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EXPLORING ETHNOMATHEMATICS IN THE ARCHITECTURE OF THE SHEIKH ZAYED MOSQUE IN SURAKARTA AS A REPRESENTATION OF ISLAMIC CULTURE

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ABSTRACT
This study explores ethnomathematical elements in the architecture of the Sheikh Zayed Grand Mosque in Surakarta as a representation of mathematics in Islamic culture. The method used is qualitative with an ethnographic approach through observation, interviews, and documentation. The results show that the mosque's architecture contains mathematical concepts, such as geometry in the form of cubes, hemispheres, and triangular pyramids, symmetry in wall and floor ornaments, and translation in decorative motifs. These findings indicate that the mosque is not only aesthetically and religiously valuable but also contains mathematical concepts that can be a source of learning. This study concludes that the Sheikh Zayed Grand Mosque can be an interesting medium for ethnomathematics learning, connecting mathematics with Islamic culture, and enriching ethnomathematics studies in Indonesia.
Keywords: Ethnomathematics, mathematical concepts, sheikh zayed grand mosque.

ABSTRAK
Penelitian ini mengeksplorasi unsur-unsur etnomatematika dalam arsitektur Masjid Agung Sheikh Zayed, Surakarta sebagai representasi matematika dalam budaya Islam. Metode yang digunakan adalah kualitatif dengan pendekatan etnografis melalui observasi, wawancara, dan dokumentasi. Hasil penelitian menunjukkan bahwa arsitektur masjid mengandung konsep-konsep matematika, seperti geometri dalam bentuk kubus, setengah bola, dan piramida segitiga, simetri pada hiasan dinding dan lantai, serta translasi pada motif dekoratif. Temuan ini menunjukkan bahwa masjid tidak hanya memiliki nilai estetika dan keagamaan, tetapi juga mengandung konsep matematika yang dapat menjadi sumber pembelajaran. Penelitian ini menyimpulkan bahwa Masjid Sheikh Zayed Grand Mosque dapat menjadi media pembelajaran etnomatematika yang menarik, menghubungkan matematika dengan budaya Islam, dan memperkaya studi etnomatematika di Indonesia.
***Kata Kunci**: Etnomatematika; konsep matematika; masjid raya syeikh zayed.*

Introduction

Mathematics is understood as a science that examines patterns, structures, and the interconnection between concepts by involving activities such as calculation, measurement, and analysis of shapes and data. Its existence is the foundation for many fields of science, because mathematics functions as a means to solve problems systematically (Faturrahman & Soro, 2021). This role is evident in the development of knowledge, technology, art, and architecture. Specifically in Islamic architecture, mathematics is expressed through the principles of proportion,

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symmetry, and geometric ornamentation, which are not only aesthetically valuable but also rich in spiritual meaning (Aqibah & Arfinanti, 2025).

To solve mathematical problems, a logical way of thinking is needed in order to obtain accurate answers (Hidajat et al., 2021). The abstract nature of mathematics encourages educators to relate it to everyday experiences to make it easier to understand (Astutiningtyas et al., 2021).Ilmiah et al., 2024).Because it is universal, mathematics is the basis for the development of science and a means of cross-cultural communication (Not only that, philosophy also contributes to placing mathematics as an important part of education (Ismail et al., 2022).

The relationship between mathematics and culture is also quite strong. Indonesia, with its rich culture, provides ample space for the development of ethnomathematics (Ummah, 2021).Through ethnomathematics, abstract concepts are introduced through cultural media, making learning more enjoyable (Safitri et al., 2024). Ethnomathematics itself is defined as a form of mathematics rooted in a particular culture (Andriono, 2021).Its forms can be found in art, architecture, and even religious buildings.

One building that represents the integration of mathematics, art, and culture is the Sheikh Zayed Grand Mosque in Surakarta. This mosque has become a religious tourism icon that presents a blend of Middle Eastern architecture with local Javanese elements (Nafii'ah et al., 2023). This can be seen in the Kawung Batik motif carvings on the porch and minaret, and the Pekalongan batik motif on the mosque carpet (Oktavian & Hidayati, 2024).As a replica of the Sheikh Zayed Grand Mosque in Abu Dhabi, this building displays a variety of geometric ornaments typical of Islamic art, albeit on a smaller scale (Putri et al., 2024). Due to its increasing popularity, its presence strengthens the existence of modern Islamic architecture in Indonesia, which harmonizes aesthetics, culture, and religious values.

