

INTEGRATION OF NEUROSCIENCE IN ISLAMIC
EDUCATION IN INDONESIA: AN EVALUATIVE CASE
STUDY FROM QUR'ĀNIC PERSPECTIVE

BY

ARINI ALFA MAWADDAH

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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A dissertation submitted in fulfilment of the requirement for
the degree of Master of Islamic Revealed Knowledge and
Heritage in Qur'an and Sunnah

AbdulHamid AbuSulayman Kulliyah of Islamic Revealed
Knowledge and Human Sciences
International Islamic University Malaysia

APRIL 2026

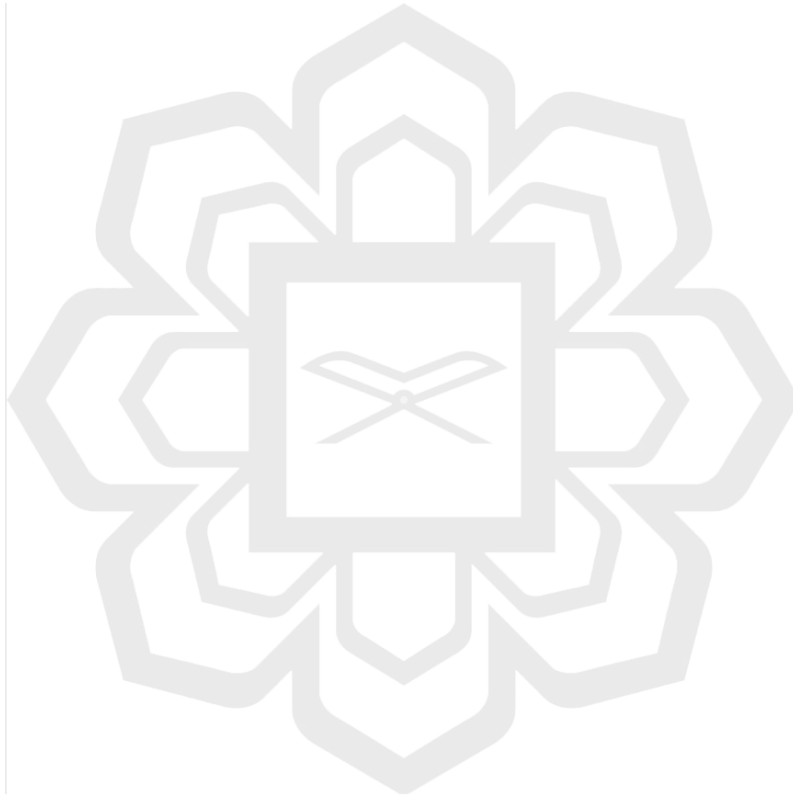
ABSTRACT

The discourse on integrating neuroscience into Islamic education in Indonesia emerges from the broader agenda of integrating Islam and science within Islamic higher education in the country. This agenda seeks to overcome the long-standing dichotomy between religious and secular sciences. However, the role of the Qur'ān and the methodological approaches employed in this discourse have drawn criticism. Critics argue that the Qur'ān is often approached superficially, without a systematic or rigorous methodology. Despite these critiques, there has been little in-depth research examining how the Qur'ān is actually engaged in this context, what interpretive methods are utilised, and why these methods are deemed inadequate from the perspective of Qur'ānic studies. This study seeks to fill that gap by taking the discourse on the integration of neuroscience into Islamic education as a case study. It aims to identify the limitations of the methodological approaches to the Qur'ān employed in this context and to evaluate the challenges involved in interpreting the Qur'ān in light of contemporary interdisciplinary issues. This research employs a qualitative, library-based approach combining descriptive, textual, and critical analysis. It reviews the literature on neuroscience and Islamic education, identifies the Qur'ānic verses and concepts most frequently cited, analyses the interpretive strategies adopted, and critically assesses their adequacy. Inductive reasoning and content analysis are used to highlight methodological patterns and shortcomings. The findings indicate that in the interpretations of several Qur'ānic verses within the discourse on integrating neuroscience into Islamic education in Indonesia, the conclusion was predetermined, namely, that neuroscience has traces in the Qur'ān. This prior assumption shapes the interpreters' framework and significantly influences the overall interpretive process and outcomes. Furthermore, the method of *al-tafsīr al-mawdhū'ī*, has not been applied rigorously and systematically. Existing studies often lack in-depth synthesis and fail to address the core objective of thematic interpretation which is to formulate a Qur'ānic framework for the theme under investigation, leaving this dimension largely underexplored. Although the issue studied is interdisciplinary, the interpretive methods employed do not reflect the complexities of such a context. This study, therefore, calls for a more robust methodology and a rigorous, collaborative effort by experts from different fields. Interdisciplinary engagement must be grounded in responsible Qur'ānic interpretation. As this study highlights the epistemological and philosophical challenges in merging modern neuroscience with Islamic educational thought, it advocates for a more reflective philosophical dialogue through interdisciplinary collaboration.

