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Reason in the Qur'an and the Brain in Neuroscience: An Epistemological Reconciliation for Modern Islamic Education

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Abstract

This study examines the epistemological reconciliation between the concepts of reason in the Qur'an and the brain in modern neuroscience to develop a paradigm for contemporary Islamic education. As neuroscience increasingly illuminates the biological foundations of cognition, the challenge lies in integrating these findings with the Islamic understanding of reason as the primary instrument of human understanding. This study identifies reason in the Qur'an as a transcendental epistemological faculty that unites cognitive, moral, and spiritual dimensions, aiming at wisdom and God-consciousness, rather than merely a biological function. In contrast, neuroscience views the brain as the biological substrate of cognition through complex neural networks, with neuroplasticity emphasizing the brain's adaptive capacity. The comparative analysis reveals common functional roles in thinking, reflection, and decision-making, while highlighting key epistemological differences: neuroscience explains how cognition occurs, while the Qur'an explains why cognition exists and its ultimate purpose. This study proposes a Qur'anic Neuroepistemology Framework (QNF), which integrates revelation, reason, and the brain to promote holistic Islamic education that develops intellectual, moral, emotional, and spiritual intelligence while bridging the gap between religious knowledge and modern science.

INTRODUCTION

The rapid development of science and technology in the 21st century has driven a paradigm shift in understanding human thought processes, learning, and the formation of behavior (Anugrahsari & Ismail, 2023). This shift not only affects secular scientific fields but also demands a reconsideration of Islamic scientific perspectives in responding to contemporary scientific findings.

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Neuroscience, as a discipline that studies the structure, function, and dynamics of the nervous system, has developed into a field playing a crucial role in explaining the biological basis of human cognitive, affective, and behavioral activity (Judijanto et al., 2025). This development has made neuroscience a primary reference for understanding how the brain works when humans think, make decisions, and experience certain emotions. Technological advances such as functional magnetic resonance imaging (fMRI), electroencephalography (EEG), and positron emission tomography (PET) allow researchers to more comprehensively observe brain activity underlying thought, memory, decision-making, and consciousness (Devianto et al., 2024).

These three brain imaging technologies provide scientists with the opportunity to not only observe behavior from the outside but also explore internal brain mechanisms that have previously been difficult to access empirically. These findings have given rise to new approaches such as brain-based learning, educational neuroscience, and neuroeducation, which are increasingly being implemented in the development of modern education systems (Kartika & Nurjayanti, 2025)(Lahmi et al., 2025). These approaches essentially seek to bridge laboratory research findings with classroom learning practices, so that educational processes can be designed in harmony with the natural functioning of the human brain.

Educational neuroscience also shows that the integration of neuroplasticity, metacognition, and self-regulated learning can improve the quality of meaningful learning and support the development of higher-order thinking skills in students (Tokuhama-Espinosa, 2021). These three elements are closely interconnected, as the brain's ability to adapt (neuroplasticity) can only be optimized if students possess metacognitive awareness and independence in managing their own learning processes.

Furthermore, recent research confirms that the dialogue between neuroscience, education, and the spiritual dimension is gaining increasing attention as a transdisciplinary approach to explaining the complexities of human learning (Widiana et al., 2024). This trend indicates that understanding human learning can no longer be reduced to purely biological aspects, but rather requires considering the dimensions of value and meaning inherent in students' spiritual experiences.

On the other hand, the Islamic scientific tradition has long positioned reason ('Aql) as the primary human instrument for acquiring knowledge, understanding revelation, distinguishing truth from falsehood, and developing moral awareness (Anggraina, 2025). This central position of reason makes it a key concept in Islamic epistemology and a fundamental difference from modern neuroscience, which views the brain as a purely biological organ. From a Qur'anic perspective, reason is understood not merely as a biological capacity, but as an epistemological instrument that integrates intellectual, moral, and spiritual dimensions (Yakin, 2025).

This understanding demonstrates that reason, within the Qur'anic framework, has a far broader function than simply processing cognitive information as commonly studied in neuroscience. The difference in orientation between the concept of reason in the Qur'an and the concept of brain in neuroscience raises epistemological questions about their relationship, particularly in explaining the nature of human thought processes and their implications for the development of Islamic education.