A number of previous studies have highlighted the connection between mathematics and culture, such as the symmetrical patterns in Surakarta Palace batik (Astriandini & Kristanto, 2021), the counting activities in the saron gamelan game (Cahyanti et al., 2024), and the application of geometry in the architectural design of the Sekadau Hilir Palace (Suwanto, 2024).However, research examining ethnomathematics at the Sheikh Zayed Grand Mosque is still very limited, even though this building is rich in mathematical elements.

This study aims to describe and explore the mathematical elements found in the Sheikh Zayed Grand Mosque. Furthermore, this study seeks to show how these elements can be used as material for simple mathematics learning. The integration of mathematics with Islamic culture through the architectural objects of the mosque is expected to provide more interesting, contextual, and enjoyable learning. Thus, this study not only broadens the scope of ethnomathematics in Indonesia, but also enriches the understanding of the relationship between mathematics, culture, and Islamic architecture, while enriching the limited ethnomathematics literature in Indonesia, especially on modern mosques.

Research Method

This exploratory ethnomathematics research through the architecture of the Sheikh Zayed Mosque in Surakarta as a representation of mathematics in

Islamic culture uses qualitative methods with an ethnographic approach. Qualitative research focuses on a deep understanding of the meaning, definition, characteristics, symbols, metaphors, and other aspects related to the description of a phenomenon (Firmansyah et al., 2021). The ethnographic approach describes the lives of people in various situations, while also revealing the subjects' perspectives on their lives, how they understand their daily behavior, and how they interact (Yusanto, 2020).The ethnographic approach helps researchers understand how values can be integrated into culture through observation, interviews, and symbolic analysis (Hanifah et al., 2025).In this study, the ethnographic approach was used not only to describe the architectural form of the Sheikh Zayed Grand Mosque, but also to understand the mathematical meaning contained therein as a representation of Islamic culture.

The methods used included observation, interviews, and documentation. Observation is direct observation in a natural environment that produces in-depth data but is relatively time-consuming and costly (Romdona et al., 2025). The observation was conducted participatively in mid-February 2025 at the Sheikh Zayed Grand Mosque, located at Jl. Ahmad Yani No.121, Gilingan, Banjarsari District, Surakarta City. The aim was to identify mathematical elements visible in the building and obtain practical information such as operating hours in order to meet with mosque officials. In this activity, the researcher recorded details of the ornaments and architectural elements for mathematical analysis and to relate them to Islamic cultural values.

Structured interviews were conducted with two groups of informants. Interviews are a method of data collection through direct interaction between researchers and respondents, which aims to explore individual views, experiences, and perceptions, both in qualitative and quantitative research (Ardiansyah et al., 2023). First, general informants were mosque visitors who were at least familiar with the Sheikh Zayed Grand Mosque and had direct experience observing its building. Second, expert informants consisted of local architects from the Greater Solo area and educators who had studied architecture or mathematics, so they could provide academic and professional perspectives. The questions in the interviews were formulated in simple language so that they could be easily understood by general informants who were not familiar with mathematical concepts, while more in-depth questions were used for expert informants to validate the findings. The interviews focused on exploring how they interpreted the mosque and uncovering the mathematical elements implied in its architecture and ornamentation.

In addition to observation and interviews, documentation was also carried out to strengthen the data. The documentation consists of photographs of the mosque's ornaments, exterior, and architectural details that contain mathematical elements. The collected data was analyzed descriptively to identify mathematical concepts such as geometry, patterns, symmetry, and calculations in the mosque's structure. This analysis aims not only to describe but also to interpret the connection between mathematical elements and Islamic cultural values.

With this method, the study is expected to show that the Sheikh Zayed Grand Mosque can serve as a medium for Islamic culture-based mathematics learning,

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while also contributing to an understanding of the relationship between mathematical concepts and local culture.

Results and Discussion

Based on the results of observations and interviews, respondents view the Sheikh Zayed Grand Mosque as a symbol of friendship between Indonesia and the United Arab Emirates (UAE). This mosque was a gift from the Crown Prince of the UAE, Mohammed bin Zayed Al Nahyan, to President Joko Widodo (Aisyah et al., 2024). A picture of mosque can be seen in Figure 1.