خلاصة البحث

ينبثق الخطاب الدائر حول دمج علم الأعصاب في التعليم الإسلامي في إندونيسيا من أجندة أوسع نطاقاً تهدف إلى دمج الإسلام والعلوم في التعليم العالي الإسلامي في البلاد. وتسعى هذه الأجندة إلى تجاوز الثنائية القائمة منذ زمن طويل بين العلوم الدينية والعلمانية. ومع ذلك، فقد تعرض دور القرآن الكريم والمناهج المتبعة في هذا الخطاب لانتقادات. إذ يرى النقاد أن القرآن الكريم غالباً ما يُتناول بشكل سطحي، دون منهجية منظمة أو دقيقة. وعلى الرغم من هذه الانتقادات، إلا أن الأبحاث المعمقة التي تتناول كيفية استخدام القرآن الكريم في هذا السياق، والأساليب التفسيرية المستخدمة، وأسباب اعتبار هذه الأساليب غير كافية من منظور الدراسات القرآنية، لا تزال قليلة. تسعى هذه الدراسة إلى سد هذه الفجوة من خلال دراسة الخطاب الدائر حول دمج علم الأعصاب في التعليم الإسلامي كدراسة حالة. وتهدف إلى تحديد أوجه القصور في المناهج المتبعة في دراسة القرآن الكريم في هذا السياق، وتقييم التحديات التي ينطوي عليها تفسير القرآن الكريم في ضوء القضايا المعاصرة متعددة التخصصات. يستخدم هذا البحث منهجاً نوعياً قائماً على المكتبة، يجمع بين التحليل الوصفي والنصي والنقدي. ويستعرض الأدبيات المتعلقة بعلم الأعصاب والتعليم الإسلامي، ويحدد الآيات والمفاهيم القرآنية الأكثر استشهاداً بها، ويحلل استراتيجيات التفسير المتبعة، ويقيم مدى كفايتها تقييماً نقدياً. ويُستخدم الاستدلال الاستقرائي وتحليل المحتوى لتسليط الضوء على الأنماط المنهجية ونقاط ضعفها. وتشير النتائج إلى أن تفسيرات لعدد من الآيات القرآنية في سياق دمج علم الأعصاب في التعليم الإسلامي في إندونيسيا، انطلقت من استنتاج محدد سلفاً، وهي القول بأن لعلم الأعصاب أصولاً أو إشارات في القرآن الكريم. ويؤثر هذا الافتراض بشكل كبير على إطار عمل المفسرين، وعلى عملية التفسير ونتائجها بشكل عام. علاوة على ذلك، لم يُطبَّق منهج التفسير الموضوعي تطبيقاً دقيقاً ومنهجياً. غالباً ما تفتقر الدراسات الحالية إلى التحليل العميق، وتُحقق في معالجة الهدف الأساسي للتفسير الموضوعي، ألا وهو صياغة إطار قرآني للموضوع قيد البحث، مما يجعل هذا البُعد غير مُستكشف بشكل كافٍ. ورغم أن القضية المدروسة متعددة التخصصات، فإن أساليب التفسير المستخدمة لا تُراعي تعقيدات هذا السياق. لذا،

تدعو هذه الدراسة إلى منهجية أكثر قوة وجهد تعاوني دقيق من قِبَل خبراء من مختلف المجالات. يجب أن يركز التفاعل متعدد التخصصات على تفسير قرآني مسؤول. ولأن هذه الدراسة تُسلط الضوء على التحديات المعرفية والفلسفية في دمج علم الأعصاب الحديث مع الفكر التربوي الإسلامي، فإنها تُناشد حوارًا فلسفيًا أكثر عمقًا من خلال التعاون متعدد التخصصات.



APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Islamic Revealed Knowledge and Heritage in Qur'an and Sunnah.

.....
Zunaidah binti Mohd Marzuki
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Muhammad Adli bin Musa
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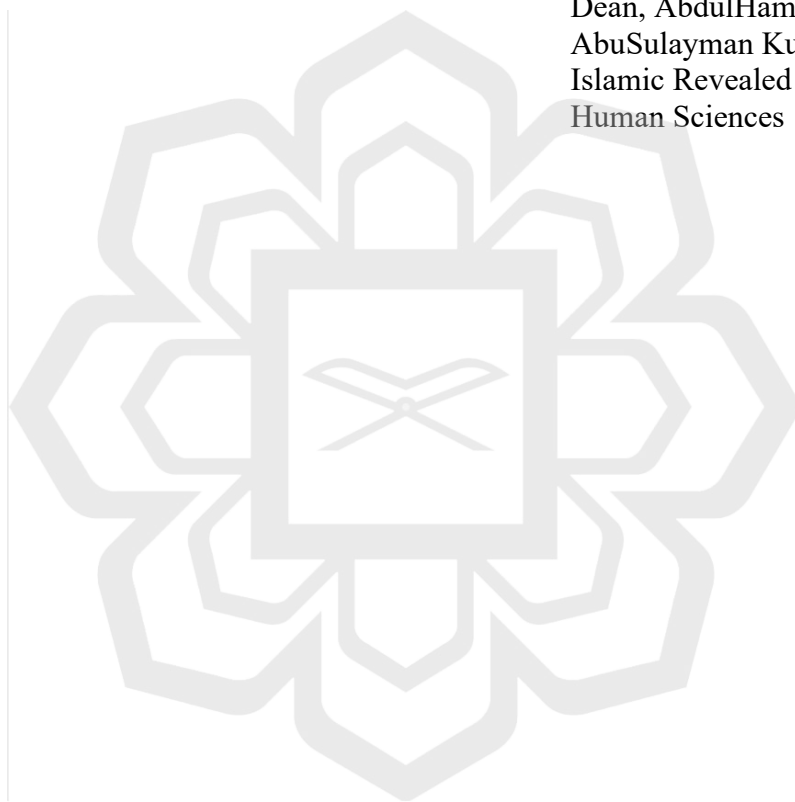
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.....
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Dean, AbdulHamid
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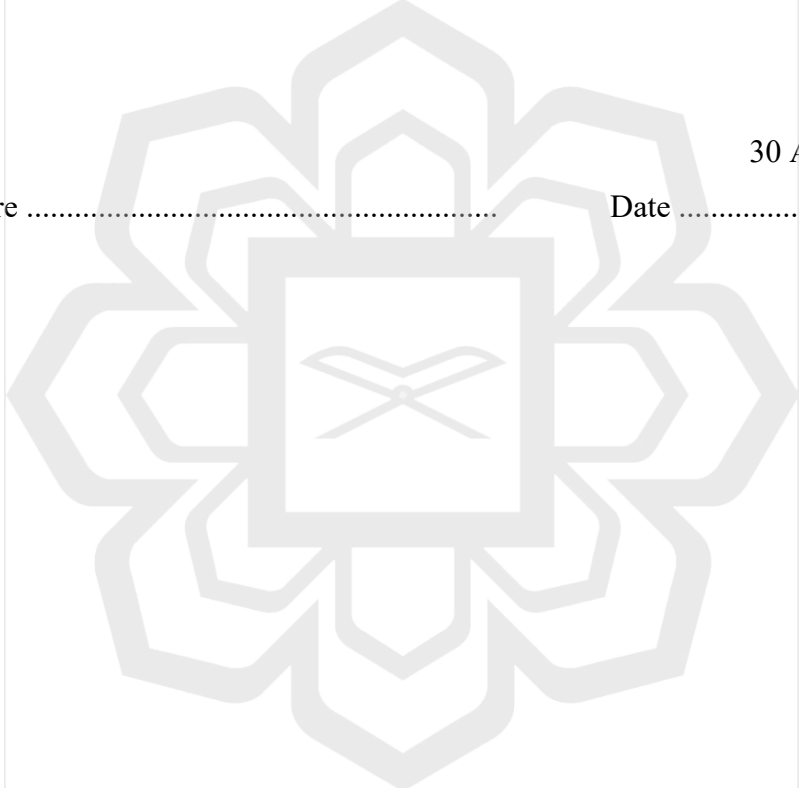


DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Arini Alfa Mawaddah

Signature Date 30 April 2026



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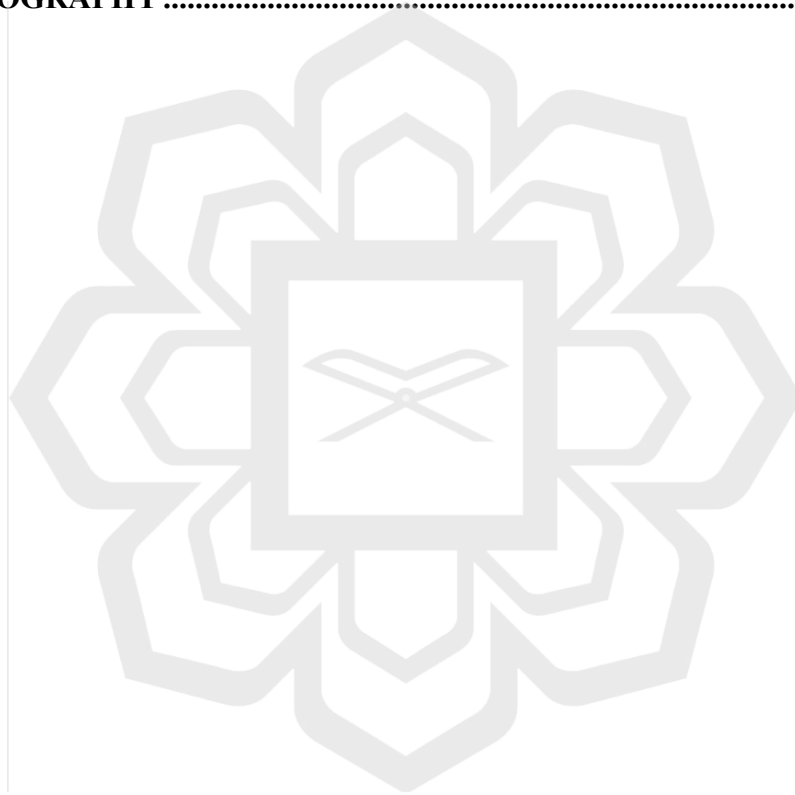
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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The agenda of integration of knowledge (hereinafter referred to as IOK)¹ developed by scholars in Islamic universities in Indonesia represents an effort toward educational reform within global Muslim societies. IOK shares the same spirit as the movement of Islamisation of Knowledge pioneered by figures such as al-Faruqi and al-Attas.² The emergence of IOK is motivated by Indonesian Muslim scholars' awareness of the epistemological and methodological conflicts between modern sciences with Islamic principles,³ the dichotomy of science,⁴ and the complexity of contemporary issues.⁵ Therefore, scholars at State Islamic Universities (UIN) across Indonesia are striving to bridge modern sciences with Islamic studies.⁶ Prominent figures in this field include

¹ The term "Integration of Knowledge" (IOK) in this study refers to the *Integrasi Ilmu* agenda as an official policy. This agenda constitutes one of the mandates arising from the change in status from the State Islamic Institute (IAIN) to the State Islamic University (UIN). This transition marks the entry of IOK into an institutionalization phase, in which its development and implementation are structurally driven by the Ministry of Religious Affairs in collaboration with Islamic higher education institutions.

² Abdul Rashid Moten, *Varieties of Islamisation: Varying Contexts, Changing Strategies* (Newcastle upon Tyne, UK: Cambridge Scholars Publishing, 2023); Lukens Bull, Ronald A., and Carolyn S. Lukens. *Islamic Higher Education in Indonesia: Continuity and Conflict*. New York: Palgrave Macmillan, 2013. Wardani. "Posisi Al-Qur'an Dalam Integrasi Ilmu : Telaah Terhadap Pemikiran Kuntowijoyo Dan M. Dawam Rahardjo." *Nun: Jurnal Studi Alquran dan Tafsir di Nusantara* 4, no. 1 (May 4, 2019): 107–57. <https://doi.org/10.32495/nun.v4i1.38>.

