



# The Interconnection between Mathematics and Muhammadiyah Islamic Teachings

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## ABSTRACT

This article explores the intersection of mathematics and Islamic values, emphasizing their roles in education and cultural development. The primary goal is to elucidate how mathematics serves not only as a tool for intellectual development but also as a means to instill character and ethical values in learners. The study addresses the problem of integrating abstract mathematical concepts with moral teachings rooted in Islamic principles, aiming to enhance students' cognitive, affective, and psychomotor skills while fostering virtues like honesty and diligence. Methodologically, the article reviews literature on mathematical characteristics and their application in Islamic civilization, particularly in science and technology. It also examines Quranic perspectives on mathematics and the universe, highlighting how mathematical principles reflect the eternal attributes of Allah. The analysis draws on historical and theological insights to demonstrate how mathematics can inspire spiritual growth and appreciation for divine creation. Results indicate that mathematics, when integrated with Islamic teachings, promotes ethical behavior and enhances students' understanding of the universe's order and beauty. This study contributes to the broader discourse on educational strategies that integrate faith-based values with academic disciplines, promoting a balanced worldview and ethical consciousness among learners. In conclusion, the synthesis of mathematics and Islamic values offers a comprehensive framework for character development and intellectual growth, underscoring the importance of interdisciplinary approaches in contemporary education.

## Keywords

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## Introduction

Mathematics is a symbolic language, a deductive science, a study of patterns of regularity and organized structures, ranging from undefined elements to defined elements, axioms, and ultimately to theorems [1]. Furthermore, the learning of mathematics is not only intended to intellectually educate learners but also to produce individuals who possess reasoning ability, good personality, and character [2]. In fact, mathematics contains values that can motivate humans and are intriguing to study; these values can even be implemented in everyday life [3]. Another opinion states that mathematics education includes values that potentially support the successful formation of character. These values are embedded in both the mathematics content and its teaching methods. This clearly shows that character education can be developed through mathematics education [4]. Additionally, values in mathematics education refer to the quality of attitudes instilled in education through mathematics materials in schools [5].

Mathematics possesses the following characteristics: mathematical objects are abstract, their symbols lack inherent meaning, and mathematics relies on agreement and deductive axiomatic thinking [6]. Mathematical activities generally operate in the domain of ideas, making mathematical objects tend toward abstraction. According to Ruseffendi, abstract mathematical objects include direct facts such as numbers or numerical symbols, skills in providing correct and quick answers, concepts as extracted ideas for grouping objects, and rules which are the most abstract objects. On the other hand, indirect mathematical objects include the ability to investigate, solve problems, learn independently, and maintain a positive attitude towards mathematics.

Mathematics is often referred to as the science of symbols. Symbols in mathematics generally are "empty of meaning" intrinsically, but can be given meaning according to context and usage [7]. The existence of these symbols provides mathematics with significant opportunities for applications in various fields of science and real-life situations. For example, symbols such as 1, 2, 3, 4, and so on do not inherently have meaning, but the ideas of numbers like the quantity of objects owned by someone totaling 2, are reflected in the domain of ideas.

Moreover, mathematical principles were also applied in the science and technology that developed within Islamic civilization. Mathematics was used in astronomy to determine the positions of stars and planets, which was crucial for navigation and calendar determination [8]. The use of mathematics in these various fields demonstrates how science and religion can complement and enrich each other. In Islam, the pursuit of knowledge is considered a form of worship and a way to better understand Allah's creation [9]. Therefore, the development of mathematics in Islamic civilization was not only an intellectual achievement but also a reflection of spiritual efforts to understand and appreciate the greatness of God [10]. Muslim scientists not only developed and applied mathematics but also translated mathematical works from other

civilizations, such as Greek and Indian, into Arabic. This facilitated the wider dissemination of knowledge and enriched global science. These contributions formed the foundation for the development of mathematics in Europe and the Western world during the Renaissance [11].

This article will further discuss the role of mathematics in Islamic life and culture, as well as the significant contributions of Muslim scholars in the history of mathematical development. It is hoped that this article will provide a deeper understanding of how mathematics and the Islamic religion are interconnected and mutually supportive.

## **Material and Methods**

The research method used in this study is a type of library research with a qualitative descriptive approach, employing content analysis method to explain the methods and types of sampling referring to three articles analyzed. The data source used is secondary data.