Figure 1. Top view of the Sheikh Zayed Grand Mosque, Image source: Special (2024). Sheikh Zayed Mosque Solo.

Figure 1 illustrates several mathematical concepts found in the architecture of the Sheikh Zayed Grand Mosque. An ethnomathematics exploration of this mosque reveals a rich array of mathematical patterns, shapes, and ratios. Each element of the building not only has geometric significance but also represents Islamic cultural and spiritual values.

1. *Mosque Porch*

   The exterior of some of these mosque porches is cube-shaped with a dome shaped like a half-sphere. The porch can be seen in Figure 2 below.

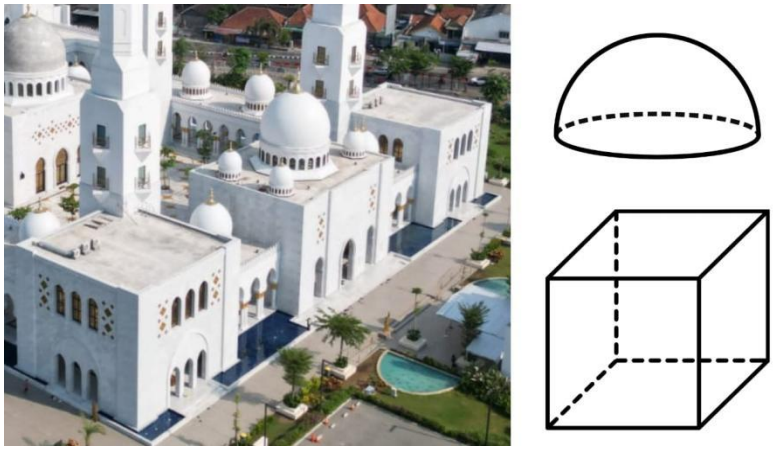

Figure 2. The porch of the Sheikh Zayed Grand Mosque

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Figure 2 shows the mosque porch, which aligns with the mathematical concept of geometry regarding three-dimensional shapes. This shape exists in mathematics.

a. The cube-shaped mosque porch has the following characteristics: a spatial structure with 6 sides, 12 edges, and 8 vertices. Each side is a square with equal edge lengths. Additionally, all angles in a cube are equal, measuring 90 degrees.
   Volume of Cube: $V = s \times s \times s$ or $V = s^3$
   Surface area of the Cube: $6\ (s \times s)$
   Usually, this porch also serves as a multifunctional space among all the buildings in a mosque (Ramadhana & Dharoko, 2018). The mosque porch can be used as a medium for students to learn how to make miniatures from cardboard or other materials, as well as an object for calculating the volume of a cube and the area of a dome.
b. The mosque dome is shaped like a hemisphere, a three-dimensional shape with a single center point and a closed curved surface. This shape has no corners or edges. Additionally, a sphere has an infinite number of radii, all of which have the same length within a single sphere.
   Volume of a hemisphere: $V = \frac{2}{3} \times \pi \times r^3$
   Surface area of a hemisphere
   Exposed Hemisphere: $2 \times \pi \times r^2$
   Solid Hemisphere: $3 \times \pi \times r^2$

Cubes symbolize stability, while domes represent the perfection of God's creation with the symbol of the sky. Domes are structures commonly used as mosque roofs that have adapted to the changing times (A. Hildayanti & Wasilah, 2023).

2. Mosque Minarets

This mosque has four towers located in the inner courtyard of the mosque. These towers are shaped like tall blocks. These towers can be interpreted as symbols of Islamic preaching that reaches the sky, representing Islam's widespread preaching. For more details, can be seen in Figure 3.

