya lokal sebagai dasar pengembangan model pembelajaran berbasis budaya lokal serta untuk mengetahui penyebab rendahnya pemahaman konsep dan kurangnya budaya lokal dalam pembelajaran matematika. Penelitian ini menggunakan metode mixed-method dengan desain kuantitatif yang diperkuat data kualitatif. Subjek 24 siswa kelas V di sebuah sekolah dasar di Kabupaten Tanah Laut. Teknik pengumpulan data meliputi tes pemahaman konsep matematika, tes pemahaman budaya lokal, dan dokumentasi. Hasil penelitian menunjukkan hanya 20,83% siswa yang mencapai kategori tinggi dalam pemahaman konsep bangun datar, sementara pemahaman terhadap budaya lokal sangat rendah yaitu 4,167% siswa mampu mengidentifikasi unsur budaya secara tepat. Hasil ini menunjukkan perlu dikembangkan bahan ajar kontekstual berbasis budaya lokal agar siswa lebih mudah memahami konsep matematika sekaligus menumbuhkan kecintaan pada budaya sendiri.

Kata Kunci: *Budaya Lokal; Matematika; Pemahaman Konsep; Sekolah Dasar.*

Introduction

The low quality of mathematics education in Indonesia remains a fundamental problem in the world of education. The results of the 2022 Programme for International Student Assessment (PISA) survey show that Indonesian students' mathematics scores have declined from 379 to 366, placing Indonesia below the global average. This situation indicates that mathematical thinking skills, particularly in terms of conceptual understanding, remain a major weakness among students at various levels of education. At the elementary school level, students tend to think concretely. Therefore, it is essential to instill a proper understanding of mathematical concepts.

Conceptual understanding is one of the competencies that students must master in learning mathematics[1]. A similar view is expressed by NCTM (2014:7), which states that there are five standard competencies that elementary school students must possess, one of which is conceptual understanding. Proper conceptual understanding must be provided from the elementary school level, as conceptual understanding is necessary for grasping knowledge concepts at higher levels[2].

Furthermore, conceptual understanding is fundamental to mathematics learning because it is directly related to students' ability to connect prior knowledge with new information, think logically, and solve problems. Zulkardi argues that mathematical conceptual understanding is necessary for problem solving and for applying everything that has been learned in the real world[3]. The purpose of conceptual understanding is the ability to behave, think, and act in accordance with the meaning, characteristics, and basic content of mathematics, as well as the ability to select and apply processes effectively and efficiently. A person will find it easier to solve problems if they have a broad mastery of concepts [4].

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[1] Radiusman Radiusman, "Studi Literasi: Pemahaman Konsep Anak Pada Pembelajaran Matematika," *FIBONACCI: Jurnal Pendidikan Matematika Dan Matematika* (Jakarta) 6, no. 1 (2020): 1–8, https://doi.org/10.24853/fbc.6.1.1-8.

[2] Asrul Karim, "Penerapan Metode Penemuan Terbimbing Dalam Pembelajaran Matematika Untuk Meningkatkan Pemahaman Konsep Dan Kemampuan Berpikir Kritis Siswa Sekolah Dasar" (masters, Universitas Pendidikan Indonesia, 2011), https://doi.org/10/2011.

[3] Muhammad Ilyas and Fahrul Basir, "Analysis of Student's Conceptual Understanding of Mathematics on Set at Class VII SMP Frater Palopo," *Proceeding International Conference on Mathematic, Science, Technology, Education and Their Applications* (Makassar), January 23, 2017, 96–102, https://ojs.unm.ac.id/icmstea/article/view/2631.

[4] Asri Laily Khurriyati et al., "Peningkatan Kemampuan Pemecahan Masalah Matematis Siswa Kelas III Melalui Media PACAPI (Papan Pecahan Pizza)," *JIIP - Jurnal Ilmiah Ilmu Pendidikan* 5, no. 4 (2022): 1028–34, https://doi.org/10.54371/jiip.v4i5.497.

However, the reality in the field shows a different situation. Elementary school students still face difficulties in understanding mathematical concepts, especially in geometry, such as flat shapes. Another research proves that the majority of students make mistakes in understanding questions, converting information into mathematical forms, and completing calculations logically [5][6].

