Integration of Islam and Mathematics: Religious and Mathematics Education in Grand Mosque of West Sumatra

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ABSTRACT
The study aimed to determine the integration of religion and mathematics education within the context of the Grand Mosque of West Sumatra, with a specific focus on its potential impact on mathematics learning. The study was undertaken at the Grand Mosque of West Sumatra. The research methodology employed in this study is descriptive qualitative research utilising an ethnographic approach. Data gathering methods include literature review, direct observation, documentation analysis, and conducting interviews. Data analysis techniques include data reduction, data presentation, and conclusion. The findings of this study indicate that the Grand Mosque serves as a multifaceted institution encompassing several functions such as a place of worship, a platform for preaching, an educational hub, a center for character development, a catalyst for moral and social advancement, a hub for economic empowerment, and a destination for religious tourism. The Grand Mosque serves as a conducive environment for the acquisition of mathematical knowledge due to the presence of several mathematical principles embedded within the worship activities, as well as within the physical structure and courtyard of the Mosque. The Grand Mosque incorporates mathematical ideas such as multiplication, parallel lines, straight lines, curves, triangles, rhombuses, rectangles, trapezoids, congruence, and social arithmetic. According to the data above, it can be inferred that the West Sumatra Grand Mosque serves as a venue for religious and mathematical education. Consequently, this establishment holds potential as a resource for students to acquire knowledge in religious studies and develop a comprehensive understanding of mathematical principles.

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1. INTRODUCTION
Implementing Islamic ideals among students should commence early, as this will establish a robust foundation for their moral and ethical development. Incorporating Islamic ideals into the curriculum is a requisite for all academic disciplines taught in Indonesian schools and madrasas, particularly for Indonesian Muslim students. This phenomenon is evident in the initial core competency, namely the competence of spiritual attitude, as stated in Permendikbud Number 37 of 2018 (Kemdikbud, 2018). According to the regulation the Minister of Education and Culture set forth, the foremost requirement is cultivating students’ spiritual attitudes. Social attitudes, knowledge, and skills are then addressed following spiritual attitudes.
The objective of each academic subject in school is to enhance students' spirituality. The enhancement of students' spirituality should be implemented within the educational framework, as stated by (Mutakalim, 2020). Hence, it is imperative for every student to be mindful of the objectives associated with the initial core competency, with mathematics education being no different. Research has indicated that the integration of Islamic principles and mathematics in the learning process has the potential to enhance students’ spiritual development (Sarah, Imamuddin, & Aprianto, 2024; Imamuddin & Isnaniah, 2023; Aviola et al., 2023; M. Imamuddin et al., 2023; Afrianti & M. Imamuddin, 2022). Integrating mathematics with Islam is necessary, as Nisa et al. (2023) highlighted. Integration can be conceptualised as amalgamating or merging two distinct entities, namely, the amalgamation of Islamic principles and mathematics within the realm of mathematical education. According to Setiawan & Thohir (2016), Akbari & Irawan (2021) and Mahariah (2023), students demonstrate intellectual competence and exhibit positive behaviour and religious values.

The acquisition of knowledge about the integration of Islam and mathematics can be facilitated through educational materials or within environments imbued with Islamic principles. The Mosque is a potential venue and educational resource for enhancing students' understanding of religion and mathematics. The Mosque serves as a sacred space where individuals of the Islamic faith engage in acts of worship and seek spiritual growth in their devotion to Allah (Putra & Rumondor, 2019; Rosadi, 2014). During the era of the Prophet, the Mosque served as a multifunctional institution, including a site for religious devotion and a center for educational pursuits and the dissemination of knowledge (Rosadi, 2014). Exposing students to educational visits at the Mosque is justifiable to enhance their comprehension of mathematical ideas, foster spiritual growth, and reinforce Islamic principles. According to recent studies conducted by M. Imamuddin et al., (2023), Gita Laelatul Qodriah, (2023), and Afrianti & M. Imamuddin (2022), there is evidence to suggest that the enhancement of students' spiritual intelligence has the potential to impact their comprehension of mathematical concepts positively and ultimately influence their academic achievements. The Mosque is a sacred space for individuals to enhance their spiritual connection with Allah. It can also serve as a platform for acquiring general information, including the study of mathematics. Thus, the Mosque is an educational institution catering to religious and mathematical instruction.