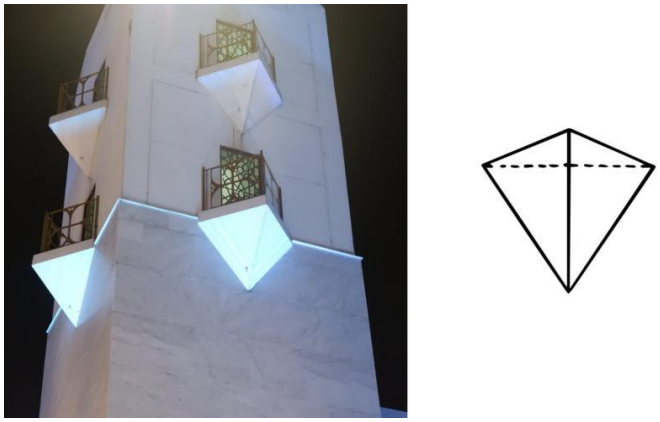

Figure 3. Minarets of the Sheikh Zayed Grand Mosque

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Figure 3 shows that these towers are decorated with triangular pyramid shapes. The use of geometric elements such as triangles and pyramids reflects the presence of ethnomathematical concepts in the architectural design of the Zayed Mosque. These shapes demonstrate mathematical ideas like symmetry, proportion, and spatial geometry, which are integrated into the mosque's artistic and cultural expression. Through these decorations, the mosque not only serves as a place of worship but also as a representation of how mathematical concepts are embodied in Islamic art and architecture.

The triangular pyramid attached to this minaret has the following characteristics: it has four sides, six edges, four vertices, a triangular base, and all sides are triangular.

Volume of a triangular pyramid: $\frac{1}{3} \times luas\ alas \times tinggi\ limas$

Surface area of the triangular pyramid: $4 \times \pi \times r^2$

In addition to containing mathematical concepts and Islamic cultural meanings, this minaret can be used in teaching to calculate the combined volume of a block and a pyramid.

3. *Mosque Walls*

The carvings on each wall of this mosque are in the shape of a rectangle. The walls of the Sheikh Zayed Grand Mosque illustrate that this mosque also incorporates elements of plane geometry. Rectangular shapes are commonly used in Islamic architecture because they represent balance, order, and harmony, values that align with the principles of Islamic art. For seen a upper wall of the Sheikh Zayed Grand Mosque, can be seen in Figure 4.

Figure 4. The upper wall of the Sheikh Zayed Grand Mosque

Figure 4 shows the wall ornaments of the Sheikh Zayed Grand Mosque in Surakarta, designed in rectangular shapes. From an ethnomathematical perspective, these carvings reflect mathematical concepts such as having four sides, four right angles, a total of 360°, and two diagonals connecting opposite corners. They also demonstrate how to calculate the area and perimeter of a rectangle. This pattern shows the integration of mathematical principles: symmetry, proportion, and measurement, into Islamic art and architecture, turning the mosque's walls into a medium that visually expresses the harmony

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between mathematics, culture, and spirituality. The elements that can be related to mathematical concepts include:

Area of a Quadrilateral: $s \times s$

Perimeter of a quadrilateral: $4 \times s$

The regularity of the square shape can be interpreted from an Islamic perspective as tawazun, which is understood as the principle of balance that is part of the teachings of wasatiyah. This value teaches the importance of living proportionally, both in worship and in social, cultural, and intellectual aspects. In the context of the architecture of the Sheikh Zayed Mosque, tawazun is reflected through the harmony between geometric shapes, artistic beauty, and spiritual meaning, so that this building is not only aesthetically valuable but also reflects the balance of Islamic teachings (Magriza et al., 2023). In addition to culture, it can be used as a medium for students to recreate the pattern in class, then identify the axis of symmetry and its area.

4. *Mosque Windows*

The mosque windows feature various flat shapes as decorations. These windows have four types of flat shapes, namely triangles, pentagons, hexagons, and kites. From all these flat shapes, we can learn by seen Figure 5.