This issue becomes increasingly relevant as Islamic education faces the challenges of the Industrial Revolution 5.0 era, digital transformation, the development of artificial intelligence, and the need to build 21st-century competencies (Rohman et al., 2024). Amidst this rapid flow of change, Islamic educational institutions are required not only to follow technological trends but also to be able to offer a solid foundation of values for students.

Education is no longer simply about developing intellectual abilities; it must also shape students' character, moral awareness, reflective abilities, and spirituality. However, Islamic educational practices still display a dichotomous tendency between religious knowledge and modern science, resulting in the development of intellectual, moral, and spiritual aspects often occurring separately (Alamsyah, 2025). This dichotomy ultimately hinders the formation of a truly holistic educational paradigm, as students tend to be introduced to two systems of knowledge that operate independently without a clear common ground.

This situation demonstrates the need for an educational paradigm capable of comprehensively integrating modern scientific findings with Islamic epistemology (Ernitasari et al., 2026). The need for this integrative paradigm is increasingly pressing with the widespread use of artificial intelligence technology in various aspects of life, including education.

Recent research reports also indicate that the use of artificial intelligence in education requires a strong ethical and epistemological framework so that the development of students' cognitive abilities remains balanced with the formation of character, values, and moral responsibility. In this context, integrating Quranic values with neuroscience findings is seen as a potential approach to building a humanistic education oriented toward intellectual-spiritual balance (Mustofa, 2026).

Several studies have attempted to connect neuroscience with Islamic education. Suyadi (2022) developed the Neuroscience Islamic Education perspective, explaining the importance of understanding brain development in shaping students' character and spirituality. This approach is an important pioneer, paving the way for further studies on the relationship between the brain and spirituality in the context of Islamic education. Other research shows that religious practices, such as prayer, dhikr, meditation, and contemplation, correlate with changes in brain activity related to emotional regulation, attention, and spiritual experiences (Mulya, 2025).

These findings provide empirical evidence that religious practices are not merely symbolic rituals but also have neurobiological traces that can be scientifically observed. Meanwhile, studies of Quranic interpretation explain that the term 'aql is always used in verb form, emphasizing the function of reason as an activity of thinking, understanding, and reflecting on reality, not as a static entity (Sholahudin et al., 2025). Nevertheless, these studies are still developing partially according to their respective disciplines.

The field of neurotheology also shows that religious experience is not solely related to the activation of specific areas of the brain, but involves integrated cognitive, affective, and social networks (Rosa et al., 2025). The complexity of these networks suggests that human spiritual experience cannot be explained solely through a reductionist approach that isolates one brain area from another. These findings open up opportunities to build conceptual models that connect the biological dimensions of the brain with the spiritual dimensions described in Islamic tradition (Alamsyah, 2025).

A review of previous research reveals several research gaps that have not received much attention. First, studies of the concept of reason in the Qur'an are still dominated by interpretive, linguistic, and theological approaches, thus lacking much dialogue with contemporary neuroscience (Sholahudin et al., 2025). This tendency has led to studies of reason in the Islamic tradition tending to operate independently without utilizing the latest findings from neuroscience.

Second, neuroscience research generally operates within an empirical-materialistic paradigm that explains thinking activity based on biological mechanisms without accommodating spiritual and transcendental dimensions (Suyadi, 2022)(Triono, 2023). As a result, metaphysical and transcendental aspects of human thinking experience tend to be neglected in mainstream neuroscience studies.

Third, integrative research linking Islam and neuroscience has focused more on implementing brain-based learning than on developing an epistemological framework that explains the conceptual relationship between revelation, reason, and the brain (Bastari, 2024). This predominant focus on practical-pedagogical aspects has left the more fundamental epistemological dimension underdeveloped. Consequently, to date, there is no conceptual model that systematically reconciles the concept of reason as a Qur'anic epistemological instrument with the brain as the biological substrate of cognitive activity.

Educational neuroscience also concludes that most research still focuses on pedagogical and neurocognitive aspects, while integration between epistemology, philosophy of science, and spirituality remains very limited (Yudelnilastia et al., 2025) This gap paves the way for the development of the Qur'anic Neuroepistemology Framework (QNF) as a conceptual synthesis that has not been widely developed in recent literature (Muliati et al., 2025).