This difficulty is inseparable from learning practices that emphasize achieving the targets set out in textbooks rather than understanding the material. As a result, students simply memorize mathematical ideas without truly understanding their content or meaning. They tend to be afraid to answer if their answers differ from the examples given by the teacher, because they are accustomed to only imitating one method of solution.

The impact of this pattern is that students are less trained in honing their critical thinking and problem-solving skills. In addition, the instructional resources used are national in scale, making the material less contextual to students' daily lives. They are asked to imagine something they have never seen or experienced, so that learning feels far from real experience. Furthermore, the teaching materials do not cover local culture, which is actually closer to students' daily lives. If mathematics materials were linked to local cultural activities, students' understanding would be easier to develop.

On the other hand, another equally important challenge is the erosion of local culture amid the tide of globalization. At present, it cannot be denied that this has an impact on the erosion of the nation's noble culture. Currently, many students are unfamiliar with culture, and many do not even know about regional songs, dances, houses, and tribes in Indonesia. They are more familiar with and prefer foreign cultures that they see on the internet. This preference will indirectly lead to the disappearance of local culture in Indonesia. If left unchecked, within the next ten to twenty years, Indonesian culture will be completely lost, and as a result, our children and grandchildren will never be able to experience Indonesian culture.

Understanding local culture is very important because it helps strengthen national identity, preserve cultural heritage, and build a harmonious society. Therefore, it is important to introduce local culture from an early age in today's digital age. This is in line with another research, which states that national identity is a major issue in education and culture in the

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[5] Chusnul Khotimah Galatea et al., "The Effectiveness of Class Management by Using Postersto Increase Literacy and Numeracy Skills," *International Social Sciences and Humanities* 1, no. 1 (2022): 32–35, https://doi.org/10.32528/issh.v1i1.33.

[6] Melisari Melisari et al., "Analisis Kesalahan Siswa Dalam Menyelesaikan Soal Pemahaman Konsep Matematika Sekolah Dasar Pada Materi Bangun Datar," *Jurnal Cendekia : Jurnal Pendidikan Matematika* 4, no. 1 (2020): 172–82, https://doi.org/10.31004/cendekia.v4i1.182.

current era[7]. The rapid pace of globalization can erode local culture. To ensure that local culture remains relevant, efforts must be made to preserve it.

To address these challenges, integrating local culture into mathematics learning can be a solution. According to another research, local culture is defined as knowledge about the richness of a region, including norms, beliefs, culture, customs, insights, and other knowledge that is passed down and preserved as an identity and guideline that teaches appropriate behavior in life[8]. Local culture can indeed be integrated into mathematics education to facilitate the learning process. This aligns with D'Ambrosio's research, which found that mathematical concepts are easier to understand when linked to local cultural practices, thereby enhancing the relevance of learning [9]. Additionally, Rosa & Orey stated that integrating local culture makes mathematics learning more meaningful and helps students understand abstract concepts[10].

In addition, this is in line with the direction of the independent curriculum policy, which emphasizes the importance of contextual learning and strengthening the Pancasila Student Profile. In the Independent Curriculum, teachers are encouraged to relate teaching materials to the real lives of students and their surrounding environment so that learning is more meaningful. Furthermore, the strengthening of the dimensions of global diversity and roots in local culture within the Pancasila Student Profile indicates that education is not solely focused on academic achievements but also on the formation of national identity and character. Therefore, the integration of local culture into mathematics education aligns with the spirit of the Merdeka Curriculum, which is relevant to students' needs in the era of globalization.

Thus, culture-based mathematics learning not only serves to improve students' conceptual understanding but also as a means of preserving local wisdom. By integrating cultural elements into the curriculum, students will become more familiar with their cultural values and traditional practices, thereby ensuring that cultural heritage remains intact amidst the era of

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[7] Rini Yudiati et al., "Pentingnya Memperkenalkan Budaya Lokal Sejak Dini Di Era Digital," *Rampa' Naong Jurnal Pengabdian Kepada Masyarakat* 2, no. 1 (2024): 23–27, https://doi.org/10.24929/rn.v2i1.3289.

[8] Ahmad Tohri et al., "The Urgency of Sasak Local Wisdom-Based Character Education for Elementary School in East Lombok, Indonesia," *International Journal of Evaluation and Research in Education (IJERE)* 11, no. 1 (2022): 333–44, https://doi.org/10.11591/ijere.v11i1.21869.

