**Electronic Journal of Education, Social Economics and Technology**
Vol. 7, No. 1, (2026), e1403
ISSN 2723-6250 (online)
DOI: https://doi.org/10.33122/ejeset.v7i1.1403

SAINTIS publishing

*Research Article*

# Exploring Ethnomathematics at the Islamic Center Mosque in Lhokseumawe as a Learning Resource for Arithmetic Sequences and Series in Junior High School

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## ABSTRACT

This study aims to explore the ethnomathematical potential embedded in the architecture of the Islamic Center Mosque in Lhokseumawe as a learning resource for teaching arithmetic sequences and series at junior secondary school level. The research adopts a qualitative approach employing an exploratory case study design. Data were collected through systematic architectural observations, visual documentation, semi-structured interviews with building managers and mathematics teachers, and numerical analysis of recurring structural patterns. The findings reveal that the arrangement of columns, arches, dome ornaments, and floor tile configurations exhibits numerical regularities that can be modelled using arithmetic sequences and series. The uniform spacing between columns reflects the concept of a common difference in arithmetic sequences, while the layered dome ornamentation illustrates the relationship between the nth term and the sum of the first n terms in an arithmetic series. These results demonstrate that mosque architecture embodies not only aesthetic and religious values but also structured mathematical principles relevant to classroom instruction. Integrating cultural context into mathematics learning enhances conceptual understanding, promotes student engagement, and increases the meaningfulness of abstract mathematical concepts. Therefore, the ethnomathematical exploration of mosque architecture offers a pedagogically sound and contextually relevant strategy for teaching arithmetic sequences and series in junior secondary education.

**Keywords:** Ethnomathematics; Mosque Architecture; Arithmetic Sequence; Arithmetic Series

## 1. INTRODUCTION

Mathematics learning at junior high school level often encounters challenges related to relevance and meaningfulness. Topics such as arithmetic sequences and series, which constitute essential components of junior high school mathematics curriculum, are frequently perceived as abstract and disconnected from students' lived experiences. This perception contributes to low levels of engagement and difficulties in understanding the numerical relationships and patterns of constant change that underpin these concepts. This observation is consistent with Wake (2022) in Educational Studies in Mathematics, who argues that mathematics instruction disconnected from students' social practices tends to result in procedural understanding without conceptual depth. Wake further emphasizes the importance of authentic contexts in fostering more reflective and sustainable mathematical understanding. Similarly, Sriraman (2022) highlights that mathematical imagination and contextual connections are critical in developing a deep conceptual understanding of numerical patterns.

Research by Stylianides and Stylianides (2023) in the Journal for Research in Mathematics Education indicates that students encounter difficulties in understanding the structure of numerical patterns when instruction emphasizes symbolic manipulation without engagement in meaningful contexts. Their findings suggest that the ability to generalize patterns an essential aspect of arithmetic sequences develops more effectively when students are provided with opportunities to examine patterns derived from real, directly observable situations. Similarly, Bakker (2022) demonstrates that understanding of quantitative relationships is strengthened when learning begins with situational exploration prior to formal symbolic representation. Likewise, Zazkis (2021) shows that algebraic generalizations tend to remain superficial when students engage solely in symbolic substitution without conceptualizing the growth and regularity of patterns. Consistent with these perspectives, Drijvers (2023) critiques the practice of "symbol pushing," referring to the mechanical manipulation of symbols without an understanding of their underlying relational structure.

Similar findings were investigated by Clarke (2024) in ZDM Mathematics Education, who argued that low student engagement with pattern-based materials stems from the lack of connection between mathematical structures and students' empirical experiences. Clarke emphasized that recontextualizing mathematical concepts within cultural and architectural settings can enhance cognitive engagement while also strengthening students' relational understanding of these concepts. Furthermore, a study by Radford (2022) in Educational Studies in Mathematics found that learning patterns and sequences becomes more effective when students are engaged in semiotic activities that integrate symbols, visual representations, and social practices. Radford highlighted that mathematical meaning emerges through the interaction between formal symbols and observable cultural contexts. These findings reinforce the argument that arithmetic sequences and series should not be taught in isolation from concrete reality.

