**Jurnal Ilmu Manajemen dan Pendidikan**
e-ISSN: 2776-3587
Vol. 4 No. 2 (2024): 147—154
https://jurnal.fkip.unmul.ac.id/index.php/impian/article/view/4329

# The Role of Local Culture in North Sumatra in Improving Mathematical Ability in the Learning of Space Shapes for 5th Grade Elementary School Students

## *Peran Budaya Lokal Sumatera Utara dalam Meningkatkan Kemampuan Matematika pada Pembelajaran Bangun Ruang Siswa Kelas V Sekolah Dasar*

**Yusron Abda'u Ansya[1], Tania Salsabilla[2], & Elvi Mailani[3]**
[1]Universitas Negeri Medan, Medan, Indonesia
[2]Universitas Negeri Medan, Medan, Indonesia
[3]Universitas Negeri Medan, Medan, Indonesia
[1]Email: yusronabda@mhs.unimed.ac.id, [2]Email: taniatsalsa.1213111029@mhs.unimed.ac.id,
[3]Email: elvimailani@unimed.ac.id

***Abstract:*** *This research aims investigates the role of North Sumatra's local culture in enhancing fifth-grade students' mathematics skills, focusing on spatial geometry. The research addresses the issue of students' low comprehension of spatial concepts in mathematics, highlighting the need for innovative approaches connected to everyday life. Using a qualitative case study method, the research involved fifth-grade students and teachers at SD Muhammadiyah 29 Sunggal and was conducted from July to September 2024.Findings reveal that incorporating local cultural elements into mathematics learning significantly improves students' understanding and interest. By integrating examples like Batak traditional houses and Maimun Palace, students better grasp abstract geometric concepts by connecting them to familiar objects. This approach transforms abstract ideas into concrete and relatable learning experiences, facilitating comprehension. Observations and interviews indicate that students responded enthusiastically, actively participating in lessons and showing greater motivation to engage with mathematics. This method not only strengthens their spatial understanding but also enriches their educational experience by embedding valuable cultural knowledge. Thus, integrating local cultural contexts into mathematics education proves to be an effective strategy for improving learning outcomes while fostering appreciation for cultural heritage.*

***Keywords:*** *local culture, North Sumatra, mathematical ability, spatial geometry, elementary school*

**Abstrak:** Penelitian ini bertujuan menyelidiki peran budaya lokal Sumatera Utara dalam meningkatkan keterampilan matematika siswa kelas lima, dengan fokus pada geometri spasial. Penelitian ini membahas masalah rendahnya pemahaman siswa tentang konsep spasial dalam matematika, menyoroti perlunya pendekatan inovatif yang terhubung dengan kehidupan sehari-hari. Menggunakan metode studi kasus kualitatif, penelitian ini melibatkan siswa dan guru kelas lima di SD Muhammadiyah 29 Sunggal dan dilakukan dari Juli hingga September 2024.Temuan menunjukkan bahwa menggabungkan elemen budaya lokal ke dalam pembelajaran matematika secara signifikan meningkatkan pemahaman dan minat siswa. Dengan mengintegrasikan contoh-contoh seperti rumah tradisional Batak dan Istana Maimun, siswa lebih memahami konsep geometri abstrak dengan menghubungkannya ke objek-objek yang mereka kenal. Pendekatan ini mengubah ide-ide abstrak menjadi pengalaman belajar yang konkret dan dapat dipahami, memfasilitasi pemahaman. Observasi dan wawancara menunjukkan bahwa siswa merespons dengan antusias, berpartisipasi aktif dalam pelajaran, dan menunjukkan motivasi yang lebih besar untuk terlibat dengan matematika. Metode ini tidak hanya memperkuat pemahaman spasial mereka tetapi juga memperkaya pengalaman pendidikan mereka dengan menyisipkan pengetahuan budaya yang berharga. Dengan demikian, mengintegrasikan konteks budaya lokal ke dalam pendidikan matematika terbukti menjadi strategi yang efektif untuk meningkatkan hasil belajar sekaligus menumbuhkan apresiasi terhadap warisan budaya.