Based on this gap, this study offers a novel approach in the form of the Qur'anic Neuroepistemology Framework (QNF), a model of epistemological reconciliation that integrates revelation as a source of values, reason as an epistemological instrument, and the brain as the biological basis of cognitive activity. This model is designed to coherently bridge these three elements, ensuring that no single dimension is diminished or ignored in understanding the nature of human thought.

Unlike previous research that focused more on the implementation of neuroscience in learning or the relationship between spirituality and brain activity, this study builds a conceptual synthesis of the ontological, epistemological, and axiological relationships between the concept of reason in the Qur'an and the concept of the brain in neuroscience (Gazzaniga et al., 2024). This framework is expected to serve as a foundation for developing a holistic, integrative, and relevant Islamic educational paradigm to meet the challenges of the 21st century.

Based on this background, this study aims to (1) analyze the concept of reason in the Qur'an and the concept of brain in modern neuroscience, (2) identify the epistemological points of contact and differences between the two, and (3) formulate the Qur'anic Neuroepistemology Framework (QNF) as a paradigm for developing Islamic education that integrates intellectual, moral, emotional, and spiritual intelligence.

METHODS

This article uses a qualitative approach with a library research design. This approach was chosen because the research focuses on the understanding, interpretation, and conceptual reconstruction of the concept of reason in the Qur'an and the concept of the brain in modern neuroscience. Through library research, various scientific sources were critically analyzed to construct a conceptual synthesis capable of explaining the epistemological relationship between revelation, reason, and neuroscience findings in the context of Islamic education (Perdana et al., 2026). This research adopts an integrative epistemological perspective that views Islamic science and empirical science as two domains that can be scientifically dialogued, resulting in a more comprehensive framework of understanding.

The research data sources consist of primary and secondary data. Primary data include the Qur'an, relevant tafsir books, and primary neuroscience literature discussing brain function, neuroplasticity, cognitive neuroscience, and neuroeducation. Secondary data were obtained from articles in reputable international journals, accredited national journals, and academic books discussing Islamic epistemology, Islamic educational philosophy, and educational neuroscience.

Literature was prioritized from publications within the last five years to ensure the study's results remain current and relevant.

Data collection was conducted through a documentary study by identifying literature from various academic databases, such as Scopus, Web of Science, Google Scholar, Dimensions, and Crossref. Sources were then selected based on their relevance to the research focus, academic quality, and publication recency. All documents were then classified according to research themes to facilitate data interpretation and synthesis.

Data analysis used thematic analysis as developed by Ismail (2022). The analysis began with a thorough reading of all sources, followed by identifying key concepts and grouping them into themes related to the concept of reason in the Quran, the concept of the brain in neuroscience, the intersection of the two, and their implications for Islamic education. These themes were then interpreted through conceptual analysis, hermeneutic analysis of Quranic verses, and comparative-epistemological analysis to reconstruct the relationship between the concepts of reason and the brain.

Data validity was maintained through source triangulation by comparing various perspectives from the literature on tafsir (interpretation), Islamic philosophy, and neuroscience. Furthermore, the research applied the principles of dependability through documentation of the source search and analysis process, and confirmability by ensuring that all interpretations were based on traceable scientific evidence (Elk & Aleman, 2022). Thus, the research findings have a sufficient level of credibility to serve as a basis for developing a conceptual model for integrating Qur'anic epistemology and neuroscience in Islamic education.

RESULT AND DISCUSSION

Reconciling the Epistemology of Reason in the Qur'an and the Brain in Neuroscience for Modern Islamic Education

A comprehensive analysis of the Qur'anic literature, tafsir (interpretation), Islamic educational philosophy, cognitive neuroscience, neuroeducation, and contemporary Islamic epistemology yields four main themes that form a model of epistemological reconciliation between the concepts of reason and brain: (1) reason as a transcendental epistemological instrument; (2) the brain as the biological substrate of human cognition; (3) the intersection of reason and brain in the learning process; and (4) the integrated model of revelation, reason, and brain as the foundation of modern Islamic education. These four themes not only demonstrate the conceptual relationship between Islamic and neuroscientific perspectives but also demonstrate their complementary nature in explaining the nature of human knowledge.