Similarly, research by Skott (2023) in Mathematical Thinking and Learning demonstrated that students who learned numerical concepts through authentic contexts showed significant improvements in their ability to identify patterns and explain relationships within sequences. Skott concluded that mathematical meaning develops more effectively when students can relate number patterns to real-world phenomena with social or cultural relevance. This perspective is further supported by Suh (2022), Ohtani and Nishida (2023), as well as Lehrer and Schauble (2021), who confirmed that learning numerical concepts through authentic contexts not only enhances procedural skills but also deepens students' structural understanding of patterns and relationships in sequences.

Based on these findings, it can be inferred that students' difficulties in understanding arithmetic sequences and series are not solely attributable to the complexity of the material, but rather to the lack of connection between formal concepts and students' concrete experiences. Rohantizani et al. (2023) found that learning grounded in local culture encourages students to generalize from concrete patterns to symbolic representations. Therefore, the recontextualization of mathematics instruction through approaches that link numerical concepts to students' real-life environments and cultural contexts is essential to enhance engagement, conceptual understanding, and the overall meaningfulness of mathematics learning at the junior high school level.

One meaningful approach to addressing these issues is ethnomathematics, a field of study that conceptualizes mathematics as a cultural practice embedded within the everyday life of a community. Theoretically, ethnomathematics emphasizes that mathematics is not merely a formal and symbolic system, but also an integral part of the cultural activities and lived experiences of local societies. This concept was introduced by D'Ambrosio in the context of mathematics education, who argued that mathematics is a form of *mathematic* that emerges from the socio-cultural environment of a particular community (D'Ambrosio, 2001). This approach seeks to integrate students' cultural experiences with formal mathematical concepts, thereby making learning more relevant and meaningful.

In recent years, ethnomathematics has become a growing focus in mathematics education research worldwide. A number of studies have demonstrated that integrating ethnomathematics into instruction has a significant impact on students' understanding of mathematical concepts. For instance, a meta-analysis by Putri et al. (2024) revealed that the application of ethnomathematics generally yields a large effect size on students' mathematics achievement, indicating that approaches linking cultural contexts with formal instructional materials can substantially enhance understanding and learning outcomes. Rokhmah et al. (2024) further emphasized that ethnomathematics-based teaching materials integrated with local cultural contexts are both feasible and effective in improving students' problem-solving abilities, as they present mathematical concepts in meaningful and relatable situations. Similarly, Assegaff and Bonyah (2024) demonstrated that ethnomathematics-oriented instructional materials, particularly those implemented through interactive games, can improve students' mathematical literacy by enabling them not only to learn procedures but also to develop conceptual understanding through culturally relevant activities.

Furthermore, Maryono et al. (2024), in their development of ethnomathematics-based teaching materials within the architectural context of the Muaro Jambi Temple, found that the integration of local cultural elements facilitated students' understanding of mathematics by enabling them to relate abstract representations to concrete objects. These findings are supported by Ninawati et al. (2025), who demonstrated that the use of ethnomathematics-based instructional materials significantly enhances students' understanding of mathematical concepts. In addition, Güreş & Ada, (2025) emphasized that the integration of ethnomathematics into mathematics instruction can improve students' representational and reasoning abilities, as the concepts are directly connected to cultural contexts familiar to their daily lives.

The ethnomathematics approach is therefore viewed not only as a strategy for contextualizing learning, but also as an epistemological perspective that recognizes mathematics as a body of knowledge shaped by social and cultural practices. In their comprehensive study, Rosa and Orey (2022) argued that incorporating ethnomathematics into the curriculum enables students to perceive mathematics as a dynamic social construct, thereby making learning more inclusive and culturally meaningful. They further asserted that culture-based learning can bridge the gap between formal mathematics and students' everyday experiences, while fostering deeper conceptual understanding.

An ethnomathematical approach becomes particularly relevant when it is connected to socio-cultural phenomena that can be directly observed by students. One such context, rich in mathematical elements yet often underexplored in mathematics education literature, is mosque architecture. Mosque structures especially those characterized by intricate ornamentation and repeating patterns embody strong mathematical relationships such as symmetry, sequences, and structural rhythm. These features can be interpreted as representations of number sequences or other recurring patterns relevant to the study of sequences and series. Previous research has demonstrated that traditional geometric patterns in cultural buildings and artifacts can serve as valuable resources for mathematics learning. For instance, ethnomathematical investigations of traditional houses and cultural artifacts have revealed embedded geometric principles, symmetry, and numerical patterns within these forms.