[9] Ubiratan D'Ambrosio, "Ethnomathematics and Its Place in the History and Pedagogy of Mathematics," *For the Learning of Mathematics* 5, no. 1 (1985): 44–48.

[10] Milton Rosa and Daniel Clark Orey, "Ethnomathematics: The Cultural Aspects of Mathematics," *Revista Latinoamericana de Etnomatemática Perspectivas Socioculturales de la Educación Matemática* 4, no. 2 (2011): 32–54, https://www.revista.etnomatematica.org/index.php/RevLatEm/article/view/32.

modernization[11]. Therefore, this research is important to highlight the issues of low mathematical concept understanding and limited awareness of local culture, while also addressing appropriate solutions to address these challenges. This study differs from previous studies in that it is a case study discussing conceptual understanding and understanding of local culture in South Kalimantan. This study can help future researchers address issues of conceptual understanding and local culture.

Method

This study uses a mixed-method approach with a quantitative design reinforced by qualitative data. The quantitative approach is used to obtain an overview of students' level of understanding of mathematical concepts and local culture through tests and questionnaires, while the qualitative approach is used to deepen the results through interviews, observations, and documentation. The research location was at UPTD SDN Atu-Atu, Pelaihari Subdistrict, Tanah Laut Regency. The reasons for selecting this research location included the identification of issues such as low student understanding of concepts, insufficient reinforcement of local culture, the school still using national-level textbooks without local cultural context, and the school's willingness to collaborate in conducting the research.

The data collection techniques used in this study were mathematical concept comprehension tests, local cultural comprehension tests, classroom observations, interviews with students and teachers, and documentation. The number of subjects in this study was 24 fifth-grade students and 1 mathematics teacher. This sample selection used purposive random sampling, a non-probability sampling technique in which researchers deliberately select subjects based on specific criteria or characteristics that are relevant to the research objectives. In this study, samples were selected based on students' knowledge of local culture and mathematical abilities, which were obtained from discussions with teachers. This sample selection used purposive random sampling, a non-probability sampling technique in which researchers deliberately select subjects based on specific criteria or characteristics that are relevant to the research objectives. In this study, the sample was selected based on students' knowledge of local culture and their mathematical abilities, which were obtained from discussions with teachers. The research instruments used included a concept understanding test developed based on indicators from the Ministry of Education and Culture (2006) and the National Council of Teachers of Mathematics (NCTM, 2014), a local cultural

[11] Yeni Suryani and Siminto, "Student And Teacher Perceptions Of Extensive Reading Practice," *Gudang Jurnal Multidisiplin Ilmu* (Padang) 1, no. 2 (2023): 9–15, https://doi.org/10.59435/gjmi.v1i2.8.

understanding test developed based on local cultural understanding indicators [12][13], and interview guidelines were developed for teachers and students regarding learning difficulties and their views on local culture.

Data analysis techniques were carried out using quantitative analysis, qualitative analysis, and data triangulation. Quantitative analysis involved analyzing test results using descriptive statistics (percentages) to categorize students' understanding of mathematical concepts and local culture into high, medium, and low categories. Categorization is done by referring to Arikunto's criteria [14]. Qualitative analysis involves analyzing data from observations, interviews, and documentation using Miles & Huberman's interactive model, which includes data reduction, data presentation, and conclusion drawing/verification. Data triangulation was conducted by comparing and integrating quantitative and qualitative to obtain a more complete picture of students' understanding of mathematical concepts and local culture [15].

The following indicators of understanding of mathematical concepts of flat building material and indicators of understanding of local culture can be seen in the following table.

Table. 1 Indicators of Understanding the Concept of Flat Buildings

Indicator
Students can restate the concept of flat shapes that they have learned.
Students can classify various objects based on whether or not the requirements that make up the concept of flat shapes are met.
Students can identify various properties of operations or concepts of flat shapes
Students can apply the concept of flat shapes logically.
Students can give examples or not of the concepts of flat shapes that have been learned.
Students can present the concept of flat shapes into various forms of mathematical representations such as graphs, sketches, tables, pictures, diagrams, mathematical models, or others.
Students can make connections between various concepts of flat shapes both among mathematics and outside mathematics.
Students can develop the necessary and or sufficient requirements of a flat shape concept.