1. Reason as a Transcendental Epistemological Instrument

A study of Qur'anic verses containing the derivation of the word 'aqala' demonstrates that reason is not positioned as a biological organ, but rather as an active human ability to understand, interpret, and learn from the realities of life. Reason functions to connect empirical phenomena with deeper meanings, enabling humans to attain true knowledge about themselves, the universe, and God (Al-Khawaldeh et al., 2024).

Thus, unlike the materialistic approach that views thinking as merely a biological activity, the Quran positions reason as an epistemological instrument with a moral and spiritual orientation. Thinking activities are directed toward attaining wisdom and God-consciousness.

The findings are summarized in Table 1.

Table 1. The Function of Reason from the

Function	Description
Cognitive	Understanding phenomena and reality
Reflective	Conducting contemplation and reflection
Moral	Distinguishing right from wrong
Spiritual	Leading to an understanding of God

These four functions demonstrate that the Qur'anic concept of reason is far broader than the concept of intelligence in modern psychology. This broader scope confirms that reason in the Qur'an cannot be fully equated with the concept of intelligence quotient (IQ) or cognitive ability alone, as commonly measured in psychometric tests. Reason encompasses not only rational processes but also a system of consciousness that integrates intellectual, emotional, moral, and spiritual dimensions. This finding also reinforces the view that Islamic education that focuses solely on cognitive achievement has the potential to diminish the primary function of reason as described in the Qur'an (Izutsu, 2002).

This interpretation aligns with the view (Suyadi et al., 2020) which positions rationality and spirituality as two inseparable elements in the formation of knowledge. This parallel view strengthens the argument that the function of reason in the Islamic tradition is comprehensive and cannot be reduced to just one of its dimensions. Thus, the results of this study confirm that the function of reason in Islam is teleological, directed at developing wisdom, piety, and the well-being of human life, not merely producing the ability to think logically.

2. *The Brain as the Biological Substrate of Human Cognition*

Analysis of modern neuroscience literature shows that all human cognitive activity has a biological basis that can be observed through brain activity. This understanding is important because it confirms that every thought process, no matter how abstract and complex, always has neurobiological correlates that can be scientifically tracked and measured.

The various functions associated with reason involve complex neural networks, particularly the prefrontal cortex, hippocampus, amygdala, and limbic system (Immordino-Yang et al., 2023)(Kandel et al., 2021). These structures work synergistically in the processes of thinking, remembering, decision-making, controlling emotions, and learning from experience.

The relationship between brain structure and cognitive function is summarized in Table 2.

Table 2. Relationship between Brain Structure and Cognitive Function

Brain Structure	***Function***
Prefrontal Cortex	Critical thinking and decision-making
Hippocampus	Memory and learning
Amygdala	Emotion regulation
Limbic System	Motivation and affective experience
Neocortex	Complex information processing

One of the important findings of neuroscience is the concept of neuroplasticity, the brain's ability to continuously develop throughout life in response to learning experiences (Howard-Jones, 2024). This concept challenges the long-held assumption that brain capacity is fixed at a certain age, and instead demonstrates that the human brain is constantly open to structural and functional changes throughout life. This finding demonstrates that human thinking ability is dynamic and can be continuously enhanced through appropriate educational stimulation.

From an Islamic educational perspective, this concept reinforces the principle of lifelong learning, which has long been a key characteristic of the Islamic scientific tradition. This principle aligns with the spirit of seeking knowledge without age limits long advocated in the Islamic tradition, so modern neuroscientific findings actually provide scientific justification for this long-held teaching. In other words, neuroscience provides biological legitimacy for the Islamic educational principle that humans have the potential to continuously learn and improve themselves throughout life (Izutsu, 2008). This concept also demonstrates that biological explanations of neuroscience do not contradict the concept of reason but rather explain the biological mechanisms that enable these functions.

3. Intersection of Reason and Brain in the Learning Process

Comparative analysis shows that, despite originating from different scientific traditions, the concept of reason in the Quran and the concept of brain in neuroscience share a number of significant points of convergence. This intersection serves as an important foundation for this research, demonstrating that these two scientific traditions, despite their different underlying assumptions, can actually explain and enrich each other. The activities of contemplation, reflection, and reflection described in the Quran have functional equivalents in neuroscience through the concepts of reflective thinking, deep cognitive processing, executive function, and metacognition.