Lhokseumawe, a city in Aceh, is home to several mosques with distinctive architectural designs, including the Lhokseumawe City Islamic Center Mosque, a prominent structure that integrates religious values, Islamic culture, and architectural aesthetics. The Islamic Center functions not only as a place of worship but also as a hub for educational, social, and cultural activities, as well as a center for the study and dissemination of Islamic knowledge (Saputra et al., 2025). The ornamental features and design patterns of this mosque offer significant potential for representing mathematical concepts, such as numerical combinations, geometric rhythms, and proportional repetition. Research by Barton (2023), El-Sayed (2025), Kaplan (2022), Khan (2024), and Necipoğlu (2023) indicates that repetitive patterns in traditional architecture and Islamic art embody mathematical structures that can be modeled through sequences and numerical progressions. However, despite the richness of these cultural and mathematical values, their application within formal mathematics instruction particularly in teaching sequences and arithmetic series remains largely underexplored in both national and international empirical studies.

An empirical study by D'Ambrosio and Knijnik (2023) emphasized that exploring local cultural objects as resources for mathematics learning can enhance students' intrinsic motivation while strengthening their cultural identity. They stated that mathematics learned through cultural contexts not only enriches cognitive understanding but also fosters social awareness of local cultural heritage. Similarly, Valero (2021), Martin (2022), and Lee and Battey (2023) highlighted that the exploration of cultural objects such as architecture, ornamental patterns, and traditional practices functions not only as a contextual learning medium but also as a means of empowering students' identities and increasing intrinsic motivation in mathematics learning. Within the context of this study, the Islamic Center Mosque in Lhokseumawe is not merely a physical structure, but also a representation of the religious and cultural identity of the Acehnese community, which can be meaningfully integrated into formal mathematics instruction.

Another relevant study by Nasir et al. (2022) found that mathematics learning grounded in socio-cultural contexts significantly enhances students' mathematical representation and argumentation skills. They emphasized that when students connect mathematical concepts to their real-world environment, the process of abstraction becomes more systematic and structured. In this regard, the mosque's ornamental patterns, pillar arrangements, and symmetrical structures can be modeled as visual representations of arithmetic sequences, thereby helping students bridge the gap between concrete visualization and formal symbolic representation. Specifically, within the domain of Islamic architecture, research by Abas and Salman (2024) on geometry in modern Islamic art and architecture found that contemporary mosque designs incorporate repeating patterns grounded in linear progressions and proportional relationships that can be modeled mathematically. Their study demonstrated that many architectural elements follow systematic numerical structures, which, in an educational context, can be transformed into exploratory learning tasks focused on sequences and series. This finding further reinforces the potential of the Lhokseumawe City Islamic Center Mosque as a contextual laboratory for mathematics learning.

Furthermore, a recent meta-analysis by Marsigit et al, (2025) in the International Journal of Mathematics Education revealed that culturally based contextual approaches have a significant positive correlation with students' understanding of numerical patterns and relationships at the secondary school level. The study confirmed that students who engage in learning through the exploration of cultural environments demonstrate stronger abilities to generalize number patterns compared to those who rely solely on procedural learning. From a pedagogical perspective, Boaler (2022) emphasized that mathematics instruction rooted in authentic contexts can reduce mathematics anxiety while simultaneously enhancing student engagement. The richness of ethnomathematics has been extensively explored in relation to visual patterns, geometry, and various cultural artifacts in mathematics education research. For instance, studies on architectural motifs in traditional houses, batik patterns, and other cultural designs have demonstrated that local cultural contexts can effectively enhance students' engagement and understanding of mathematical concepts. However, research that specifically examines mosque architecture as a learning resource for teaching arithmetic sequences and series at the junior high school level remains limited. This gap underscores the need for further investigation into the integration of cultural contexts and mathematics within formal education, in order to optimize both the cultural and mathematical values embedded in architectural forms as authentic learning resources.