Source: Depdiknas (2006) [16]

[12] Tohri et al., "The Urgency of Sasak Local Wisdom-Based Character Education for Elementary School in East Lombok, Indonesia."

[13] Rosa and Orey, "Ethnomathematics."

[14] Suharsimi Arikunto, *Research Method* (Rineka Cipta, 2010).

[15] Matthew B. Miles and A. Michael Huberman, *Qualitative Data Analysis: An Expanded Sourcebook* (SAGE, 1994).

[16] Heris Hendriana et al., "The Role of Problem-Based Learning to Improve Students' Mathematical Problem-Solving Ability and Self Confidence," *Journal on Mathematics Education* 9, no. 2 (2018): 291–300, https://doi.org/10.22342/jme.9.2.5394.291-300.

Table. 2 Mathematical Concept Understanding Assessment Section

Score	Assessment Criteria
4	The answer is very comprehensive, the concepts used are appropriate, the steps to solve the problem are logical and systematic, and the conclusion is correct and accompanied by clear reasoning.
3	The answer is quite complete, the concepts used are mostly correct, the steps to solve the problem are quite logical, but there are still a few minor errors.
2	The answer is incomplete, the concepts used are inaccurate, and the steps to solve the problem are not systematic.
1	The answers are very limited, the concepts used are inappropriate, and the steps to solve the problems are unclear.
0	No response or irrelevant response to the question.

Table. 3 Indicators of Understanding Local Culture

Indicator
Students can mention elements of local culture in the surrounding environment
Students can explain the meaning or value contained in local culture
Students can relate local culture to daily life
Students can distinguish between local culture and outside culture
Students can identify changes in local culture due to external influences
Students can show pride in local culture
Students can give examples of local culture preservation

Source: (Tohri, 2022; Rosa & Orey, 2011) [17][18]

Table. 4 Local Culture Understanding Assessment Section

Score	Assessment Criteria
4	Students demonstrate an excellent understanding of local culture. Students are able to explain elements of local culture, their meanings or values, and provide clear and accurate examples of cultural application or preservation.
3	Students demonstrate a good understanding of local culture. Students can explain elements of local culture and their meanings, but their explanations are incomplete or the examples provided are limited.
2	Students have limited understanding of local culture. Students are only able to mention or explain a small part of local cultural elements without in-depth explanation.
1	Students demonstrate very low understanding of local culture. Explanations are inaccurate, very limited, or irrelevant to the local culture in question.

In determining the category of the test results of students' understanding of flat building concepts and understanding of local culture in solving problems through categorization based on the average value and standard deviation. According to Arikunto the average value and standard deviation of the research data can determine the high, medium and low categories [19]. The criteria for achieving the ability to understand the concept of flat building and understanding of local culture, which is contained in table 3 as follows:

[17] Tohri et al., "The Urgency of Sasak Local Wisdom-Based Character Education for Elementary School in East Lombok, Indonesia."

[18] Rosa and Orey, "Ethnomathematics."

[19] Arikunto, *Research Method*.

Table 5. Student Ability Classification Criteria

Score	Category
Score $\geq \bar{X} + SB$	High
$\bar{X} - SB <$ Score $< \bar{X} + SB$	Medium
Score $\leq \bar{X} - SB$	Low

Source: Nastiti, et al (2020)[20]

To analyze the ability to understand the concept of flat buildings and understanding of local culture of students, scoring is carried out on student answers to each item from the test instrument. Data on the score of understanding the concept of flat buildings and understanding the local culture of students received by students will be analyzed using the percentage formula, as follows:

$$Grade = \frac{Student\ Score}{Ideal\ Score} \times 100\%$$

Results and Discussion

1. Test Results of Understanding the Concept of Flat Buildings

The test of students' understanding of the concept of flat shapes was carried out after the students finished learning the flat shape material. This aims to determine the extent of students' understanding of the concept of flat shapes, as well as the reason for the importance of applying the PMBBL model. The test consists of 10 multiple choice questions and 5 description questions, where each question has been adjusted to the concept understanding indicators.