Table 1. Integration of Qur'anic Intellect and Neuroscience Concepts

Qur'anic Intellect	Neuroscience Concept
Tafakkur	Reflective Thinking
Tadabbur	Deep Cognitive Processing
Ta'aqqul	Executive Function
Muhasabah	Metacognition
Hikmah	Wisdom-Based Decision Making
Ulul Albab	Integrated Intelligence

These results demonstrate that the conflict between the concepts of reason and brain is actually more epistemological than functional. The superficial differences are more due to the differing frameworks and scientific objectives of each tradition, rather than to any substantial conflict in understanding the cognitive process itself. Functionally, both address relatively similar cognitive processes. The difference lies in the orientation of the explanation. Neuroscience seeks to explain how thinking occurs through biological mechanisms, while the Quran explains why humans should think and the direction in which this thinking activity is directed.

These findings strengthen the argument that reducing the concept of reason to a mere biological activity will eliminate the moral and spiritual dimensions that are key characteristics of Islamic epistemology (Kamali, 2018). Such a reduction risks making education solely oriented towards cognitive achievement without attention to the formation of character and piety in students. Conversely, ignoring neuroscientific explanations will deprive Islamic education of its scientific foundation in human learning mechanisms. Therefore, both perspectives need to be positioned in a complementary manner.

4. The Epistemological Reconciliation Model of Revelation, Reason, and Brain

The final theme represents the main finding and conceptual novelty of this research. This theme culminates the entire analysis, as it is where the previous three themes converge into a coherent and applicable framework. Based on the literature synthesis, the relationship between revelation, reason, and the brain can be understood through a hierarchical-integrative model (Sousa, 2022). In this model, revelation serves as a source of values and truth orientation, reason as an instrument of interpretation and reflection, and the brain as the biological medium that enables all cognitive processes to occur.

This model demonstrates that modern Islamic education is not merely focused on developing thinking skills; it must also ensure a clear value orientation. Without a clear value orientation, the educational process risks producing cognitively intelligent individuals who lack direction and moral grounding in their lives. Revelation provides normative direction, reason provides reflective and interpretive abilities, and the brain provides the biological mechanisms of learning. These three elements form an inseparable whole. Separating any one component will result in a partial and incomplete educational process.

These findings reinforce the view that reason and brain are not two opposing entities, but rather two distinct perspectives in explaining human cognitive reality (Newberg, 2023). These two perspectives fundamentally stand at different levels of explanation and, therefore, should not be viewed as mutually exclusive. Neuroscience explains the biological mechanisms of thinking activity, while the Quran provides ontological, epistemological, and axiological orientations regarding the purpose of using the faculty of thinking (Pessoa, 2022). Thus, the dialogue between Islamic scientific traditions and neuroscience does not result in conflict, but rather produces a productive synthesis for the development of 21st-century Islamic education.

Qur'anic Neuroepistemology Framework (QNF)

Based on these four main themes, this research produces a conceptual model of the Qur'anic Neuroepistemology Framework (QNF), consisting of five components: Revelation-Based Knowledge, Rational Reflection, Neural Processing, Character Formation, and Civilizational Development. These five components are arranged sequentially to illustrate how the values of revelation can ultimately be transformed into concrete contributions to social life. This model depicts the path of human development, beginning with revelation as a source of values, processed through rational reflection and neural mechanisms, then internalized into character before ultimately culminating in contributions to the development of society and civilization (Pessoa, 2023).

The QNF model represents a major research innovation because it offers an epistemological framework that simultaneously reconciles the relationship between revelation, reason, and the brain (Raniya et al., 2025). This novelty lies in its nature, which goes beyond the descriptive level but instead offers a conceptual framework that can serve as a practical reference in designing educational processes.

Unlike previous research, which generally only discussed Islamic educational neuroscience or the concept of reason separately, this model explains the ontological, epistemological, and axiological relationships of these three elements within a single, coherent conceptual framework (Al-Otaibi, 2025). This contribution opens up space for a more constructive dialogue between the Islamic scientific tradition and the development of modern neuroscience as well as being a foundation for the development of Islamic education theories, curricula, learning strategies, and policies that are more integrative, relevant, and adaptive to the challenges of the 21st century.

