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The Role Of Islamic Education In Shaping Students' Character Through Science and Technology

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Abstract

Neurotheology in Islamic education offers an interdisciplinary approach that integrates neuroscience with Islamic teachings to address the challenges of science and technology in the modern era. This study examines how the neurotheological perspective can bridge the gap between religious values and scientific and technological advancements, particularly in optimizing the brain's potential for holistic learning. The research problem lies in the dichotomy between secular science/technology and Islamic education, which often leads to fragmented human development. The objective of this study is to analyze the conceptual framework of neurotheology in strengthening Islamic education's response to science and technology, as well as to identify practical implications for curriculum integration. Using a qualitative literature review based on content analysis, data were collected from Quranic verses, the works of classical Islamic thinkers (such as Al-Ghazali, Al-Farabi, and Ibn Sina), and contemporary neurotheology literature. The research findings indicate that the concepts of 'aql (reason) and nasiyah in the Quran correlate with brain functions in neuroscience, thereby enabling the hybridization of neuroscience within Islamic education. This approach enhances cognitive, emotional, and spiritual intelligence, supports brain-based learning through practices such as prayer and dhikr, and encourages the ethical use of technology in accordance with tawhid. This study concludes that neurotheology provides a strong foundation for Islamic education to embrace science and technology without losing its spiritual essence, thereby fostering a generation of ulul albab in the digital age.

Keywords: Neurotheology, Islamic Education, Neuroscience, Science and Technology, Brain-Based Learning

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INTRODUCTION

Neurotheology in Islamic education offers an integrative approach that bridges the findings of modern science (particularly neuroscience) with the values of Islamic spirituality, in order to foster a holistic understanding of technology and science. This integration emphasizes that science and technology are means to improve the quality of life and strengthen faith, not merely physical tools.

Studies on neurotheology are gaining increasing prominence in academic discourse, particularly in the context of character education. This field integrates findings from neuroscience with spiritual values to explore how spiritual experiences can shape an individual's cognitive, moral, and emotional aspects. In the realm of education, the neurotheological approach offers an opportunity to develop students' character more holistically, addressing intellectual, emotional, and ethical dimensions simultaneously.

Islamic education, as an educational system grounded in the Quran and Sunnah, has the primary goal of shaping individuals of noble character who are also well-versed in knowledge. However, in the era of the Fourth Industrial Revolution and rapid advancements in science and technology, a dichotomy has emerged between religious knowledge and secular knowledge. This poses a challenge in integrating spiritual values with the rational and empirical approaches of science and technology. This phenomenon is evident in the low level of scientific literacy among students in Islamic education, while digital technology is often used without the filter of religious values, potentially leading to negative impacts such as addiction and a decline in spiritual intelligence.

In fact, this view is supported by various studies showing that traditional Islamic education is less than optimal in developing the brain's potential holistically. In fact, the human brain, as the center of reason and the soul, is the key to the learning process. Neurotheology, as an interdisciplinary field that combines neuroscience with theology, offers a solution by explaining how spiritual experiences such as prayer, remembrance of God, and contemplation influence brain activity, such as the release of dopamine and increased neural connectivity.

This approach aligns with the thought of classical Islamic figures such as Al-Ghazali, who emphasized the balance between reason and the heart, as well as Al-Farabi and Ibn Sina, who discussed aspects of neuroscience within the philosophy of Islamic education.

This study focuses on how neurotheology can strengthen Islamic education in responding to science and technology, with the aim of producing an integrative educational model. The benefits include the development of a brain-based curriculum that combines ayat kauniyah

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(science) with ayat qauliyah (the Quran), thereby fostering a generation of Muslims who are knowledgeable, pious, and capable of innovating ethically.

LITERATURE REVIEW

A. The Concept of Neurotheology as an Interdisciplinary Framework

Neurotheology is a field of study that systematically explores the relationship between neuroscience (brain function and structure) and religious, spiritual, and theological experiences. This field does not view religion and science as opposites, but rather as two complementary perspectives for understanding human nature.

According to Andrew Newberg (a pioneer in neurotheology), the principles of neurotheology encompass the reciprocal interaction between neuroscience and theology. This includes the study of how spiritual practices influence brain activity (for example, increased activity in the prefrontal cortex during meditation or prayer) and, conversely, how an understanding of the brain can enrich theological interpretation. Neurotheology emphasizes a holistic approach: neither reductionist (reducing spiritual experience solely to brain chemistry) nor dogmatic.

In the context of Islam, neurotheology connects the concepts *of aql* (reason) and *nasiyah* (forehead/brain) in the Qur'an with findings in neuroscience. Qur'anic verses Al-Alaq: 15–16 mention *nasiyah*, which scientifically refers to the frontal lobe of the brain associated with moral decision-making and self-control. This forms the basis for neuroscience-based Islamic education.