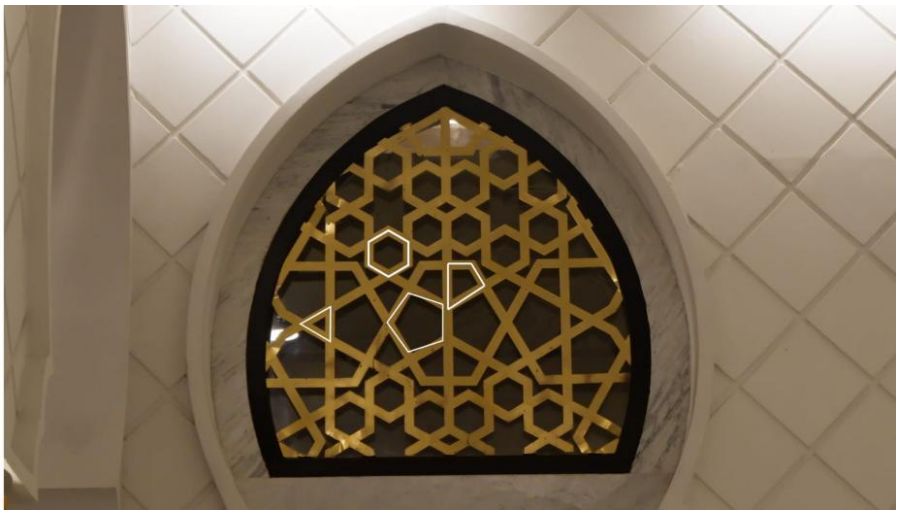

Figure 5. Upper window of the Sheikh Zayed Grand Mosque

In Figure 5, there is a triangle. A triangle has three straight sides, three vertices, and the sum of its three angles is 180°. Calculating its area and perimeter:

Area of the Triangle: $L = \frac{1}{2} \times alas \times tinggi$

Perimeter of the Triangle: $K = s + s + s$

A kite has four sides, with two pairs of adjacent sides of equal length, four vertices, two diagonals that are perpendicular to each other, and one axis of symmetry. Calculating the area and perimeter:

Area of the kite: $L = \frac{1}{2} \times diagonal\ 1 \times diagonal\ 2$

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Perimeter of the kite: $K = sisi\ a + sisi\ b + sisi\ c + sisi\ d$

Pentagon, a pentagon has the following characteristics: it has 5 sides of equal length, it has 5 angles of equal size, it has 5 axes of symmetry. Calculating its area and perimeter

Area of a pentagon: $L = \frac{1}{4} \times \sqrt{5}(5 + 2\sqrt{5}) \times s^2$

Perimeter of the pentagon: $K = 5 \times s$

Hexagon, The hexagon in the ornament of the Sheikh Zayed Grand Mosque has the following characteristics: it has 6 sides, 6 vertices, and 6 axes of symmetry. Calculating its area and perimeter

Area of a hexagon: $L = \left(\frac{3}{2}\sqrt{3}\right) \times s^2$

Perimeter of the hexagon: $K = 6 \times s$

Wall decoration of the Sheikh Zayed Grand Mosque, can be seen in the Figure 6.

Figure 6. Wall decoration of the Sheikh Zayed Grand Mosque

In the central area of this mosque, we can see rectangular shapes again, as shown in Figure 6, arranged into a large rectangular pattern , this decoration is attached to the upper walls of the mosque. All of these shapes can be used to visualize the geometry of flat shapes. Students can redraw and calculate the area of the shapes. The variety of these shapes symbolizes the diversity of the community while maintaining harmony and balance.

5. *Mosque Floor*

The floor of the Sheikh Zayed Grand Mosque is very attractive with black circles visible on it. Seen the Figure 7.

Figure 7. Decorative pattern on the floor of the Sheikh Zayed Grand Mosque

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One of the things that can be learned from the circular floor decoration pattern in Figure 7 is the characteristics of a circle, namely, it has a center point, a radius, a diameter that is twice the length of the radius, and unlimited fold symmetry and rotational symmetry. Calculating the area and circumference

Area of the circle: $L = \pi \times r \times r$

Circumference of the circle: $K = 2 \times \pi \times r$ or $K = \pi \times d$

Through this decorative pattern, we can understand how circle concepts are applied in Islamic architecture and how mathematics plays a role in the beauty and balance of building design.

6. *Wall and Floor Decorations*

The paintings on the walls and floors of this mosque are all arranged and patterned, further demonstrating the mosque's deep connection to the concept of mathematical symmetry. This reflects the close relationship between art and mathematics in Islamic architecture. These geometric patterns are not merely ornamental but also demonstrate the application of mathematical concepts, particularly symmetry, a fundamental element of Islamic design. Through the arrangement of recurring shapes and motifs, this mosque exemplifies how mathematical ideas are visually expressed in a religious and cultural context. Square wall painting in the Sheikh Zayed Grand Mosque, can be seen in Figure 8.