CONCLUSION

This research demonstrates that the concept of reason in the Quran and the concept of the brain in neuroscience are not in a conflicting relationship, but rather complementary at the epistemological level. This conclusion provides a direct answer to the epistemological question raised at the outset of the research: how to position the relationship between two scientific traditions that have often been viewed as operating independently.

Neuroscience explains the biological mechanisms of cognitive processes, while the Quran provides an ontological, moral, and spiritual orientation to the use of reason. These two explanations fundamentally operate at different yet complementary levels, so they must be understood simultaneously to achieve a complete picture of the nature of human thought. These findings emphasize that a comprehensive understanding of the nature of human knowledge requires an integration of empirical and transcendental dimensions to transcend the dichotomy between religious and modern science.

The primary scientific contribution of this research is the development of the Qur'anic Neuroepistemology Framework (QNF), a conceptual model that reconciles the relationship between revelation, reason, and the brain within a coherent epistemological framework. This model addresses the previously identified literature gap and affirms this research's position as an initial attempt to more systematically bridge the study of Islamic interpretation, Islamic educational philosophy, and cognitive neuroscience.

Unlike previous research, which generally only linked neuroscience to learning practices or examined the concept of reason normatively, QNF offers a conceptual synthesis that explains the ontological, epistemological, and axiological interrelationships of these three elements. This three-dimensional interrelationship provides added value, as previous research tended to focus on only one dimension without fully connecting it to the other two. Thus, this research enriches the body of Islamic educational theory and expands the scope for scientific dialogue between Quranic studies, Islamic educational philosophy, and contemporary neuroscience.

The implications of this research include the development of a more holistic Islamic educational paradigm that positions the strengthening of intellectual, moral, emotional, and spiritual intelligence as a whole, supported by a scientific understanding of brain processes. This paradigm is expected to encourage Islamic educational institutions to design learning processes that are oriented not only toward academic achievement but also toward the holistic development of students' personalities.

The QNF framework can serve as a conceptual foundation for curriculum development, learning design, interdisciplinary research, and Islamic education policies that are more adaptive to the challenges of the 21st century. Practical use of this framework opens up opportunities for educators and policymakers to formulate learning strategies that balance cognitive reinforcement with value reinforcement. Future research is recommended to test the QNF model through empirical studies at various educational levels and contexts to validate its effectiveness in improving the

quality of learning and developing student character.

REFERENCES

Al-Khawaldeh, S. K., Al-Ajaleen, M. M., Al-Khawaldeh, N. N., Al Kayed, M. M., & Alkayid, M. M. (2024). The semantic and contextual meanings of the cognitive words "Ya'qilun, Yatafakkarun, Yatadabbarun, Yafqahun" in the Holy Qur'an. *Theory and Practice in Language Studies*, *14*(6), 1838–1849.

Al-Otaibi, G. M. (2025). Semantic prosody of deictic verbs in the Holy Qurʾān: A corpus study. *Humanities and Social Sciences Communications*, *12*(1), 88.

Alamsyah, A. A. (2025). Neurospiritualitas dalam Pendidikan Karakter: Antara Kognisi, Moralitas, dan Pengembangan Diri. *PROGRESSA: Journal of Islamic Religious Instruction*, *9*(2), 128–139.

Anggraina, Y. A. (2025). Integrasi Wahyu dan Akal dalam epistemology Islam: Studi Literatur Berbasis Al Qur'an dan Pemikiran Filsus Muslim. *Inklusi: Jurnal Pendidikan Islam Dan Filsafat*, *1*(2), 99–108.

Anugrahsari, I., & Ismail, I. (2023). Transformasi Pendidikan Abad 21: Filsafat Pendidikan dalam Wujud Kurikulum Merdeka. *Jurnal Ilmu Multidisiplin*, *1*(1), 10–25.

Bastari, A. (2024). Pesan-pesan Al-Qur'an untuk ulul albab: Studi tematik dengan pendekatan munasabah. *Jurnal Semiotika-Q: Kajian Ilmu Al-Quran Dan Tafsir*, *4*(2), 589–606 10 19109 4 2 24480.