## **Results and Discussion**

### **A. Honesty attitude Mathematics**

Mathematics, often referred to as the science of calculation, is a discipline related to the process of computation. In the process of calculation to achieve the correct answer, the use of theorems or definitions becomes crucial, requiring attitudes of precision, accuracy, and exactness. After obtaining the result, it is important to check the steps taken to ensure their compliance with the theorem used. Errors in following the theorem can lead to incorrect answers. Therefore, a high level of precision is required.

Mathematics also emphasizes the principle of honesty. When performing mathematical processes, it is important to adhere to existing principles and theorems; disregarding these principles can lead to errors. One cannot justify mistakes in mathematical work by blaming valid definitions or theorems. For example: If it has been agreed in the mathematical context that  $-2$  multiplied by  $4$  equals  $-12$ , then it cannot be justified if someone claims that  $-2$  multiplied by  $4$  equals  $12$ . There is no reason or excuse that can be used to oppose this because the intended result should be  $-12$ . This aligns with the honest nature taught in Islam.

In Arabic, the word "honesty" is equivalent to "as-sidqu" or "siddiq," meaning true, genuine, or truthful. Terminologically, honesty or as-sidqu means the conformity between words and actions, the conformity between information and reality, firmness and steadfastness of heart, and something good that is not mixed with falsehood. "Shidq" (honesty) is the conformity between conscience and speech, so if one of these conditions is missing, it cannot be called perfect honesty. Honesty is acknowledging, speaking, or providing information that aligns with reality. Linguistically, honesty can also be called the antonym or opposite of lying, which means speaking or providing information that does not correspond to the truth. Honesty is the foundation of

morality and the basis of all virtues; therefore, a person who is honest is always filled with virtues and noble morals. They are always straightforward and not hypocritical, content, full of compassion, always doing good, patient, maintaining dignity, humble, transparent, fair, not deceitful, not treacherous, and not cunning. Conversely, a person accustomed to lying clearly demonstrates contradictory behavior. Honesty is one of the commendable virtues that every person should possess, as exemplified by Prophet Muhammad [12].

### **B. Understanding the greatness of Allah with the concept of infinity**

There are several principles in mathematics that can be used to prove the oneness of Allah and His attributes. For example, in this topic, the author discusses the concept of limit. One of the questions that arises is whether the sequence of natural numbers such as 1, 2, 3, 4, ... is finite or infinite?

Generally, many people consider this sequence to be infinite. However, upon closer examination, the sequence of natural numbers will be finite up to a certain point, for example, up to the  $n$ th natural number (1, 2, 3, ...,  $n$ ). However, the value of  $n$  depends on the limits we set, which ultimately only Allah knows. Thus, the sequence approaches infinity. In essence, this concept teaches us that life in this world is not eternal or everlasting, because only Allah possesses these attributes. As mentioned in Surah Al-Qasas, verse 88, everything in this universe will inevitably perish, except the Face of Allah. This reflects that the mathematical laws, considered by some as infinite, will also disappear in the end.

Human thought can only glorify the attributes of God with the knowledge that it possesses. This knowledge should strengthen our faith, rather than distance us from Allah by assuming that we can solve all problems with our own knowledge. On the other hand, the Qur'an sometimes explains the universe in a more abstract manner. For example, in Surah Al-Anbiya, verse 30, it is mentioned that this universe is a mass or arrangement of elements that are spread out. Thus, the Qur'anic perspective on the universe is as an unfolding of interconnected elements. This universe, which is the vast universe, also includes its laws and natural causes. Therefore, fundamentally, the universe should be understood as a manifestation of the existence of Allah SWT, His oneness, His greatness, His omnipotence, and His compassion. The universe along with all its contents and laws cannot exist without the existence of Allah, the Most Merciful [13].

Everything, including the heavens and the earth, is the creation of Allah, the Almighty (Qur'an 14:11). Allah is the absolute owner of the universe, its ruler, and its sustainer, the Most Merciful (Qur'an 1:1-3). This universe submits to the will of Allah (Qur'an 3:83) and praises Him (Qur'an 57:1, 59:1, 61:1, see also Qur'an 17:44, 24:41). The relationship between the universe (creation) and Allah (Creator) is very close, and although the universe has its own laws, this creation is absolutely dependent on the Creator who is infinite and absolute [14].