Figure 8. Square wall painting

As shown in Figure 8, the wall paintings of the mosque are arranged in the form of squares and display two-fold symmetry. This means that the design can be divided into two identical halves, mirroring each other perfectly. The repetitive and balanced structure of the wall ornaments illustrates how mathematical principles such as reflection and proportion are consciously applied to produce visual harmony. These geometric elements also emphasize the role of mathematics in preserving the order and unity found in Islamic art. Next is Floor of Sheikh Zayed Grand Mosque, can be seen of Figure 9.

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Figure 9. Floor of Sheikh Zayed Grand Mosque

Meanwhile, Figure 9 shows the floor of the mosque, which demonstrates four-fold symmetry that divides the design into four equal and harmonious sections. This pattern highlights the mathematical concept of rotational symmetry, often used in Islamic architecture to symbolize infinity and balance. From an ethnomathematical perspective, the symmetrical layout of the floor exemplifies how geometry functions as both an artistic tool and a reflection of cultural and spiritual values embedded in the architecture of the mosque.

7. *Upper Mosque Ornaments*

The Sheikh Zayed Grand Mosque contains many patterns, one of which is shown in the Figure 10 below.

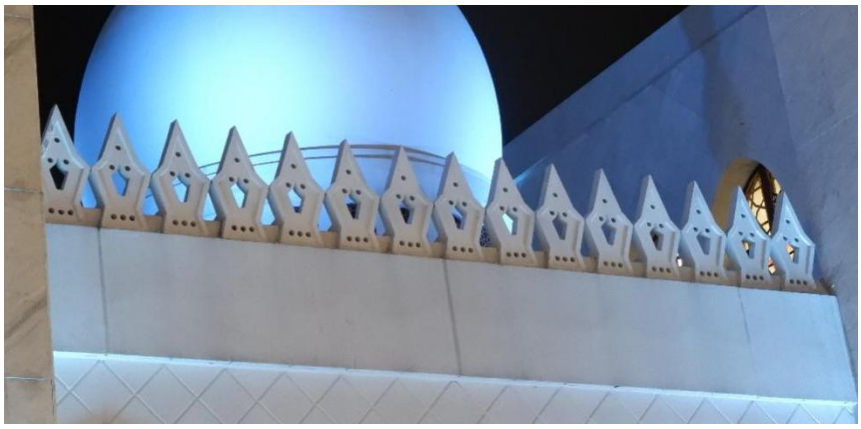

Figure 10. Upper decoration of the Sheikh Zayed Grand Mosque

In Figure 10, there are many shapes resembling kites arranged side by side with identical forms. This decoration applies a mathematical concept of translation, which is a pattern that is identical, parallel, and repetitive. This pattern can be associated with the meaning of dhikr in Islam, which is a means of remembering Allah that fosters peace of mind and spiritual strength (Misnaini et al., 2024). Understanding translation is related to students' skills in modeling or representing a problem, namely converting a question into a more mathematical form (Zulaikha et al., 2023).

This translation is one of the mathematical materials in geometric transformation learning, so that the existing patterns can reinforce that the

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Sheikh Zayed Grand Mosque contains many mathematical elements that can be studied and used as a medium of learning through Islamic culture.

Conclusion and Recommendations

The results of this study show that the Sheikh Zayed Grand Mosque not only functions as a place of worship but also represents strong ethnomathematics in its architecture. The geometric elements, symmetry, and translation patterns found show how mathematical concepts are integrated into every detail of the building. Overall, the architecture of this mosque reflects a harmonious integration of mathematics, Islamic values, and architectural art, presenting both beauty and deep meaning.

From an ethnomathematics perspective, this mosque has the potential to be a contextual and inspiring learning medium. The use of Islamic culture as an introduction is expected to foster students' interest in learning while broadening the study of the relationship between mathematics and culture.

Further research can be directed towards developing an ethnomathematics-based learning model using the architecture of the Sheikh Zayed Grand Mosque as the main medium. In addition, comparisons with other mosques will enrich the findings on the application of mathematics in Islamic architecture. In-depth research on the proportions, structure, and stability aspects of the building is also important. Digitalization efforts, such as through the creation of 3D models or interactive simulations, can help visualize mathematical concepts so that they are easier to understand in learning activities.