Devianto, Y., Sediyono, E., Prasetyo, S. Y. J., & Manongga, D. (2024). Membaca Sinyal Electroencephalogram (EEG) Dalam Menangkap Tingkat Emosi (Berdasarkan Ontologi. *Faktor Exacta*, *17*(2), 152–160 10 30998 17 2 20878.

Elk, M., & Aleman, A. (2022). Brain mechanisms in religion and spirituality: An integrative predictive processing framework. *Neuroscience & Biobehavioral Reviews*, *135*, *10457*. https://doi.org/10.1016/j.neubiorev.2022.104578

Ernitasari, E. P., Sentia, W., & Mamat, N. (2026). The Role of the Andragogical Approach in Improving Parents Educational Competence in Early Childhood Education in the Modern Era. *Bunayya: Journal of Islamic Early Childhood Education*, *1*(1), 17–24.

Gazzaniga, M. S., Mangun, G. R., & Ivry, R. B. (2024). *Cognitive neuroscience: The biology of the mind* (6th ed.). W. W. Norton & Company.

Howard-Jones, P. (2024). Neuroscience and education: A review of educational interventions and approaches informed by brain science. *Educational Research Review*, *42*. https://doi.org/10.1016/j.edurev.2024.100582

Immordino-Yang, M. H., Darling-Hammond, L., & Krone, C. R. (2023). The brain basis for integrated social, emotional, and academic development: How emotions and social relationships drive learning. *Educational Psychologist*, *58*(2), 1–20.

Ismail, M. (2022). *Menalar Makna Berpikir dalam Al-Qur'an: Pendekatan Semantik terhadap Konsep-Konsep Kunci Al-Qur'an*. Unida Gontor Press.

Izutsu, T. (2002). *Ethico-religious concepts in the Qur'an*. McGill-Queen's University Press.

Izutsu, T. (2008). *God and man in the Qur'an: Semantics of the Qur'anic Weltanschauung*. Islamic Book Trust.

Judijanto, L., Runtunuwu, P. C. H., & Indriawati, R. (2025). Tren Penelitian Educational Neuroscience dalam Pendidikan Abad 21 berdasarkan Kajian Bibliometrik pada Database Scopus. *Jurnal BELAINDIKA: Pembelajaran Dan Inovasi Pendidikan*, *7*(2), 352–361. https://doi.org/10.52005/belaindika.v7i2.384

Kamali, M. H. (2018). *Reading the signs: A Qur'anic perspective on thinking*. International Institute of Islamic Thought.

Kandel, E. R., Koester, J. D., Mack, S. H., & Siegelbaum, S. A. (2021). *Principles of neural science* (6th ed.). McGraw-Hill Education.

Kartika, D., & Nurjayanti, G. (2025). Brain-Based Learning dalam Pendidikan Islam Strategi Pembelajaran Berbasis Otak. *An-Nuha*, *5*(3), 414–428. https://doi.org/10.24036/annuha.v5i3.693

Lahmi, A., Dahlan, D., Hakim, R., & Prima, A. (2025). Meretas Jalan Pendidikan Islam Modern melalui Perspektif Neurosains. *Al Qodiri: Jurnal Pendidikan, Sosial Dan Keagamaan*, *23*(2). https://doi.org/10.53515/qodiri.2025.23.2.517-529

Muliati, M. M., Atmunadi, A., & Zahara, A. (2025). Neuroscience-Based Fiqh Learning to Strengthen Spirituality and Religious Cognition of Students in Madrasah: Pembelajaran Fiqih Berbasis Neurosains Untuk Penguatan Spiritualitas Dan Kognisi Religius Peserta Didik Di Madrasah. *Ikhtisar: Jurnal Pengetahuan Islam*, *5*(2), 375–386.

Mulya, B. (2025). Efek Psikologis Pembacaan Dzikir Terhadap Kesehatan Mental Di Era Digital. *NIHAYAH: Journal of Islamic Studies*, *1*(2), 288–300.