Mosques can serve as effective venues for providing religious and mathematics instruction, thereby enhancing students' comprehension of religious principles and mathematical concepts. The purpose of this practice is to cultivate Islamic principles and enhance students' proficiency in mathematics. Cultivating Islamic values and studying mathematics equip future generations with the necessary skills and mindset to effectively confront the difficulties that arise in an increasingly advanced and complex future.

Numerous prior academics have undertaken studies on using mosques as educational settings to enhance religious knowledge and foster comprehension of mathematical ideas. For instance, Rifa'i (2016), researched the Mosque's dual role as a site for worshipping Allah and as a conducive environment for scholarly pursuits. According to the findings of Darodjat and Wahyudiana's study conducted in 2014, it was determined that the Mosque serves as a sacred space for engaging in prayer and studying Islamic teachings. In contrast to the findings of Rifa'i (2016) and Darodjat and Wahyudiana (2002), several subsequent studies undertaken by Marhummah & Mariana (2020), Astutti & Mailihastarin (2021), Ana & Mariana (2022), and Nurhalisa et al., (2022) have identified and concluded the presence of various geometrical concepts within mosque settings.

The present study centres its investigation on the Mosque as a site of religious devotion, drawing upon prior scholarly inquiries, including the seminal work conducted by Rifa'i (2016) and Darodjat and Wahyudiana (2002). The studies undertaken by Marhummah & Mariana (2020), Astutti & Mailihastarin (2021), Ana & Mariana (2022), and Nurhalisa et al. (2022) were centred upon the exploration of geometric principles within the context of mosques. This research wants to merge the two focal points of prior research to advance the current study. The Mosque serves as an educational institution that combines religious devotion and academic pursuits, particularly emphasizing the study of
mathematics. The integration of education has a substantial role in developing students' character and personality, as evidenced by studies conducted by Rashed & Halim (2021) and Maya Nurjanah, (2021). According to Prastowo et al. (2023), the integration process can address current challenges.

Integrating Islamic and mathematics education is necessary to cultivate students' religious values and foster a strong understanding of mathematical concepts. The present study was conducted at the Grand Mosque of West Sumatra, as it is widely recognised among students in the region of West Sumatra. Furthermore, the Grand Mosque of West Sumatra possesses a unique allure that sets it apart from other mosques. The provision of religious and mathematics education at the Grand Mosque of West Sumatra provides students with a comprehensive understanding of religious principles and mathematical concepts. Previous discussions about mosques were discussed separately between religious centers and as a source of learning mathematical concepts. Therefore, this study will combine the functions of the mosque as a religious center and the mosque as a source of learning mathematics concepts. This is important to instill a religious attitude and increase students' knowledge of mathematical concepts in learning mathematics, so as to produce religious mathematicians in the future.

2. METHODS

The present study employs a descriptive qualitative methodology, utilising an ethnographic approach. The primary objective of this study is to investigate the intersection of religious and mathematics education within the context of the Grand Mosque of West Sumatra. The primary instrument employed in this study is the researcher. The researcher acquired the data by independent means, including literature review, observation, documentation analysis, and interviews. The collection of data in this study encompasses several techniques. a) literature data is gathered by collecting relevant literature about mosques and mathematical concepts contained in the mosque through literature such as books, articles and others, b) direct observation is conducted to observe worship activities, physical mosques, traders, and visitors near the Grand Mosque. c) documentation is employed by capturing photographs as supporting evidence pertinent to the research objectives. d) interviews are conducted with individuals who know the historical establishment and current state of the Grand Mosque.

The data utilised in this study were obtained from several sources, including literature, observation, documentation, and interviews. These sources were carefully examined and selected based on their relevance to the research objectives, while any extraneous or redundant data were excluded through data reduction. Moreover, data presentation involves systematically aggregating acquired data, resulting in a coherent and significant dataset. Upon the presentation of the data and subsequent analysis, the conclusion mentioned above is the outcome of this study endeavor.