References

A.Hildayanti, & Wasilah. (2023). Studi Transfigurasi Masjid melalui Periodisasi Pembangunan Masjid di Indonesia. *Jurnal Lingkungan Binaan Indonesia*, *12*(2), 72–84. https://doi.org/10.32315/jlbi.v12i2.76

Aisyah, F., Susilowati, E., Qadzafi, S. A., Islam, U., Raden, N., & Said, M. (2024). Strategi Branding Pengurus Masjid Raya Sheikh Zayed Solo untuk Mewujudkan Masjid Pelopor Moderasi Beragama. *J-KIs Jurnal Komunikasi Islam*, *5*(2), 409–420. https://doi.org/https://doi.org/10.53429/j-kis.v5i2.1192

Andriono, R. (2021). Analisis Peran Etnomatematika dalam Pembelajaran Matematika. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, *4*(2), 184–190. https://doi.org/10.24176/anargya.v4i2.6370

Aqibah, E. K., & Arfinanti, N. (2025). Eksplorasi Ethnomatematika Dan Nilai-Nilai Pendidikan Karakter Pada Ornamen Masjid Gedhe Kauman. In *Jurnal Ilmiah Pendidikan Matematika* (Vol. 13, Issue 1).

Ardiansyah, Risnita, & Jailani, M. S. (2023). *Teknik Pengumpulan Data Dan Instrumen Penelitian Ilmiah*. http://ejournal.yayasanpendidikandzurriyatulquran.id/index.php/ihsan

Astriandini, M. G., & Kristanto, Y. D. (2021). Kajian Etnomatematika Pola Batik Keraton Surakarta Melalui Analisis Simetri. *Mosharafa: Jurnal Pendidikan Matematika*, *10*(1), 13–24. https://doi.org/10.31980/mosharafa.v10i1.637

Astutiningtyas, E. L., Wulandari, A. A., Farahsanti, I., & Exacta, A. P. (2021). Microteaching dalam Jaringan berbasis Lesson Study dan Keterampilan

e-ISSN 2746-5594
p-ISSN 2746-5608

Penyusunan Authentic Assessment Matematika berorientasi HOTS. *UNION: Jurnal Ilmiah Pendidikan Matematika*, *9*(1), 49–60. https://doi.org/10.30738/union.v9i1.9136

Faturrahman, M., & Soro, S. (2021). Eksplorasi Etnomatematika pada Masjid Al-Alam Marunda Ditinjau dari Segi Geometri. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(2), 1955–1964. https://doi.org/10.31004/cendekia.v5i2.734

Hanifah, G., Jannah, N. H., Azahra, S., Aulia, V. N., Rahman, Putri, S. A., & Ahman, A. (2025). Studi Etnografi dalam Penelitian Bimbingan dan Konseling. *JISPENDIORA: Jurnal Ilmu Sosial*, *4*(2), 578–592. https://doi.org/10.56910/jispendiora.v4i2.2450

Cahyanti, A. H. A. P. C., Kurniawan, I., Kristanto, Y. D., & Kurniawan, H. (2024). Kajian Etnomatematika Pada Alat Musik Saron Di Daerah Yogyakarta. *Jurnal Ilmiah Matematika Realistik (JI-MR)*, *5*(1), 150–155. https://repository.usd.ac.id/52412/1/12163_3773-10774-1-PB.pdf

Hidajat, D., Maghfirotun Amin, S., & Yuli Eko Siswono, T. (2021). Exploring Metacognitive Skills Of University Students In Solving Mathematics Problems Based On Cognitive Style. *Muk Publications Global and Stohastic Analysis*, *8*, 277–296. https://www.mukpublications.com/resources/3-MATH-1-DJAT-EXPLORING.pdf

Ilmiah, J., Terpadu, M., Husnaidah, M., Hrp, M. S., Sofiyah, K., & Logis, B. (2024). Konsep Dasar Matematika Fondasi Untuk Berpikir Logis. *Jurnal Ilmiah Multidisiplin Terpadu*, *8*(12), 41–47.