Mustofa, L. (2026). *Artificial intelligence dan dinamika peran guru dalam pendidikan Islam di Madrasah Tsanawiyah Negeri 1 Kotawaringin Timur Kalimantan Tengah*.

Newberg, A. B. (2023). *Neurotheology: How science can enlighten us about spirituality*. Columbia University Press.

Perdana, T., Yuda, Y., Nuardi, A., & Sabri, A. (2026). Anatomi, Relevansi, Dan Kontekstualisasi Dasar-Dasar Pengembangan Ilmu Neurosains Pendidikan Islam (NPI. *ARMADA: Jurnal Penelitian Multidisiplin*, *4*(5), 357–366.

Pessoa, L. (2022). Emotion and cognition and the amygdala: From "what is it?" to "what's to be done?" *Neuropsychologia*, *179*, 108449.

Pessoa, L. (2023). *The entangled brain: How perception, cognition, and emotion are integrated*. MIT Press.

Raniya, P. T., Silmi, T. A., Kusaeri, K., Suparto, S., & Malyuna, S. I. (2025). Neuroeducational assessment design of Islamic religious education in the era of society 5.0. *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, *7*(1), 45–61. https://doi.org/10.37680/scaffolding.v7i1.7286

Rohman, T., Ilyasin, M., & Muadin, A. (2024). Kontribusi Islam Terhadap Perkembangan Pendidikan Islam Dalam Era Industri 4.0. *Journal of Instructional and Development Researches*, *4*(6), 486–498.

Rosa, V., Resti, O., & Dwi, G. S. (2025). Implementasi Zakat dalam Meningkatkan Kesejahteraan Masyarakat di Kecamatan Lubuk Sikaping. *Krigan: Jurnal Manajemen Dan Bisnis Syariah*, *3*(2), 226–239.

Sholahudin, S., Al Farisi, M. Z., & Supriadi, R. (2025). Analisis semantik istilah kognitif dalam Al-Qur'an: Tafakkur, tadabbur, 'aql, dan tażakkur. *Jurnal Semiotika-Q: Kajian IlSholahudin, S., Al Farisi, M. Z., & Supriadi, R. (n.d.). Analisis Semantik Istilah Kognitif Dalam Al-Qur'an: Tafakkur, Tadabbur, 'aql, Dan Tażakkur. Jurnal Semiotika-Q: Kajian Ilmu Al-Quran Dan Tafsir, 5(2), 543–564.Mu Al-Qura*, *5*(2), 543–564.

Sousa, D. A. (2022). *How the brain learns* (6th ed.). Corwin Press.

Suyadi. (2022). Learning taxonomy of Islamic education: The development of aql and the brain in Quran from a neuroscience perspective. *Millah: Journal of Religious Studies*, *21*(2), 361–410. https://doi.org/10.20885/millah.vol21.iss2.art3

Suyadi, N., Z., & Fauzi, N. A. F. (2020). The fiqh of disaster: The mitigation of COVID-19 in the perspective of Islamic education-neuroscience. *International Journal of Disaster Risk Reduction*, *51*, 101848.

Tokuhama-Espinosa, T. (2021). *Neuromyths: Debunking false ideas about the brain*. W. W. Norton & Company.

Triono, A. (2023). *Sosioneurosains Perspektif Al-QurAn Studi Perilaku Manusia Dan Faktor-Faktor Yang Memengaruhinya*.

Widiana, I. W., Jampel, I. N., Tegeh, I. M., & Parwata, I. G. L. A. (2024). *Metacognitive-Based Learning Model Model Pembelajaran Berbasis Metakognitif*. PT.

RajaGrafindo Persada-Rajawali Pers.
Yakin, A. A. (2025). Hibridisasi Pendidikan Islam Dan Neurosains: Implementasi Paradigma Integrasi Keilmuan Dalam Pendidikan Islam. *MA'ALIM: Jurnal Pendidikan Islam*, *6*(2), 153–167 10 21154 6 2 11739.
Yudelnilastia, Y., Putri, V. M., Novitri, R., & Angela, I. (2025). Analisis Pembelajaran Diferensiasi pada Anak Usia Dini dari Perspektif Pendidikan Islam. *Jurnal Penelitian & Praktik Pendidikan Anak Usia Dini Islam*, *1*(1), 8–15.