3. FINDINGS AND DISCUSSION

3.1 Findings

The term "mosque" is mentioned in 28 instances throughout the sacred text of the Quran. A mosque can be understood as a designated space for prostration. The etymology of this term may be traced back to the Arabic word "sajada," - "yasjudu" - "sujdan." It is closely associated with the act of obedience, characterised by a deep sense of reverence and respect. The term "mosque" denotes a physical space where individuals engage in prostration with utmost devotion and submission. The Mosque is a sacred space dedicated to religious devotion for adherents of the Islamic faith. The Mosque serves as a sacred place of worship for Muslims, symbolising the dwelling of Allah, as indicated by the significance conveyed in the teachings of Allah.
Means: That light shines through houses of worship which Allah has ordered to be raised, and where His Name is mentioned. He is glorified there morning and evening.

The Mosque serves as a sacred structure dedicated to the worship of Allah, designed to facilitate the remembrance, gratitude, and proper devotion of the ummah. Prayer is paramount in the Mosque, a fundamental pillar of Islam and a daily ritual obligation. It enables Muslims to engage in communion with their Lord since they are required to perform it at least five times a day, including during the night. The primary function of the Mosque is to cultivate the religious beliefs and dedication of the neighboring Muslim community (Rifa'i, 2016).

In addition to providing formal education, the Mosque can serve as a platform for cultivating students’ religious identity. In the context of the Mosque, students engage in physical gatherings with their peers. These congregational prayer sessions foster a sense of emotional and intellectual connection, leading to heightened intimacy among friends. Furthermore, these collective prayers serve as a means to establish a closer bond with Allah. The utilisation of the Mosque as a gathering space for various purposes, including worship and other communal activities, has been demonstrated by the Prophet and his companions (Baharuddin Husin, 2011).

Facilitating students’ proximity to the Mosque for prayer is imperative and crucial, as this practice enhances students’ religious engagement and fosters stronger connections among students, teachers, and peers while nurturing a deeper relationship with the Divine. Furthermore, students can acquire several forms of education, including religious and general knowledge, throughout their time in the Mosque. The Mosque serves as a social institution, fulfilling several roles, including that of an educational center (Darodjat dan Wahyudiana, 2002; Putra & Rumondor, 2019; Khikmawati, 2020). In order to facilitate a comprehensive education encompassing both religious and general scientific knowledge, exposing students to local mosques is imperative. This initiative seeks to equip students with a well-rounded understanding of religious principles and broader academic concepts. The West Sumatra Grand Mosque, as seen in Figure 1, is a potential destination for students residing in West Sumatra.

![The Grand Mosque of West Sumatra](https://phinemo.com/masjid-raya-sumatera-barat/)

Figure 1. The Grand Mosque of West Sumatra

The Grand Mosque is a revered site of worship that holds significant cultural and religious importance for the Muslim community in West Sumatra. Architect Rizal Muslimin designed the Grand Mosque of West Sumatra. The architectural design of the Mosque incorporates earthquake-resistant features, enabling it to serve as a haven for individuals seeking shelter during seismic events. The Grand Mosque is called the Mosque of a Thousand Wind Doors because of its numerous entrances. The Mosque is a structure characterised by a square shape, deviating from the conventional architectural feature of a dome and instead including a gabion, as observed in the study conducted by (Supriatna & Handayani, 2021). Despite lacking a dome, the Grand Mosque of West Sumatra is recognised as one of the seven mosques globally renowned for its exceptional architectural design (Zulfikar, 2021).
Similar to other mosques in Indonesia, the primary purpose of the Grand Mosque of West Sumatra is to serve as a religious sanctuary for prayer. Nonetheless, the West Sumatra Grand Mosque serves multiple functions, including its role as a da’wah centre, a facility for character-building, moral and social development, an educational institution, a hub for ummah economic empowerment, and a location for religious tourism. This discovery provides empirical evidence that aligns with the research conducted by Rifa’i, wherein it is posited that the Mosque serves multiple purposes, including but not limited to being a platform for da’wah, a hub for fostering social and moral growth, a catalyst for political advancement, a facilitator of economic progress, and a facilitator of educational enhancement (Rifa’i, 2016). In addition, the mosque is also planned to accommodate people affected by natural disasters such as sunami, floods and others, based on the results of interviews.