In the hadith, said:

حَدَّثَنَا مُحَمَّدُ بْنُ عَبْدِ اللَّهِ بْنِ نُمَيْرٍ حَدَّثَنَا أَبُو مُعَاوِيَةَ وَكَعْبٌ قَالَ حَدَّثَنَا الْأَعْمَشُ ح وَحَدَّثَنَا أَبُو كُرَيْبٍ حَدَّثَنَا أَبُو مُعَاوِيَةَ حَدَّثَنَا الْأَعْمَشُ عَنْ شَقِيقٍ عَنْ عَبْدِ اللَّهِ قَالَ قَالَ رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ عَلَيْكُمْ بِالصِّدْقِ فَإِنَّ الصِّدْقَ يَهْدِي إِلَى الْبِرِّ وَإِنَّ الْبِرَّ يَهْدِي إِلَى الْجَنَّةِ وَمَا يَزَالُ الرَّجُلُ يَصْدُقُ وَيَتَحَرَّى الصِّدْقَ حَتَّى يُكْتَبَ عِنْدَ اللَّهِ صِدِّيقًا وَإِيَّاكُمْ وَالْكَذِبُ فَإِنَّ الْكَذِبَ يَهْدِي إِلَى الْفُجُورِ وَإِنَّ الْفُجُورَ يَهْدِي إِلَى النَّارِ وَمَا يَزَالُ الرَّجُلُ يَكْذِبُ وَيَتَحَرَّى الْكَذِبَ حَتَّى يُكْتَبَ عِنْدَ اللَّهِ كَذَّابًا حَدَّثَنَا مَنْجَابُ بْنُ الْحَارِثِ التَّمِيمِيُّ أَخْبَرَنَا ابْنُ مُسْهِرٍ ح وَحَدَّثَنَا إِسْحَاقُ بْنُ إِبْرَاهِيمَ الْحَنْظَلِيُّ أَخْبَرَنَا عِيسَى بْنُ يُونُسَ كِلَاهُمَا عَنْ الْأَعْمَشِ بِهَذَا الْإِسْنَادِ وَلَمْ يَذْكُرْ فِي حَدِيثِ عِيسَى وَيَتَحَرَّى الصِّدْقَ وَيَتَحَرَّى الْكَذِبَ وَفِي حَدِيثِ ابْنِ مُسْهِرٍ حَتَّى يُكْتَبَ اللَّهُ

"Al A'masy narrated to us; similarly, it is also narrated through other chains, and Abu Kuraib narrated to us; Abu Mu'awiyah narrated to us; Al A'masy narrated to us from Syaqq from 'Abdullah, he said: The Messenger of Allah (may peace be upon him) said: 'You must be truthful, for truthfulness leads to righteousness, and righteousness leads to Paradise. A person continues to speak the truth and strives for truthfulness until he is recorded with Allah as truthful. Beware of lying, for lying leads to wickedness, and wickedness leads to Hellfire. A person continues to lie and persist in falsehood until he is recorded with Allah as a liar.'"

The above hadith explains the importance of speaking truthfully because truthfulness leads to goodness. Conversely, lying leads to evil. Furthermore, according to Muhammadiyah as stated in the Articles of Association and Bylaws of Muhammadiyah, living together in society is a rule established by Allah for human life in this world. Prosperity, peace, prosperity, and happiness of society can only be achieved through principles of justice, honesty, brotherhood, and mutual cooperation, based on the true laws of Allah, without being influenced by Satan and the urges of desires [15].

Furthermore, according to Suyatno [16], qauliyah verses are the verses that Allah SWT stated in the Qur'an and conveyed by the Prophet in Hadith. Kauniyah verses are manifestations of the signs of Allah's greatness in the universe, while nafsiah verses are manifestations of Allah's greatness found within human beings. Humans are considered as microcosms that reflect the greatness of the universe in miniature. In addition to qauliyah and kauniyah verses, there are also syajarah verses which are signs of Allah's greatness visible through the history of the development of the universe and its contents. The development of the universe over time shows extraordinary dynamics, always moving in orderly orbits, which is also evidence of Allah's greatness that can be a source of truth for mankind.

## Conclusion

Every learning process should provide holistic benefits to students, encompassing cognitive, affective, and psychomotor aspects, and instilling noble values that shape the nation's character. Integrating mathematical concepts with Islamic values is crucial as a means to shape the nation's character. Therefore, it is important to continue developing the analysis of mathematical materials by linking them with verses of the Qur'an, which are a source of wisdom and knowledge that can be learned by every human through the study of mathematics.

## Conflict of Interest

This article is prepared based on existing references, with no conflicts of interest involved.

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