³ Abdullah, M. Amin. *Islamic studies di perguruan tinggi: Pendekatan Integratif-Interkonektif*. Pustaka Pelajar, 2006; Zainal Abidin Bagir, Jarot Wahyudi, dan Afnan Anshori, *Integrasi Ilmu dan Agama: Interpretasi dan Aksi* (Bandung: Mizan Pustaka, 2005); Kementerian Agama Republik Indonesia, Direktorat Pendidikan Tinggi Keagamaan Islam, Direktorat Jenderal Pendidikan Islam, *Pedoman Implementasi Integrasi Ilmu di Perguruan Tinggi Keagamaan Islam* (Makassar: Repositori UIN Alauddin Makassar, 1970), 16, <https://repositori.uin-alauddin.ac.id/17004/>,

⁴ Hanafi, Muchlis. 2010. "Integrasi Ilmu Dalam Perspektif Al-Qur'an". *SUHUF* 3 (2), 175 -91. <https://doi.org/10.22548/shf.v3i2.69>

⁵ Abdullah, Amin. *Multidisiplin, Interdisiplin, & Transdisiplin: Metode Studi Agama & Studi Islam di Era Kontemporer*. 1st ed. Yogyakarta, Indonesia: IB Pustaka, 2020.

⁶ Zainal Abidin Bagir, Jarot Wahyudi, dan Afnan Anshori, *Integrasi Ilmu dan Agama: Interpretasi dan Aksi* (Bandung: Mizan Pustaka, 2005); Kementerian Agama Republik Indonesia, Direktorat Pendidikan Tinggi Keagamaan Islam, Direktorat Jenderal Pendidikan Islam, *Pedoman Implementasi Integrasi Ilmu di Perguruan Tinggi Keagamaan Islam* (Makassar: Repositori UIN Alauddin Makassar, 1970), 16, <https://repositori.uin-alauddin.ac.id/17004/>; Wardani. "Posisi Al-Qur'an Dalam Integrasi Ilmu : Telaah Terhadap Pemikiran Kuntowijoyo Dan M. Dawam Rahardjo." *Nun: Jurnal Studi Alquran dan Tafsir di Nusantara* 4, no. 1 (May 4, 2019): 107–57. <https://doi.org/10.32495/nun.v4i1.38>.

Azyumardi Azra, M. Amin Abdullah, and Imam Suprayogo.⁷ These scholars not only conceptualised the integration of knowledge but also played a pioneering role in institutionalising it within Indonesia's State Islamic Universities, embedding the framework into their systems and policies.

The implementation of IOK is evident in various aspects such as education, research, community service, and university policies.⁸ In research, IOK is reflected in academic articles and books written by faculty members, as well as in students' theses and dissertations.⁹ These studies explore the integration of Islamic studies with modern sciences¹⁰ such as physics,¹¹ biology,¹² and mathematics.¹³ One of the implementations of IOK is the integration of neuroscience into Islamic education. Research on this topic has been growing rapidly at Ahmad Dahlan University.

Neuroscience is a discipline that studies the nervous system and the brain to uncover the biological foundations of human behaviour.¹⁴ In the 1990s, a new field

⁷ Bagir, Wahyudi, dan Anshori, *Integrasi Ilmu dan Agama*; Kementerian Agama RI, *Pedoman Implementasi Integrasi Ilmu*; Wardani, "Posisi Al-Qur'an Dalam Integrasi Ilmu."

⁸ Suprpto, and Sumarni. "Implementasi Integrasi Ilmu Di PTKI: Integrasi Dalam Tridharma Perguruan Tinggi." *EDUKASI: Jurnal Penelitian Pendidikan Agama dan Keagamaan* 20, no. 2 (October 14, 2022): 119–32. <https://doi.org/10.32729/edukasi.v20i2.1246>.

⁹ Iskandar, Syahrullah. "Studi Alquran Dan Integrasi Keilmuan: Studi Kasus UIN Sunan Gunung Djati Bandung."

Wawasan: Jurnal Ilmiah Agama dan Sosial Budaya 1, no. 1 (February 3, 2016): 86–93. <https://doi.org/10.15575/jw.v1i1.580>.