Table 1 was used as the basis for developing the test instrument and analyzing the results. Each question was developed according to the concept understanding indicators. Assessment was carried out using a scoring system for multiple choice questions and a rubric for essay questions, which were then converted into percentages. The high, medium, and low categories are determined using the mean and standard deviation according to Arikunto. Of the 24 students, only 20.83% were in the high category for conceptual understanding, and only 4.17% for local cultural understanding. Based on the results of the concept understanding test, it was found that there were 5 students out of 24 students who got the high category. This category is obtained from the results of tests made based on indicators of concept understanding and has been done by students. The following is the

[20] Annisa Mulia Nastiti et al., "Analisis Kemampuan Berpikir Kritis Matematis Dan Karakter Siswa SMP Dengan Pembelajaran Daring," *Wilangan: Jurnal Inovasi Dan Riset Pendidikan Matematika* 1, no. 4 (2020): 341–52, https://doi.org/10.62870/wjirpm.v1i4.8876.

categorization of the ability to understand the concept of flat buildings of students.

Table. 6 Categorization of Concept Understanding Ability

Category of Concept Understanding Ability	Number of Students	Percentage
High	5	20,83%
Medium	7	29,17%
Low	12	50%

Source: Arikunto (2010)[21]

Categories were determined through two stages. First, all student answers were scored using an objective rubric. Second, scores were classified based on the mean and standard deviation according to Arikunto. Based on the percentage of the ability to understand the concept of flat buildings of class V A students, there are 20.83% students in the high category, 29.17% students in the medium category, and 50% students in the low category. The following is a description of each category based on student answers.

a. High Category Concept Understanding Ability

In this category, students are able to answer the description correctly, coherently, and completely including units. The following are the answers of students who have a high understanding of the concept of flat buildings.

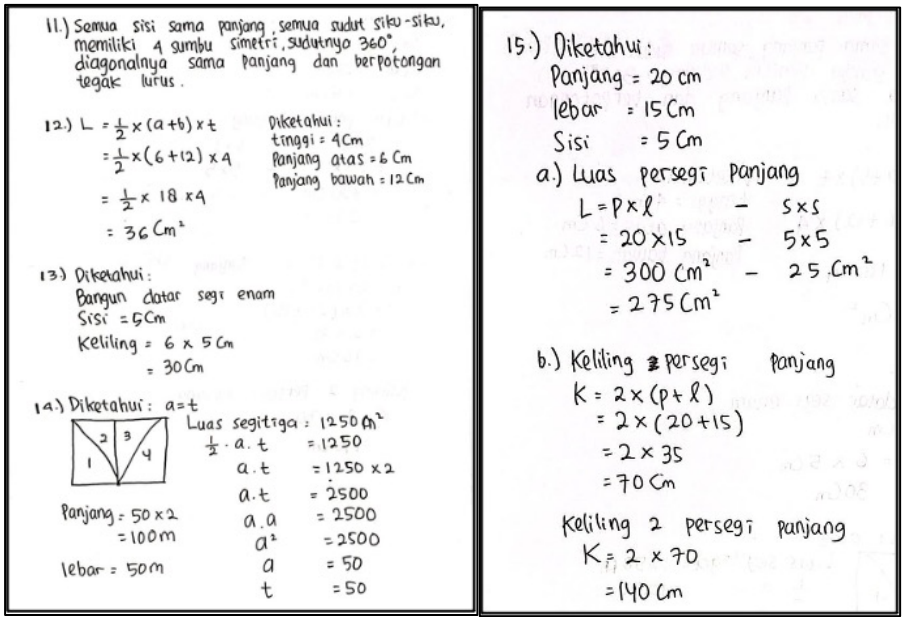

Figure 1. Answers From Students With A High Level Of Conceptual Understanding

[21] Arikunto, *Research Method*.

The indicators in Table 1 were operationalized into measurable behaviors and mapped into specific test items. Each item was aligned with one conceptual understanding indicator. Scoring rubrics were constructed according to those indicators, and analysis was conducted both overall and per indicator to identify specific weaknesses in students' conceptual understanding. Here it can be seen that students have been able to answer all description questions correctly and completely, starting from known to answered complete with the unit. This shows that students already understand the concept of flat buildings.

b. Medium Category Concept Understanding Ability

In this category, students can answer but incomplete, for example not writing known information or units, and there are still mistakes in understanding the meaning of the problem. The following are the answers of students who have a moderate understanding of the concept of flat shapes.