Ismail, H. H., Dewi, I., & Simamora, E. (2022). Keterkaitan antara Filsafat Matematika dengan Model Pembelajaran Berbasis Budaya. *Paradikma Jurnal Pendidikan Matematika*, *15*(2), 39–46. https://doi.org/10.24114/paradikma.v15i2.40922

Magriza, M. T. R., Ledang, I., & Sari, U. P. (2023). INSANI : Jurnal Ilmu Agama dan Pendidikan Tawazun Sebagai Prinsip Wasathiyyah Dalam Kehidupan Muslim Kontemporer. *INSANI : Jurnal Ilmu Agama Dan Pendidikan*, 1(1), 164–182. https://journal.pp-annur.com/index.php/insani/index

Misnaini, Tohar, A. A., & Khairi, Z. (2024). IJEDR: Indonesian Journal of Education and Development Research Dzikir dan Doa: Pilar Keberhasilan dalam Meningkatkan Resiliensi. *IJEDR: Indonesian Journal of Educational and Development Research*, *2*(2), 1226–1233.

Nafii'ah, D. F., Grahesti, A., & Putri, A. R. (2023). Pengaruh Daya Tarik Dan Hasil Review Melalui Media Sosial Terhadap Keputusan Masyarakat Berkunjung Ke Masjid Raya Syeikh Zayed Surakarta. *Ar-Rehla: Jurna; of Islamic Tourism, Halal Food, Islamic Travelling, And Creative Economy*, *3*(2), 112–133. https://doi.org/10.21274/ar-rehla.v3i2.8311

Oktavian, R. M., & Hidayati, R. (2024). Identifikasi Konsep Arsitektur Pada Bangunan Masjid Sheikh Zayed Surakarta. *Prosiding SIAR Seminar Ilmiah Arsitektur*, 1()*128*, 153–159. https://proceedings.ums.ac.id/siar/article/view/4017

Putri, D. A., Husein, R. M., Lestari, S. D., & Azka, R. (2024). Kajian Frieze Group Pada Bangunan Masjid Raya Skheikh Zayed Solo. *De Fermat : Jurnal Pendidikan Matematika*, *7*(2), 144–156. https://jurnal.pmat.uniba-bpn.ac.id/index.php/DEFERMAT/article/view/323

e-ISSN 2746-5594
p-ISSN 2746-5608

Ramadhana, D., & Dharoko, A. (2018). Ruang Sakral dan Profan Dalam Arsitektur Masjid Agung Demak, Jawa Tengah. INformasi dan Ekspose hasil Riset Teknik SIpil dan Arsitektur, 14(1), 13-25. https://journal.uny.ac.id/index.php/inersia/article/view/19491

Romdona, S., Junista, Si. S., & Gunawan, A. (2025). Teknik Pengumpulan Data: Observasi, Wawancara Dan Kuesioner. *Jisosepol: Jurnal Ilmu Sosial Ekonomi Dan Politik*, *3*(1), 39–47. https://samudrapublisher.com/index.php/JISOSEPOL

Safitri, S. L. D. A., Santoso, D. A., & Kuryanto, Moh. S. (2024). Pengaruh Permainan Tradisional Engklek Melalui Pendekatan Etnomatematika Terhadap Hasil Belajar Siswa Kelas V. *Absis: Mathematics Education Journal*, *6*(2), 106–111. https://doi.org/https://doi.org/10.32585/absis.v6i2.5581

Suwanto, R. (2024). Etnomatematika Pada Bentuk Bangunan Keraton Kusuma Negara Di Sekadau Hilir. *Jurnal Derivat: Jurnal Matematika dan Pendidikan Matematika*, *11*(1), 19–28. https://doi.org/10.31316/jderivat.v11i1.5135

Ummah, M. S. (2021). Ragam Budaya Indonesia sebagai Strategi dalam Membangun Literasi Ummah, M. S. (2021). Ragam Budaya Indonesia sebagai Strategi dalam Membangun Literasi dan SDM Masyarakat. *AMBARSA Jurnal Pendidikan Agama Islam*, 11(1), 1–14. https://doi.org/10.59106/abs.v1i

Yusanto, Y. (2020). Ragam Pendekatan Penelitian Kualitatif. *Journal of Scientific Communication (Jsc)*, *1*(1), 1–13. https://doi.org/10.31506/jsc.v1i1.7764

Zulaikha, Syif. R., Assegaf, Hudiono, B., & Ahmad, D. (2023). Translasi Representasi Matematika SMP Dari Bentuk Verbal Ke Simbolik dan Sebaliknya Pada Materi SPLDV. https://jurnal.untan.ac.id/index.php/jpdpb/article/view/28294