An ethnomathematics-based approach to learning arithmetic sequences and series not only offers an alternative perspective on abstract concepts but also provides practical opportunities for students to connect numerical patterns with real-life experiences in their environment. For example, the repetitive rhythm of mosque ornamentation or the structured arrangement of pillars can be analyzed as representations of arithmetic sequences. In the educational literature, such culturally grounded contexts have been shown to support students in identifying numerical patterns and relationships, thereby strengthening their understanding of abstract mathematical concepts. In addition to the mathematical elements inherent in cultural structures, it is important to recognize that ethnomathematics also has a strategic pedagogical dimension in addressing challenges in mathematics learning. Recent bibliometric studies indicate a growing number of ethnomathematics publications worldwide, suggesting that this approach is increasingly acknowledged as an effective strategy for enriching learning environments and stimulating students' interest in mathematics. These studies further reveal that ethnomathematics contributes not only to enhancing mathematical understanding but also to strengthening the connection between mathematics and local cultural heritage among younger generations.

This study seeks to address the identified research gap by exploring ethnomathematical elements within the Islamic Center Mosque in Lhokseumawe City as a learning resource for teaching arithmetic sequences and series at the junior high school level. The research focuses on identifying both implicit and explicit mathematical elements embedded in the mosque's ornamentation and architectural structure, as well as developing a contextualized understanding of learning based on these findings. Therefore, this study is expected to contribute to the advancement of more meaningful and contextually relevant pedagogical practices in mathematics education, while also enriching the body of international literature on ethnomathematics.

## 2. RESEARCH METHOD

This study employed a qualitative approach using an exploratory case study design within an ethnomathematics framework. This approach was selected because the research objective extends beyond identifying mathematical patterns in architectural forms to reconstructing their mathematical meanings into contextually relevant learning resources for junior high school students, particularly in the topic of arithmetic sequences and series. The case study design enables an in-depth examination of a specific context namely, the architecture of the Islamic Center Mosque in Lhokseumawe City allowing the resulting interpretations to be closely situated within the social, cultural, and religious background of the local community. The theoretical foundation of this study is grounded in an ethnomathematical perspective, which conceptualizes mathematics as a cultural practice embedded in social artifacts. This perspective is supported by Rosa and Orey (2023) in Educational Studies in Mathematics, who argue that the exploration of cultural artifacts can bridge informal and formal mathematical knowledge in learning contexts. Furthermore, Radford (2023), Lerman (2022), and Ernest (2022) emphasize that understanding mathematical concepts develops through the interaction between symbolic representations and culturally meaningful social practices. Accordingly, the analysis of mosque architecture in this study was conducted not only from a geometric standpoint but also from an epistemological perspective, examining how cultural patterns can be transformed into formal symbolic concepts.

The research participants consisted of two junior high school mathematics teachers, one mosque building manager or designer with expertise in the architectural structure, and eighth-grade students involved in the contextualization phase. Participants were selected purposively based on their relevance to the research objectives. Data were collected through systematic observation of repetitive architectural elements, visual documentation, semi-structured interviews, and numerical measurements of distances, quantities, and intervals among structural components. Observations focused on column arrangements, arches, dome ornamentation, and floor tile patterns, all of which exhibited indications of linear regularity. Previous studies by Grünbaum and Shephard (2023) and Bier (2023) have shown that repetitive patterns in Islamic art can be analyzed through the identification of modular systems and iterative transformations, thereby supporting the analytical framework employed in this study.

Data were analyzed through a systematic process involving the visual reduction of architectural elements into numerical units, classification of patterns based on potential arithmetic sequence or series models, formulation of corresponding symbolic mathematical representations, and pedagogical validation through discussions with mathematics teachers. This analytical framework is consistent with the concept of progressive mathematization described by Gravemeijer (2022) in the Journal of Mathematics Education, which emphasizes that real-world contexts should be gradually modeled into formal mathematical structures to generate meaningful learning. To ensure the credibility of the findings, data validity was established through the triangulation of methods and data sources, as well as member checking procedures. These strategies were employed to verify that the mathematical interpretations accurately reflected the actual architectural conditions and were consistent with participants' perspectives.