Students have the opportunity to engage in educational activities by visiting the Grand Mosque for academic purposes. The Mosque serves as a hub for educational development, offering instruction in the fundamental principles of Islam (Khikmawati, 2020; Rifa’i, 2016). The Mosque is an optimal educational development hub, providing an ideal environment and platform for acquiring knowledge in religious studies and other academic disciplines. Therefore, students can acquire knowledge in several scientific disciplines, such as mathematics, using the resources available within the Mosque and its immediate vicinity. Given the West Sumatra Grand Mosque’s distinctive characteristics and multifaceted nature, it would be very suitable to utilise it as a venue for religious instruction and mathematical education for students.

Mathematics education entails the acquisition and comprehension of mathematical concepts as the fundamental content for educational purposes. The acquisition of mathematical knowledge among students commences with the initial presentation of elementary mathematical principles. In this research, students study mathematics within the context of a Mosque, wherein they acquire knowledge of mathematical ideas inherent to the Mosque environment. Students acquire knowledge of mathematical concepts while engaging in worship activities and by observing the elements inside the actual courtyard of the Grand Mosque.

Within the realm of worship activities, an avenue for students to acquire mathematical knowledge is through the utilisation of congregational prayers. The total number of individuals engaging in congregational prayers during each prayer session can be calculated by multiplying the number of rows of worshippers by the number of individuals present in a single row at a given prayer time, thereby employing the fundamental mathematical concept of multiplication. The phenomenon under consideration pertains to the arrangement of prayer shaft rows, specifically the alignment of their distances relative to the orderly and well-organised rows of prayer shafts. This pertains to line alignment and its implications in this context. Engaging in congregational prayer in a linear formation within the premises of the Grand Mosque, as depicted in Figure 2.

https://masjidraya.sumbarprov.go.id

Figure 2. Prayer Camp
The physical Mosque provides opportunities for learning various mathematical ideas, including the fundamental concept of a line, which is integral to studying geometry. The visual representation of the concept of line is depicted in Figure 3.

![Figure 3. Line and Curves](image)

A triangle is a geometric figure composed of three sides that cross at pairs of points. Additionally, a two-dimensional geometric figure is characterised by three angles, as depicted in Figure 4.

![Figure 4. Triangle](image)

A rhombus is a quadrilateral characterised by the property of having pairs of sides that are of equal length and diagonals that are perpendicular to each other. Consider the rhombus depicted in Figure 5.

![Figure 5. Rhombus](image)
In addition to the aforementioned mathematical notions, the physical Grand Mosque also incorporates rectangles and trapezoids, as depicted in Figure 6.

![Rectangle and Trapezoid](image)

**Figure 6.** Rectangle and Trapezoid

Equivalence and congruence pertain to comparing two or more planar figures in terms of their respective properties. Two planar figures are considered congruent if they possess identical shapes and sizes. The concepts of equivalence and congruence are visually shown in Figure 7.

![Conjunction and Equivalence](image)

**Figure 7.** Conjunction and Equivalence

Traders engage in commercial activities within the courtyard of the Grand Mosque of West Sumatra. Engaging in commercial transactions among vendors and visitors within the premises of the Mosque might be regarded as a means of acquiring knowledge in the field of mathematics, specifically in the realm of social arithmetic. In the context of commercial transactions, students can acquire knowledge about the concepts of profit and loss. Figure 8 depicts the customary commerce activity near the Grand Mosque's courtyard.

![Buying and selling](image)

**Figure 8.** Buying and selling
3.2 Discussion

The acquisition of mathematical knowledge by students necessitates the provision of environments, educational materials, and instructional settings that are familiar and relatable to them. The appropriate educational environment and access to quality learning materials can foster students’ intrinsic motivation for learning. Imamuddin (2022) states that incorporating familiar contexts can enhance and support students’ learning experiences. Identifying suitable locations and educational materials should acknowledge the religious competencies that students must possess. One location and educational resource that can be utilised is the Mosque. The Mosque serves as a sacred space for the religious observance of Muslims. The Mosque is a sacred space where Muslims can deepen their connection with Allah and enhance their religious devotion. In addition to its primary function as a place of prayer, the Mosque has been recognised as a venue for educational purposes (Darodjat and Wahyudiana, 2002; Putra & Rumondor, 2019; Khikmawati, 2020).