B. Neurotheology in Islamic Education

Suyadi (2019) proposes *hybridization* as a transdisciplinary approach that goes beyond mere integration or the Islamization of science. Hybridization gives rise to a new branch of science: Islamic Educational Neuroscience, which optimizes the brain's potential in religious education. This addresses the criticism that Islamic education has traditionally been dogmatic and pedagogical, lacking in empirical and rational elements, and thus failing to dynamically develop students' potential to become *ulul albab*.

This hybridization involves:

a. Neuroanatomy and neurophysiology: The prefrontal cortex for critical and moral thinking; the limbic system for emotional regulation.
b. Educational interventions: Stimulation through in-depth question-and-answer sessions, contemplation (tafakur), remembrance (dzikir), and *whole-brain learning*.

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This approach aligns with Al-Ghazali's ideas on intellectual, emotional, physical, and spiritual development, as well as modern concepts such as Emotional Intelligence (Goleman) and Spiritual Intelligence (Zohar & Marshall).

Studies in spiritual neuroscience within Islamic education indicate that character education is *brain education*. The conventional behavioral approach is replaced by neuroplasticity interventions that is, the brain's capacity to change through the conscious repetition of Islamic practices.

C. The Role of Science and Technology in Character Building through Neurotheology

The science and technology approach enables objective measurement and intervention:

1. Neuroimaging (fMRI, qEEG): Shows that dhikr and prayer increase amygdala-prefrontal cortex connectivity, strengthening emotional regulation, empathy, and calmness—the foundations of Islamic character (honesty, responsibility, patience).
2. Neurofeedback and edtech: Islamic mindfulness apps, gamified learning, and personalized AI can monitor and train students' brain patterns in real time.
3. Neuroplasticity and habituation: Character is shaped through long-term changes in neural pathways. The Neuro-PAI (Neuroscience Islamic Education) approach is effective for early childhood in internalizing Islamic social values.

In the digital age, technology integration helps address challenges (e.g., the influence of social media) while strengthening spiritual resilience. Studies show that neuroscience-based Islamic education can shape the adaptive religious character of Generation Z.

The integration of science and Islam is not merely a transfer of knowledge, but rather the cultivation of a holistic character: students who are devout, knowledgeable, and of good moral character, capable of navigating technological disruption.

RESEARCH METHODOLOGY

This study employs a qualitative approach in the form of library research, a method that involves reviewing books or journals on the discussed topic using content analysis techniques. Primary data sources include the Quran, Hadith, and the works of classical Islamic thinkers (Al-Ghazali, Al-Farabi, Ibn Sina), while secondary sources include neuroscience literature, neurotheology (Newberg et al.), and studies on the hybridization of Islamic education and neuroscience from various sources that complement the interpretation of the research theme, such as books, the internet, international journals, and Sinta-indexed scientific journals

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Data was collected through documentation and then analyzed thematically to identify correlations between Islamic theological concepts and neuroscience findings related to approaches in science and technology. Data validity was ensured through source triangulation.

RESEARCH FINDINGS AND DISCUSSION

Research findings indicate that neurotheology provides a robust framework for integrating Islamic education with science and technology. The concept of 'aql in the Quran correlates with the function of the prefrontal cortex in neuroscience, which is responsible for decision-making and ethics. Religious practices such as prayer have been shown to increase activity in the parietal and frontal lobes, thereby promoting concentration and calmness that are beneficial for technology-based science learning.

From an Islamic perspective, the study's findings also indicate that classical thinkers such as Al-Ghazali and Ibn Sina have addressed the connection between spiritual experience and the function of reason. Al-Ghazali, for example, emphasized the importance of muraqabah that is, awareness of God's presence as a path to clarity of heart and mind. This clarity is believed to pave the way for a deeper understanding of the values of truth and wisdom. This idea aligns with a principle in neurotheology stating that spiritual engagement can direct an individual's focus and cognitive activities toward a more reflective and purposeful direction. In the world of education, this kind of understanding supports the development of students who are not only intellectually superior but also morally and spiritually mature.

The discussion reveals that this hybridization gives rise to "Islamic Educational Neuroscience," which optimizes the brain's potential through brain-based learning infused with the principles of Tawhid. For example, the use of VR (Virtual Reality) technology to simulate verses about the natural world can be combined with contemplation to enhance spiritual intelligence. This finding is supported by Newberg's theory of neurotheology, which explains how religious experiences modify brain structure, in line with Islamic teachings that encourage the pursuit of knowledge as a form of worship.

The main challenge is teachers' limited understanding of neuroscience, but there is great potential through interdisciplinary training. Overall, this approach strengthens Islamic education so that it does not become outdated while remaining rooted in religious values.

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Table 1: The Influence of Spiritual Practices on Brain Activity in Science Learning

Aspect	Islamic Practices	Neuroscience Impact	Educational Implications
Concentration	Prayer	Increased prefrontal activity	Technology-focused learning
Emotional Intelligence	Remembrance	Release of dopamine & serotonin	Ethics of science use
Creativity	Contemplation	Brain Hemisphere Connectivity	Innovation based on monotheism

A Model of Neurotheological Integration in Islamic Education Regarding the Approach to Science and Technology. This integration views reason (neurological) and revelation (theological) not as operating independently, but rather as mutually reinforcing through technology as an instrument of observation and application.