## 3. RESULTS AND DISCUSSION

The findings of this study indicate that the architecture of the Lhokseumawe City Islamic Center Mosque embodies systematic and consistent numerical regularities that reflect the characteristics of arithmetic sequences and series. These regularities are not incidental; rather, they arise from underlying principles of Islamic architectural design, which emphasize symmetry, proportion, modularity, and structured repetition. Within this framework, the physical structure of the building can be interpreted as a concrete manifestation of linear and progressive mathematical patterns. In the arrangement of the main columns, the analysis reveals a relatively constant spacing between successive supporting elements. From a mathematical perspective, the positions of the columns can be modeled using an arithmetic sequence characterized by a constant difference. This observation illustrates that the concept of "common difference" in an arithmetic sequence has a direct correspondence to real-world spatial distances. When students recognize that each column is positioned at an equal interval from the previous one, they are able to grasp that uniform increment is the fundamental property of an arithmetic sequence. This finding is consistent with Tall's (2022) work in Educational Studies in

Mathematics, which suggests that students' understanding of algebraic concepts is strengthened when symbolic representations are connected to visual and spatial experiences.

Figure 1. Column Spacing as an Arithmetic Sequence Model

Based on the **Figure 1**, illustrates a row of columns arranged at a constant distance $b$(common difference) between successive elements. If the position of the first column is denoted as $a$ or $U_1$, then the position of the $n$, the column can be expressed using the arithmetic sequence formula, Un = a + (n-1)b. Direct observation of these spatial intervals enables students to recognize that the notion of "difference" in mathematics corresponds to an actual physical distance, thereby facilitating a more concrete understanding of the concept.

In addition to the column arrangement, repetitive patterns are also evident in the arches of doors and windows. The number and placement of arches along one side of the building create a consistent visual rhythm. When interpreted numerically, this pattern can be understood as a structured distribution of elements exhibiting a regular increase within a given section. In a learning context, this phenomenon can be utilized to demonstrate how visual patterns can be translated into numerical representations. This process of translation is particularly important, as students often encounter difficulties when transitioning from concrete experiences to abstract symbolic forms. Research by Sweller (2022), Cobb (2023), Jönsson (2024), and Confrey and Maloney (2023) indicates that learning approaches emphasizing the connection between visual and symbolic representations are more effective in fostering relational understanding, rather than merely procedural knowledge.

**Figure 2**. Rhythmic Pattern of Door and Window Arches

The **Figure 2** depicts a series of arches characteristic of Islamic architecture at the Lhokseumawe Islamic Center Mosque. Each arch can be considered as one unit ($n$), and their uniform repetition reflects a visual "rhythm" that corresponds to constant numerical patterns in mathematics. This regularity illustrates how repeated architectural elements can embody structured mathematical relationships. By counting the number of arches within a given section of the building, students can engage in activities that promote pattern recognition and generalization. These skills are fundamental for developing early algebraic thinking, as they provide a conceptual foundation for understanding arithmetic sequences prior to the introduction of formal symbolic formulas.

In the dome ornamentation, a tiered structure can be observed in which the number of motifs increases systematically from the innermost layer to the outermost. From a mathematical perspective, if each successive layer exhibits a constant increment in the number of motifs, the pattern can be modeled as an arithmetic sequence. Furthermore, when the total number of motifs across multiple layers is considered, the concept of an arithmetic series becomes directly applicable. This visual representation provides a meaningful way to distinguish between the $n$-th term and the sum of the first $n$terms. Students can observe that a constant increase at each level leads to a cumulative total that follows a predictable pattern. Such visualization supports conceptual understanding by linking incremental growth to total accumulation. This finding is consistent with Ferrini-Mundy's (2022a) work in the Review of Educational Research, which demonstrates that tiered visual representations can enhance students' understanding of accumulation and generalization in the study of series.