**Kata kunci:** budaya lokal, Sumatera Utara, kemampuan matematika, bangun ruang, sekolah dasar

***Article history***

*Received:*
*19 November 2024*

*Accepted:*
*20 December 2024*

*Published:*
*22 December 2024*



***How to cite this article:***
Ansya, Y. A., Salsabilla, T., & Mailani, E. (2024). The Role of Local Culture in North Sumatra in Improving Mathematical Ability in the Learning of Space Shapes for 5th Grade Elementary School Students. *Jurnal Ilmu Manajemen dan Pendidikan*, *4*(2), 147—154. https://doi.org/10.30872/jimpian.v4i2.4329

* *Corresponding author: Yusron Abda'u Ansya, Email: yusronabda@mhs.unimed.ac.id*

## INTRODUCTION

Education is a learning process aimed at developing individuals' knowledge, skills, attitudes, and values so that they can function well in society. This process lasts a lifetime, starting from the family environment, school, to the wider community. Formal education, which is conducted in institutions such as schools and universities, plays an important role in shaping a person's intellectual, moral, and social abilities. Moreover, education also plays a strategic role in the development of a country, because through education, quality human resources can be produced to advance various sectors of life (Jahari et al., 2019; Sipuan et al., 2022).

In Indonesia, formal education is regulated through the national education system, which includes primary, secondary, and higher education. Primary education serves as the main foundation of the entire national education system, as it is at this level that students begin the structured formal learning process. Based on Law No. 20 of 2003 on the National Education System, basic education consists of six years in Elementary School and three years in Junior High School. At the elementary education level, students are equipped with basic knowledge such as reading, writing, arithmetic, and an introduction to various other fields of study. Basic education also serves as the initial stage of character formation and the development of critical thinking skills, which will support students in continuing their education to higher levels and actively participating in society. (Yunanto & Kasanova, 2023).

In primary education, mathematics learning plays an important role in building students' logical and analytical thinking abilities. However, mathematics teaching often faces challenges, especially in conveying abstract concepts that are difficult for students to understand. Mathematics learning, particularly on the topic of spatial shapes, is often considered an abstract subject for elementary school students. Students often have difficulty understanding geometric concepts such as shape, volume, and dimension due to the lack of connection between the material taught and real-life contexts (Ansya et al., 2024). This presents a unique challenge for teachers in delivering the material in an engaging and relevant manner. In North Sumatra, with its rich cultural diversity and local heritage, there is great potential to integrate culture into learning as an effort to bridge the gap between mathematical concepts and students' daily lives.

The local culture of North Sumatra, which includes various ethnic groups such as Batak, Malay, Karo, and others, has a rich architectural and craft heritage filled with geometric elements. For example, the traditional Batak house has a spatial structure that can be connected to geometric concepts in mathematics. However, this potential is often not optimally utilized in classroom learning. Students learn separately between science and their culture, whereas the integration of both can become an effective learning tool (Ansya, Alfianita, & Syahkira, 2024).

The problem currently faced is the low ability of students to understand spatial shapes in mathematics. One of the contributing factors is the teaching method, which tends to focus on theory without involving contextual experiences that are close to students' lives. Additionally, the lack of innovation in learning makes students less motivated and difficult to grasp the abstract concepts taught in class. As a result, the mathematics learning outcomes on this topic have not shown significant improvement.

To address this issue, integrating local culture into mathematics education can be an effective solution. Local culture can be used as a learning context that brings mathematical concepts closer to the realities familiar to students. For example, using traditional building structures or handicraft patterns to explain the concept of spatial shapes. Thus, students can understand the concept more concretely while also preserving and maintaining the local cultural heritage. (Ansya, Alfianita, & Syahkira, 2024).

This approach not only enhances students' understanding of spatial concepts but also fosters a sense of love and pride in their local culture. Additionally, the integration of local culture into learning also has the potential to increase student motivation as they learn through familiar and relevant aspects of their lives. This is expected to have a positive impact on elementary school students' mathematics learning outcomes, particularly in the topic of spatial shapes. Research conducted by Mahpudin and Yuliati, (2019); Nelawati et al., (2018); Putra and Indriani, (2017) that mathematics learning based on local culture is able to improve mathematical skills in spatial geometry material.

Thus, this research will explore the role of local culture in North Sumatra in enhancing the mathematics skills of fifth-grade students in spatial learning. It is hoped that the proposed solution can serve as a guide for educators to develop more effective and meaningful learning methods for students.

## METHOD

This research will use qualitative research methods with a case study approach. This method was chosen because it is suitable for deeply exploring how the role of local culture in North Sumatra can enhance students' mathematical abilities in spatial learning. Qualitative research allows researchers to understand phenomena comprehensively, through direct interaction with participants, and to uncover meanings related to students' learning experiences (Moleong, 2018). The case study approach was used to focus on 31 fifth-grade students at Muhammadiyah 29 Sunggal Elementary School for the 2024/2025 academic year, thereby providing a more detailed and contextual picture of the integration of local culture in mathematics learning. This research was conducted from July to September 2024.