This model illustrates a triadic relationship between Neurobiological Potential (the brain as hardware), Theological Values (spirituality as software), and Science-Technology (as an accelerator). Islamic education serves as *the core engine* that synergizes these three aspects to produce well-rounded individuals who are intellectually capable and spiritually grounded.

Key Components of the Integration Model:

1. The Neurotheological Dimension: A focus on how religious practices (such as prayer, dhikr, and tadabbur) stimulate specific parts of the brain, such as *the prefrontal cortex* for moral decision-making and *the limbic system* for emotional regulation.
   Allah SWT says: "We will show them Our signs in all regions of the earth and within themselves, until it becomes clear to their inner selves that the Qur'an is indeed the truth..." (QS. Fussilat [41]: 53).
2. The Dimension of Islamic Education: Playing a role in transforming neuroscience findings into a curriculum and learning methods based on human nature.
3. Science and Technology Dimension: Providing tools (such as fMRI or digital applications) to validate the effectiveness of educational methods while also serving as a medium for applying scientific knowledge in society.

In general, the results of this study show that neurotheology is not merely a theoretical construct, but also a conceptual-practical approach in the modern technological era that has real implications for character education. When spirituality is not limited solely to religious aspects but

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is also understood as part of human neurological and psychological dynamics, educational design can be conducted more scientifically and adapted to the context of changing times, in a comprehensive and human-centered manner. In the context of the moral crisis and identity crisis currently plaguing the world of education, the integration of neurotheology is not only relevant but also urgently needed as a foundation for meaningful and sustainable character building.

CONCLUSION

Neurotheology in Islamic education offers an interdisciplinary framework capable of bridging the dichotomy between religious studies and modern science. Through this approach, spiritual concepts such as *'aql* (reason) in the Quran are understood to have a tangible biological correlation with brain function, particularly in the *prefrontal cortex*, which controls moral and ethical decision-making. This integration enables Islamic education to utilize neuroscience findings to holistically optimize students' brain potential, so that technological advancement is no longer viewed as a threat but rather as a means to strengthen faith.

In practical application, religious practices such as prayer, dhikr, and tafakkur have been scientifically proven to have a positive impact on neurological activity that supports learning. Prayer helps improve focus and concentration through the activation of the frontal lobe, while dhikr supports emotional regulation through the release of dopamine and serotonin. By understanding these mechanisms, Islamic education can implement *brain-based learning* methods with a monotheistic (tauhid) perspective, where the use of technologies such as *Virtual Reality* (VR) can be integrated with reflective activities to enhance students' spiritual intelligence.

Overall, this model of neurotheological integration establishes a triadic relationship between neurobiological potential, theological values, and the acceleration of science and technology. This provides a strong foundation for the development of a curriculum that is adaptive to the changing times yet remains rooted in spiritual values. By making neurotheology the foundation of character education, Islamic educational institutions are expected to produce a generation *of ulul albab* who are not only intellectually capable in the digital age but also possess strong moral and spiritual integrity.

FUTURE DIRECTIONS

This study has provided a conceptual framework for neurotheology in strengthening Islamic education in the face of science and technology. However, there are still several important avenues for future research to further develop these findings.

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First, experimental empirical research involving neuroimaging technologies such as fMRI, EEG, or qEEG is needed to directly measure the impact of religious practices (prayer, dhikr, tafakkur) on students' brain activity and structure in the context of science and technology learning. Previous research has largely been theoretical and literature-based; therefore, laboratory-based or quasi-experimental studies in Islamic schools are highly relevant.

Second, the development and pilot testing of a comprehensive neurotheology-based curriculum model for Islamic education. Future research can design integrated learning modules that combine brain-based learning with the values of tawhid, and then measure their effectiveness in enhancing students' cognitive, emotional, and spiritual intelligence, as well as their character, through mixed-methods or action research designs.

Third, exploring the use of emerging technologies such as Artificial Intelligence (AI), Virtual Reality (VR), Augmented Reality (AR), and neurofeedback in neurotheologically-informed instructional design. Research can examine how these technologies can be utilized without undermining spiritual values, but rather by strengthening students' religious experiences.

Fourth, human resource development and policy are key to sustainability. In the future, there is a need for certification training programs for Islamic Education teachers on neuroscience in Islamic education, as well as the establishment of interdisciplinary research centers between the faculties of education, medicine, and information technology. The government, through the Ministry of Religious Affairs and the Ministry of Education, is expected to include neurotheology as one of the national research priorities in order to realize character education that is both scientifically grounded and spiritually meaningful.

By pursuing the above research directions, it is hoped that the contribution of neurotheology to Islamic education will not remain merely at the conceptual level but will become a scientific-practical movement capable of transforming Islamic education in Indonesia and the wider Islamic world, ensuring it remains relevant, competitive, and rooted in divine values amidst the rapid advancement of science and technology.

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