This research endeavours to establish the West Sumatra Grand Mosque as a centre for religious and mathematical education to enhance students’ comprehension of mathematical concepts and foster their religious development within mathematics education. The Grand Mosque’s utilisation can potentially enhance students’ religious aptitude. Furthermore, students can acquire mathematical knowledge by engaging with many elements present within the Mosque, including prayer rituals, the architectural structure of the Mosque, and the surrounding premises. The Grand Mosque incorporates various mathematical principles within its worship activities, physical structures, and courtyards. The concept of multiplication and parallel lines, can be seen from the number of shaf and the number of people praying in congregation and the distance from shaf to shaf. The concept of lines, curves, triangles, rhombuses, rectangles, trapezoids, and congruence can be found in mosque architecture. Social arithmetic, can be found from the buying and selling activities between traders and buyers in the mosque courtyard.

The Grand Mosque of West Sumatra serves as an educational institution that harmoniously combines the principles of Islam and mathematics. Incorporating Islamic beliefs into the learning process can enhance the overall quality of education. The findings of this study align with other research, affirming the positive effects of incorporating Islamic principles into mathematics education. Such integration has enhanced motivation and interest in learning, fostered religious commitment, and enhanced mathematical proficiency (Setiawan & Thohir, 2016; Imamuddin & Isnaniah, 2023; Rahmi et al., 2023; Imamuddin et al., 2023; Febrianti et al., 2023; Pribia, Imamuddin, Isnaniah, & Ismirawati, 2023). According to recent studies conducted by Azzuhro & Salminawati, (2023) as well as Aviola et al., (2023), it has been found that the incorporation of religion or integrated education into the learning process has the potential to enhance student attributes such as honesty, confidence, and responsibility. The integration of Islam and mathematics in learning, not only has a positive impact on Islamic school students but also has a positive impact on public school students (Sari, Imamuddin, & Financhi, 2023).

Integrating Islam and mathematics in the mathematics education provided at the West Sumatra Grand Mosque for students serves to equip them with religious attitudes and enhance their grasp of mathematical ideas. Consequently, it is anticipated that mathematics educators will integrate religious and mathematical instruction within the context of mosques, both within the student body and the school setting. Directing students to learn math well and instilling religious traits in students is a must.

Making the mosque a place of learning in integrating Islamic values and mathematics in learning is a very positive thing. Making students have good ahlak and faith and making the math material learned will be more concrete, easy for students to learn and understand. The integration of learning makes students have the ability of faith and piety as well as science and technology in accordance with the objectives of national education, (Harahap, 2018). Thus, integrating Islamic values and mathematics in learning can give birth to students or individuals who are intact. This is in accordance with one of the functions of the curriculum (the integrating function), namely, the curriculum as an educational tool must be able to produce whole individuals (Oemar Hamalik, 2014). For this reason, learning or curriculum integration must be a policy by the government, in this case by the education office.
4. CONCLUSION

The findings of this study suggest that the Grand Mosque of West Sumatra has the potential to serve as a venue and resource for religious and mathematics instruction. The significance of the Grand Mosque extends beyond its role as a spiritual sanctuary, as it also serves as an educational institution where students can acquire knowledge in geometry and social arithmetic. Integrating religious and mathematics education within the Mosque setting offers a valuable opportunity for students to enhance their grasp of Islam and mathematical ideas. This approach aims to equip students with a comprehensive education that encompasses developing their religious values and proficiency in mathematics. Based on the results of this study, teachers are expected to carry out religious and mathematics education in nearby mosques, making the mosque an alternative place in carrying out mathematics learning for students. To education observers to intensify learning that is able to equip students with religious attitudes, cognition and psychomotor in a balanced manner. For Future research should delve deeper into the specific pedagogical approaches that can effectively integrate Islamic teachings and mathematics in educational settings. Exploring the impact of such integrated curricula on students' academic performance and holistic development would be a valuable direction for future studies.

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