Data collection will be carried out through several techniques, namely observation, interviews, and documentation (Sugiyono, 2013). Observations were conducted during the learning process to see how students understand and apply the concept of spatial shapes when mathematics material is delivered using a local cultural approach, for example, by using examples of traditional buildings or crafts related to the local culture of North Sumatra. Interviews will be conducted with the teachers and fifth-grade students of SD Muhammadiyah 29 Sunggal to gain further understanding of their experiences in this learning process, as well as to identify the benefits of the applied approach.

The data obtained will be analyzed thematically to identify patterns of students' understanding of spatial concepts after the integration of local culture in mathematics learning. This thematic analysis will involve the process of coding and grouping data based on the main themes that emerge from interviews, observations, and documentation. From the results of this analysis, the researcher will examine whether the integration of local culture successfully enhances students' ability to understand spatial structures.

## FINDINGS AND DISCUSSION

### 1. Results

The initial observations before the implementation of local culture-based learning show that most students have difficulty understanding the concepts of spatial figures, such as shape, volume, and dimension. When given questions related to spatial figures, such as calculating volume or recognizing geometric shapes, many students are unable to answer correctly. This indicates that concepts that should be understood concretely still feel abstract to the students, thereby hindering their understanding of the material.

**Figure 1. Observation of Learning Implementation**
**(Source: Personal Documentation, 2024)**

An interview with the teacher revealed that students' lack of understanding of spatial geometry in mathematics learning is due to their limited ability to grasp the concept. The teacher stated that the concept of spatial shapes is often considered abstract by students, making it difficult to understand well. The lack of visualization skills regarding the shapes and dimensions of three-dimensional figures, as well as the minimal use of relevant contextual learning media, further worsens students' understanding. This causes students to have difficulty applying spatial concepts, such as calculating volume or correctly and accurately recognizing geometric shapes.

After identifying the difficulties students had in understanding spatial shapes, the teacher began to implement a local culture-based approach in mathematics education. At the implementation stage, learning about spatial shapes is connected with cultural elements present in the students' surroundings. For example, students are invited to study the structure of the Batak traditional house, which has many geometric elements. In this activity, students observe the shape of the traditional house and identify geometric elements, such as triangles on the roof, beams on the walls, and cubes on the foundation. In this way, the previously abstract concepts of spatial structures become more concrete and easier to understand because students can see and relate them to real objects.

**Figure 2. Rumah Adat Bolon Suku Batak**
**(Source: Disbudparekraf Sumut, 2024)**

Next, from the Melayu Tribe, Maimun Palace, which is one of the historical relics of the Melayu Tribe in Medan, can serve as an effective medium for teaching spatial structures to elementary school students. This palace has an architectural structure rich in geometric elements, such as cubes in the main building, prisms on the roof, and curved shapes on the windows and doors. By utilizing this building in education, students can visualize geometric shapes in a tangible and contextual manner. Observation of the Maimun Palace can help students understand spatial concepts such as volume, surface area, and dimensions, while introducing them to local cultural heritage. This approach can make learning more meaningful, relevant, and increase students' interest in mathematics.

**Figure 3. Istana Maimun Suku Melayu**
**(Source: Portal Informasi Indonesia, 2019)**

In addition to traditional houses, teachers also use local crafts such as ulos as a teaching medium. Ulos, with its geometric patterns, is used to explain various shapes and patterns related to the concept of geometry. The teacher facilitates active discussions with students, encouraging them to analyze the geometric elements they encounter in their cultural environment. Next, problems about three-dimensional shapes are given using

local cultural contexts, such as calculating the volume or surface area of three-dimensional shapes found in traditional house structures or ulos patterns. This approach not only enhances students' understanding but also makes them more interested and motivated in learning mathematics.

**Figure 4. Kain Ulos Khas Suku Batak**
**(Source: Putri, 2018)**

At the final stage, the results of interviews and observations showed that students responded very positively to the implementation of a local culture-based approach in mathematics learning. Students appeared more enthusiastic and engaged during the learning process, especially because the material presented felt more relevant and closer to their daily lives. By using examples that are familiar to the students, such as traditional houses and local crafts, the students feel more comfortable and motivated to understand spatial concepts.