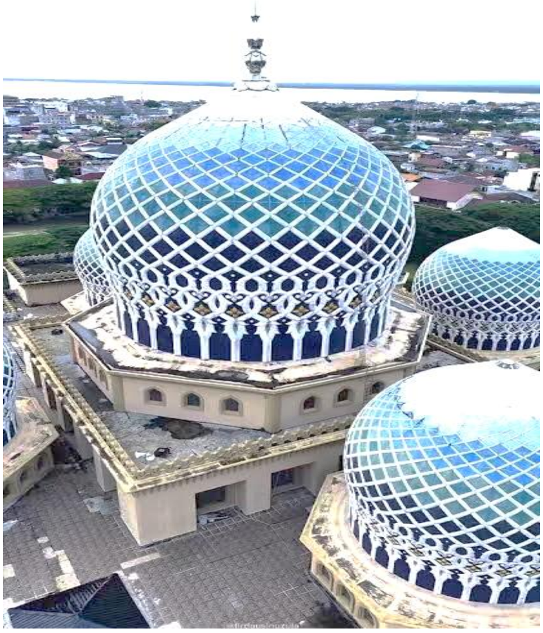

**Figure 3**. Dome Ornamentation Representing an Arithmetic Series

The interior view of the dome reveals layers of ornamentation arranged concentrically, centered around a single focal point. This structure provides a clear visual analogy for key concepts in arithmetic sequences and series.

- The arithmetic sequence ($U_n$) can be represented by the number of motifs in a specific layer (for example, the third layer from the center).
- The arithmetic series ($S_n$) can be interpreted as the total number of motifs accumulated from the central layer up to a given layer.

Through this visualization, students are not limited to memorizing formulas; instead, they develop a conceptual understanding of accumulation and generalization. They can observe how individual terms contribute progressively to an overall total, thereby strengthening their comprehension of series as cumulative processes. This interpretation is supported by Ferrini-Mundy (2022b), who found that tiered visual representations significantly enhance students' understanding of how individual values (terms) contribute to the total sum in a series.

The floor tile patterns also make a significant contribution to the analysis. In certain sections, the number of tiles in each successive row increases consistently compared to the previous row. This configuration can be interpreted as a two-dimensional representation of an arithmetic sequence, in which the pattern grows systematically across the spatial arrangement. From a pedagogical perspective, this pattern provides opportunities for students to identify growth regularities, formulate general expressions, and determine the total number of tiles without relying on direct counting. Such activities promote the development of algebraic generalization skills by encouraging students to move from concrete observation to abstract representation. This interpretation is supported by Kieran's (2023) study in *Mathematical Thinking and Learning*, which suggests that engagement with concrete, pattern-based tasks facilitates students' transition from arithmetic reasoning to formal algebraic thinking.

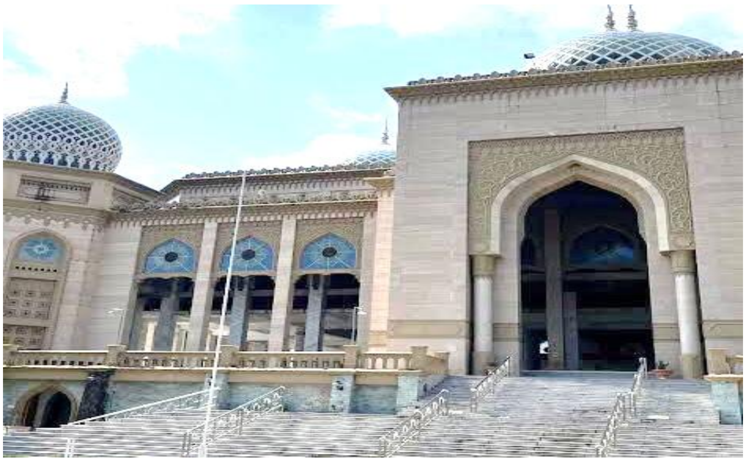

**Figure 4**. Floor Tile Patterns as Two-Dimensional Generalization

The **Figure 4** illustrates a tiled floor featuring a regularly repeating geometric pattern. From a mathematical perspective, this pattern can serve as an effective learning medium for several key concepts.

- Identifying growth patterns: Students can observe how a basic tile unit expands across a larger area, revealing systematic increases in spatial arrangement.
- Formulating general expressions: When the pattern develops row by row for example, with a constant increase in the number of tiles students can construct linear expressions to represent the number of tiles in the $n$-th row.
- Facilitating the transition to algebraic thinking**:** By determining the total number of tiles in an extended arrangement using the concept of series, students move beyond simple counting toward more formal and abstract mathematical reasoning.

The smallest unit (term) can be represented by each individual tile or a set of geometric motifs, denoted as $U_1, U_2, \dots, U_n$.