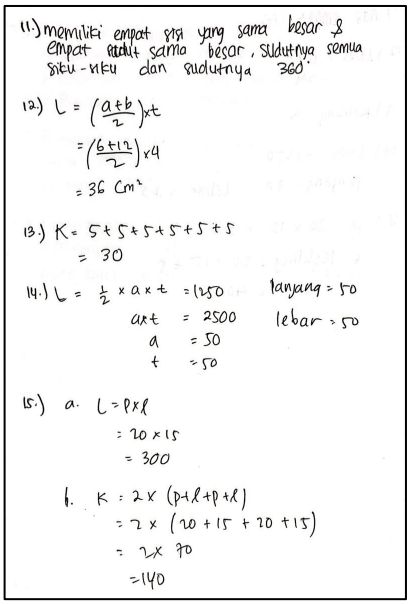

Figure 2. answers from students with a medium level of conceptual understanding

Here it can be seen that students have been able to answer all the description questions, but have not written completely what is known in the problem and the unit, besides that there are still errors in understanding the meaning of the problem. This can be seen in questions number 14 and 15 students are still wrong in working on the problem.

c. Low Category Concept Understanding Ability

In this category, students have not been able to master the concept correctly, it can be seen from the errors in the characteristics of flat shapes, the area/circle formula, and are less able to explain how to get the answer. The following are the answers of students who have a low understanding of the concept of flat shapes.

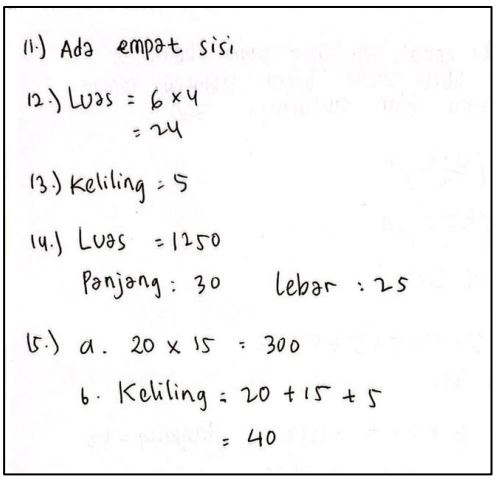

Figure 3. Answers From Students With A Low Level Of Conceptual Understanding

Here it can be seen that students have been able to answer all the description questions, but there are still many shortcomings such as, in question number 11 students only mention one of the many characteristics of a square, in question number 12 students incorrectly answer the area of a trapezoid, in question number 13 students are wrong in writing the perimeter of a hexagon flat shape, in question number 14 students' answers are wrong and do not write how to get the answer, and in question number 15 students are mistaken in understanding the problem, area formula, and perimeter formula. Based on these students' answers, it is clear that students do not understand the concept of flat shapes. This is supported by the student's opinion who said that "Math lessons are difficult, I am confused about distinguishing between jajargenjang and rhombus because they are all similar."

Based on the indicators of concept understanding, it is found that of the 8 indicators, students' understanding of the concept of flat shapes is still quite low. The percentage is obtained from the number of students who have an understanding of the concept in each indicator. The percentage of students' understanding of the concept of flat shapes based on each indicator can be seen from the following table.

Table 7 Percentage of Understanding the Concept of Flat Buildings Based on Indicators

Indicator	Percentage
Restate the concepts they have learned	37,5%
Classify various objects based on whether or not the requirements that make up the concept are met	25%
Identifying various properties of operations or concepts	41,7%
Apply concepts logically	29,17%
Giving examples or not of concepts that have been learned	25%
Presenting concepts into various forms of mathematical representations such as graphs, sketches, tables, drawings, diagrams, mathematical models, or others	45,83%
Making connections between various concepts both within mathematics and outside of mathematics	20,83%
Develop necessary and sufficient conditions for a concept	37,5%

Source: Data Processe

Based on the analysis per indicator, it shows that students' achievements are still low, especially in connecting various concepts (20.83%) and giving examples or non-examples of concepts (25%). The indicator with the highest achievement is presenting concepts in the form of mathematical representations (45.83%).

2. Test Results of Understanding Local Culture

The students' local culture understanding test was carried out with the aim of knowing the extent of students' understanding of local culture, as well as the reason for the importance of implementing the PMBBL model. The test consists of 10 multiple choice questions and 5 description questions, where each question has been adjusted to the indicators of understanding local culture.