Additionally, many students expressed that learning spatial concepts through the shapes of traditional houses helps them visualize and understand geometric concepts more easily. Some students even mentioned that this method made them more interested and enthusiastic about studying mathematics, which was previously considered a difficult and abstract subject. This contextual approach provides students with a deeper learning experience because they can directly see the application of concepts in real life.

## 2. Discussion

The initial observations before the implementation of local culture-based learning show that many students have difficulty understanding the concept of spatial shapes, including form, volume, and dimension. When students are given questions related to spatial shapes, such as calculating volume or recognizing geometric shapes, many of them are unable to answer correctly. These difficulties indicate that the concepts of spatial shapes, which should be understood concretely, still feel abstract to the students, hindering their understanding of the material. This is reinforced by interviews with teachers who state that students often have limitations in their ability to visualize the shapes and dimensions of three-dimensional objects, which is exacerbated by the lack of relevant contextual learning media.

After identifying these difficulties, the teacher decided to implement a locally-based cultural approach in mathematics learning. In the implementation stage, learning about spatial structures is connected with cultural elements present around the students. For example, students are invited to study the structure of traditional Batak houses that have various geometric elements. This activity allows students to observe and identify geometric elements, such as triangles on the roof, beams on the walls, and cubes on the foundation. In this way, the concepts of spatial shapes that were previously abstract become more concrete and easier to understand, because students can see and relate them to real objects in their environment. That statement is supported by Ansya et al. (2021) and Wirda (2024) that using spatial media based on culture can be easily understood and concrete with the students' real-life experiences.

Besides the traditional Batak house, Istana Maimun, which is a historical relic of the Malay tribe in Medan, is also used as an effective learning medium. With an architectural structure rich in geometric elements, such as cubes in the main building and prisms on the roof, Istana Maimun helps students visualize geometric shapes in a tangible way. Observing this building not only deepens students' understanding of the concepts of volume, surface area, and dimensions, but also introduces them to local cultural heritage. This approach makes learning more meaningful and relevant and has the potential to increase students' interest in mathematics.

This approach is also supported by research Ansya (2023), Ansya et al. (2024), and Selpiana (2024) that direct observation of buildings can enhance students' understanding of spatial concepts.

At the final stage, the results of interviews and observations showed that students responded very positively to the implementation of a local culture-based approach in mathematics learning. They appeared more enthusiastic and engaged, especially because the material presented felt closer to their daily lives. Many students expressed that learning three-dimensional shapes through traditional house forms helped them visualize and understand geometric concepts more easily. Moreover, this contextual approach provides a deeper learning experience, making students feel more comfortable and motivated to study mathematics, which they previously considered difficult and abstract (Fatwa et al., 2024).

Overall, the local culture-based learning approach has proven successful in increasing students' interest in learning mathematics, particularly in understanding spatial shapes. This approach not only makes the material easier to understand but also creates a more engaging and enjoyable learning atmosphere. Thus, this method has the potential to be continuously used and developed to improve students' learning outcomes and bring them closer to the rich local cultural heritage.

## CONCLUSION

Based on the research conducted, it can be concluded that the application of a local cultural-based approach in mathematics education, particularly in spatial geometry, is effective in enhancing students' understanding and interest. Through the use of concrete examples from local culture, such as the Batak traditional house and Maimun Palace, students can relate geometric concepts to real objects they are familiar with, thereby transforming their initially abstract understanding into something more concrete and relevant. Observation and interview results show that students responded positively, becoming more enthusiastic and engaged in learning, and feeling more motivated to study mathematics. This approach not only helps students understand the concept of spatial shapes but also enriches their learning experience by introducing local cultural values.

## REFERENCES

Ansya, Y. A. (2023). Upaya Meningkatkan Minat dan Prestasi Belajar Siswa Kelas IV Sekolah Dasar pada Pembelajaran IPA Menggunakan Strategi PjBL (Project-Based Learning). *Jurnal Ilmu Manajemen Dan Pendidikan (JIMPIAN)*, *3*(1), 43–52. https://doi.org/10.30872/jimpian.v3i1.2225

Ansya, Y. A., Alfianita, A., & Syahkira, H. P. (2024). Optimizing Mathematics Learning in Fifth Grades: the Critical Role of Evaluation In Improving Student Achievement and Character. *Progres Pendidikan*, *5*(3), 302–311. https://prospek.unram.ac.id/index.php/PROSPEK/article/view/1120

Ansya, Y. A., Alfianita, A., Syahkira, H. P., & Syahrial, S. (2024). Peran Evaluasi Pembelajaran pada Mata Pelajaran Matematika Kelas V Sekolah Dasar. *Indiktika : Jurnal Inovasi Pendidikan Matematika*, *6*(2), 173–184. https://doi.org/10.31851/indiktika.v6i2.15030