Furthermore, the findings of this study indicate that the exploration of ethnomathematics not only enriches the learning context but also strengthens the construction of conceptual understanding. When students recognize that concepts such as sequences and series are embedded in architectural structures that are familiar and culturally meaningful to them, an integration emerges between cognitive experience and cultural identity. This integration enhances the relevance of learning and reduces students' resistance to material that is often perceived as abstract. This perspective is supported by Gay (2022) in *Urban Education*, who argues that culturally responsive teaching significantly increases student motivation and engagement. Similarly, Ladson-Billings (2021) and Muhammad (2023) emphasize that culturally responsive pedagogy plays a crucial role in fostering student motivation, engagement, and active participation, as it creates a learning environment that is both relevant to and respectful of students' identities.

From an epistemological perspective, these findings illustrate a process of progressive mathematization. The first stage involves the observation of visual patterns, followed by the identification of numerical regularities, and culminating in the formulation of symbolic models. This sequence reflects a transition from concrete experience to formal abstraction. In the context of teaching arithmetic sequences and series at the junior high school level, these stages enable students to understand that mathematical formulas are not merely procedural rules, but rather generalizations derived from observable patterns. Consequently, exploration-based learning grounded in mosque architecture has the potential to foster deeper conceptual understanding compared to approaches that rely solely on direct formula presentation. However, the effectiveness of this approach is highly dependent on the teacher's ability to facilitate the mathematization process. If cultural contexts are used merely as illustrative examples without systematic numerical exploration, their pedagogical potential may not be fully realized. Therefore, it is essential for teachers to design investigative learning activities that encourage students to observe, measure, calculate, and model patterns independently. Overall, the findings confirm that the architectural structure of the Islamic Center Mosque in Lhokseumawe City holds significant potential as a contextual learning resource for arithmetic sequences and series. The repetitive patterns, constant intervals, and linear growth observed in columns, dome ornamentation, arches, and floor tiles exhibit clear numerical regularities that can be represented symbolically. This integration of cultural context not only enhances students' conceptual understanding but also strengthens the connection between mathematics and their socio-cultural realities.

## 4. CONCLUSION

Based on the comprehensive process of data exploration, analysis, and interpretation, this study confirms that the architecture of the Lhokseumawe City Islamic Center Mosque embodies mathematical structures that conceptually and symbolically align with the topic of arithmetic sequences and series at the junior high school level. The repetitive arrangement of columns with fixed intervals reflects the concept of common difference in arithmetic sequences, while the tiered configuration of dome ornamentation and the structured patterns of floor tiles illustrate linear growth that can be modeled using formulas for the $n$-th term and the sum of the first $n$ terms. These architectural elements, therefore, should not be viewed solely as aesthetic or religious features, but also as concrete representations of systematic numerical regularities. Conceptually, this study reinforces the perspective that mathematics does not exist independently of cultural contexts but is embedded within the social practices and artifacts of a community. The ethnomathematical exploration undertaken in this research demonstrates a process of progressive mathematization, beginning with the observation of visual patterns, followed by the identification of numerical regularities, and culminating in the formulation of symbolic models in the form of arithmetic sequence and series expressions. This process is consistent with the objectives of algebra learning at the junior high school level, particularly in fostering generalization skills, symbolic representation, and relational understanding of numerical structures.

From a pedagogical standpoint, the use of mosque architecture as a learning resource offers several important implications. First, from a cognitive perspective, it enables students to develop conceptual understanding through concrete experiences prior to engaging with formal abstraction. Second, from an affective perspective, connecting mathematical content to students' religious and cultural environments has the potential to enhance motivation, curiosity, and engagement. Third, from a sociocultural perspective, learning becomes a medium for internalizing local identity values while fostering appreciation for Islamic architectural heritage. In this way, mathematics learning extends beyond procedural mastery to encompass meaning-making and contextual relevance. Overall, this study demonstrates that the exploration of ethnomathematics within the architecture of the Islamic Center Mosque in Lhokseumawe City constitutes a rational, relevant, and meaningful pedagogical strategy for teaching arithmetic sequences and series at the junior high school level. The integration of mathematical structures with local cultural contexts not only deepens students' conceptual understanding but also repositions mathematics as a discipline embedded within social reality. Through this approach, mathematics learning has the potential to become more contextual, humanistic, and oriented toward broader educational meanings beyond mere symbolic manipulation.

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