Based on the results of the local culture understanding test, it was found that only 1 student out of 24 students was able to answer all questions correctly or had a high category. This category is obtained from the results of tests made based on indicators of understanding local culture and has been done by students. The following is the categorization of students' local cultural understanding ability.

Table. 8 Categorization of Ability to Understand Local Culture

Local Culture Understanding Ability Category	Number of Students	Percentage
High	1	4,17%
Medium	10	41,67%
Low	13	54,17%

Source: Data Processed

Based on the percentage of the ability to understand local culture of class V A students, there are 4.17% students in the high category, 41.67% students in the medium category, and 54.17% students in the low category. The following is a description of each category based on student description answers.

a. Ability to Understand Local Culture in the High Category

In this category, students were able to answer all questions correctly and completely. The following are the answers of students who have a high understanding of local culture.

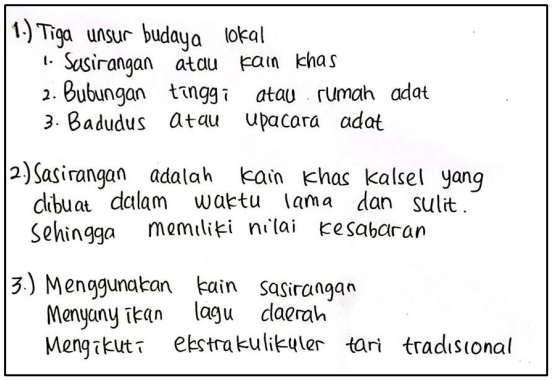

Figure 4. Answers From Students With A High Understanding Of Local Culture

Here it can be seen that students have been able to answer all the description questions correctly and precisely. This shows that students already have a good understanding of cultural concepts.

b. Ability to Understand Local Culture in the Medium Category

In this category, students answer some questions correctly but incompletely. The following are the answers of students who have a moderate understanding of local culture.

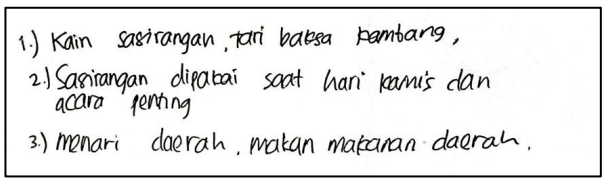

Figure 5. Answers From Students With A Medium Understanding Of Local Culture

Here it can be seen that students can answer the description questions, although the answers are not complete. This shows that students already have an understanding of local culture, although not much.

c. Ability to Understand Local Culture in the Low Category

In this category, students answered soberly and did not show adequate understanding, and even felt unfamiliar with local culture questions. The following are the answers of students who have a low understanding of local culture.

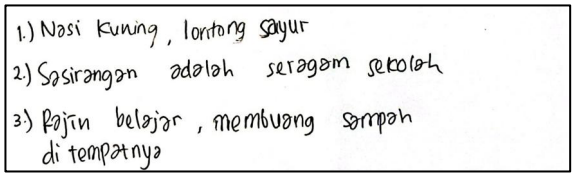

Figure 6. Answers From Students With A Low Understanding Of Local Culture

Here, it can be seen that students answer the description questions in a rough way. The student has not written the right answer that can show that he has a good understanding of local culture. After an interview with the student, he stated that he was rarely and still unfamiliar with the questions given.

Based on the indicators of understanding local culture, it was found that of the 7 indicators, students' understanding of local culture was still quite low. The percentage of students' understanding of local culture based on each indicator can be seen from the following table.

Table. 9 Percentage of Understanding of Local Culture Based on Indicators

Indicator	Percentage
Mentioning the elements of local culture that exist in the surrounding environment	33,3%
Explaining the meaning or value contained in local culture	12,5%
Relating local culture to daily life	20,83%
Distinguishing between local culture and foreign culture	25%
Identifying changes in local culture due to external influences	29,17%
Showing pride in local culture	41,67%
Provide examples of local culture preservation	37,5%

Source: Data Processed

Based on the analysis per indicator, the lowest understanding of students is explaining the meaning/value of culture (12.5%) and linking local culture to daily life (20.83%). While the highest indicator is showing pride in local culture (41.67%).