Ansya, Y. A., Ardhita, A. A., Rahma, F. M., Sari, K., & Khairunnisa, K. (2024). Analisis faktor penyebab rendahnya kemampuan literasi baca tulis siswa sekolah dasar. *JGK (Jurnal Guru Kita)*, *8*(3), 598–606. https://doi.org/10.24114/jgk.v8i3.60183

Ansya, Y. A., Ardhita, A. A., Sari, K., Nainggolan, M. G., Ayunda, R., Hasibuan, W. A., & Antika, W. (2021). Lunturnya Nilai-Nilai Pancasila sebagai Ideologi dalam Kehidupan Masyarakat Indonesia di Era Globalisasi yang Mengakibatkan Munculnya Kelompok Terorisme. *Jurnal Handayani*, *12*(2), 144–153. https://doi.org/10.24114/jh.v12i2.45265

Disbudparekraf Sumut, D. S. (2024). *Rumah Bolon, Rumah Adat Tradisional Suku Batak di Kabupaten Samosir*. https://disbudparekraf.sumutprov.go.id/2024/artikel/rumah-bolon-rumah-adat-tradisional-suku-batak-di-kabupaten-samosir/#:~:text=Rumah bolon merupakan rumah adat,sebuah rumah pertemuan kelurga besar.

Fatwa, I., Harjuna, H., & Hindi, A. N. A. (2024). *Strategi Pembelajaran Matematika*. CV Ruang Tentor.

Jahari, J., Khoiruddin, H., & Nurjanah, H. (2019). Manajemen Peserta Didik. *Jurnal Isema : Islamic Educational Management*, *3*(2), 53–63. https://doi.org/10.15575/isema.v3i2.5009

Moleong, L. J. (2018). *Metodologi Penelitian Kualitatif*. Remaja Rosdakarya.

Mahpudin, M., & Yuliati, Y. (2019). Peran budaya lokal terhadap literasi matematika siswa sekolah dasar di cirebon. *Proceedings of the ICECRS*, *2*(1), 287–292. https://icecrs.umsida.ac.id/index.php/icecrs/article/view/1400

Nelawati, N., Meriyati, M., Putra, R. W. Y., & Simatupang, A. T. (2018). Pengembangan bahan ajar bercirikan etnomatematika suku komering materi bangun datar siswa sekolah dasar. *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika*, *1*(2), 407–414. https://ejournal.radenintan.ac.id/index.php/pspm/article/view/2422

Portal Informasi Indonesia. (2019). *Istana Maimoon, Simbol Akulturasi Budaya*. https://indonesia.go.id/kategori/komoditas/706/istana-maimoon-simbol-akulturasi-budaya

Putra, R. W. Y., & Indriani, P. (2017). Implementasi Etnomatematika Berbasis Budaya Lokal dalam Pembelajaran Matematika pada Jenjang Sekolah Dasar. *Numerical: Jurnal Matematika Dan Pendidikan Matematika*, 9–14. https://journal.iaimnumetrolampung.ac.id/index.php/numerical/article/view/118

Putri, L. N. (2018). *Pameran Kain Ulos, Salah Satu Produk Peradaban Tertua di Asia*. National Geographic. https://nationalgeographic.grid.id/read/13942087/pameran-kain-ulos-salah-satu-produk-peradaban-tertua-di-asia#google_vignette

Selpiana, S. (2024). *Eksplorasi Konsep Geometri pada Rumah Adat Bugis Saoraja di Kabupaten Pinrang*. IAIN Parepare.

Sipuan, S., Warsah, I., Amin, A., & Adisel, A. (2022). Pendekatan Pendidikan Multikultural. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, *8*(2), 815–830. https://doi.org/10.37905/aksara.8.2.815-830.2022

Sugiyono, D. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Wirda, A. (2024). *Pengembangan Multimedia Interaktif Berbasis Etnomatematika Pada Bangunan Masjid Agung Al Falah Di Jambi Materi Bangun Ruang Kelas V Sekolah Dasar* [Universitas Jambi]. https://repository.unja.ac.id/64872/

Yunanto, F., & Kasanova, R. (2023). Membangun Karakter Mahasiswa Indonesia Melalui Pendidikan Karakter. *Journal on Education*, *5*(4), 12401–12411. https://doi.org/10.31004/joe.v5i4.2223