Based on the results of preliminary observations at UPTD SDN Atu-Atu, Tanah Laut Regency, South Kalimantan, a problem was found in understanding mathematical concepts of flat building material and understanding local culture. Teachers still apply learning strategies using the lecture method which ends with emphasizing and deepening the material through assignments and practice problems. This unattractiveness in learning is one of the causes of

students feeling bored in learning math. In addition, teachers tend to emphasize the achievement of material according to the textbook without exploring students' conceptual understanding. Students are accustomed to imitating procedures without understanding the meaning of the concept, and show fear of answering differently from the teacher's example. The data also shows that only 20.83% of students have an understanding of the concept of flat shapes in the good category.

This is in line with the research of Fajrin which states that students will get higher scores if in learning mathematics do not use the lecture method, this is because the lecture method is only centered on the teacher [22]. Meanwhile, to get maximum results, mutual interaction between students and teachers is needed. In addition, another study by Azaria stated that the application of contextual learning proved effective in improving students' understanding of mathematical concepts and could create an active and enjoyable learning environment [23].

In addition to the low understanding of mathematical concepts, it was also found that students' knowledge of local culture in their environment was weak. Out of 24 students, only one recognized the Banjar traditional house (Bubungan Tinggi) shown by the teacher. The lack of integration of local culture in the learning process has an impact on the fading of love for one's own culture. In fact, local culture is a rich source of learning of educational and contextual values. Research emphasize that globalization and the dominance of digital media have also shifted students' interest from local culture to foreign culture, which has the potential to erode national identity [24][25].

In addition, this is also in line with Wulandari's research which shows the lack of interest of elementary school students in Indonesian culture [26]. This has an impact on the decline of their enthusiasm in learning culture. This problem arises because of the excessive use of gadgets or technology and focuses only on online games. Time that should be utilized to find out and explore their own culture is instead spent playing games.

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[22] Bilqis Farikha Rizki Al Fajrin et al., "Analisis Kemampuan Pemahaman Konsep Matematika Siswa Ditinjau Dari Penggunaan Metode Ceramah," *Himpunan: Jurnal Ilmiah Mahasiswa Pendidikan Matematika* (Jakarta) 3, no. 1 (2023): 103–8, https://jim.unindra.ac.id/index.php/himpunan/article/view/8589.

[23] Tio Tanra Azaria et al., "Penerapan Pendekatan Pembelajaran Kontekstual Untuk Meningkatkan Pemahaman Konsep Matematika Pada Materi Pecahan Di Kelas VI Sekolah Dasar," *Jurnal Basicedu* 9, no. 1 (2025): 1–11, https://doi.org/10.31004/basicedu.v9i1.9484.

[24] Nastiti et al., "Analisis Kemampuan Berpikir Kritis Matematis Dan Karakter Siswa SMP Dengan Pembelajaran Daring."

[25] Yudiati et al., "Pentingnya Memperkenalkan Budaya Lokal Sejak Dini Di Era Digital."

[26] Innayah Wulandari et al., "Integrasi Nilai Kearifan Lokal Dalam Pendidikan Karakter Siswa Di Era Globalisasi," *Pendekar: Jurnal Pendidikan Berkarakter* (Mataram) 7, no. 4 (2024): 370–76, https://doi.org/10.31764/pendekar.v7i4.27026.

These two findings show that the low understanding of mathematical concepts and the lack of local cultural knowledge are interrelated. Mathematics materials that are not linked to the context of real life or local culture make learning less meaningful for students. In fact, research by D'Ambrosio (1985)[27] and Rosa & Orey (2011) confirmed that the integration of local culture in mathematics learning can improve student understanding because it is more contextual and relevant[28].

Conclusion

The low understanding of students' mathematical concepts related to flat building material is one of the serious problems that must be overcome, considering that understanding concepts is a major and important foundation in learning further material. In this study, it can be seen that students' concept understanding is still relatively low, as evidenced by 79.167% or 19 students having problems understanding the concept of flat shapes. In addition, the need for knowledge related to existing local culture is also one of the serious concerns. In this study, it can be seen that students' understanding of local culture is low, as evidenced by as many as 95.83% or as many as 23 students do not recognize the local culture in their area. Therefore, it is important to be able to apply a mathematics learning that can not only improve students' concept understanding, but also can increase students' understanding of local culture. The suggestion in this research is that there is a need for a local culture-based mathematics learning model to improve elementary school students' concept understanding

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