¹⁰ According to Fachruddin Faiz, integration of two or more scientific disciplines that results in the emergence of new theories and concepts such as Islamic Economics, is one of the four types of practices of integration-interconnection of sciences. Fachruddin Faiz, 'Anomali Anomali Paradigma Integrasi Interkoneksi: Sebuah Catatan Setelah 10 Tahun Implementasi', in *Praksis Paradigma Integrasi-Interkoneksi dan Transformasi Islamic States di UIN Sunan Kalijaga* (Yogyakarta: Pasca Sarjana UIN Sunan Kalijaga, 2014), 109 –11.

¹¹ Susilayati, Muslimah, Mufiq Mufiq, and Barid Syamsiyah. "Paradigma Fisika Qur'ani Dalam Tridharma Perguruan Tinggi Keagamaan Islam." *Al-A'raf: Jurnal Pemikiran Islam dan Filsafat* 16, no. 2 (December 30, 2019): 161. <https://doi.org/10.22515/ajpif.v16i2.1696>.

¹² Rodiana, Abda 'Ilma. "Integrasi Sains Dan Al-Qur'an Pada Pembelajaran Biologi Di Madrasah Aliyah Kota Tangerang Selatan," Bachelor's thesis, Jakarta: FITK UIN Syarif Hidayatullah Jakarta. 2021.

¹³ Azmi, Memen Permata, and Azwir Salam. "Konstruksi Integrasi Islam Dan Ilmu Matematika Dalam Implementasi Kurikulum Pendidikan Matematika Uin Suska Riau." *JURING (Journal for Research in Mathematics Learning)* 5, no. 2 (June 30, 2022): 119. <https://doi.org/10.24014/juring.v5i2.14892>.

¹⁴ Larry R. Squire et al., *Fundamental Neuroscience*, 4th ed. (Amsterdam: Academic Press, 2013), 3, https://books.google.co.id/books?id=QGzJFu_NyzcC&pg=PA3; Donoghue, Gregory M., and Jared Cooney Horvath. "Neuroeducation: A Brief History of an Emerging Science." *Encyclopedia of Behavioral Neuroscience*, 2nd edition, 2022, 63237. <https://doi.org/10.1016/b978-0-12-819641-0.00077-3>.

called educational neuroscience (hereafter referred to as neuroeducation) emerged¹⁵, offering insights from neuroscience to improve teaching and learning methods. This new field led to the development of approaches such as brain training, brain-based learning, and brain exercises.¹⁶

The earliest article on the integration of neuroscience into Islamic education in Indonesia was published in 2012.¹⁷ According to this article, the issues driving this idea include concerns about the adequacy of current educational methods in addressing modern challenges in science and technology,¹⁸ as well as aspirations to develop an Islamic educational approach based on science and empiricism.¹⁹ Therefore, proponents of this view advocate the integration of neuroscience into Islamic education.²⁰ The pioneer of this idea explicitly states that he views this idea as a more focused development of al-Faruqi's Islamisation of Knowledge and M. Amin Abdullah's²¹ concept of the integration-interconnection of knowledge.²²

Proponents of this idea argue that Muslims' exegetical views have significantly shaped how they perceive neuroeducation.²³ They stated that neuroscience and neuroeducation have not developed within Islamic education because neuroscience is

¹⁵ Educational neuroscience or neuroeducation is a field of study which aims to validly and meaningfully translate knowledge about how learning occurs at the brain and how the brain is affected by learning processes, into improvements in teaching practises, educational theory, and policy.

¹⁶ Donoghue, Gregory M., and Jared Cooney Horvath. "Neuroeducation: A Brief History of an Emerging Science." *Encyclopedia of Behavioral Neuroscience*, 2nd edition, 2022, 63237. <https://doi.org/10.1016/b978-0-12-819641-0.00077-3>.

¹⁷ Suyadi. "Integrasi Pendidikan Islam Dan Neurosains Dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *AlBidayah : jurnal pendidikan dasar Islam*, 1, 4, no. 2012 (June 1, 2012). <https://doi.org/https://doi.org/10.14421/albidayah.v4i1.29>

¹⁸ Ibid

¹⁹ Suyadi. *Pendidikan Islam dan Neurosains: Menelusuri Jejak Akal dan Otak dalam Al-Qur'an Hingga Pengembangan Neurosains dalam Pendidikan Islam* (version google books). 1st ed. Jakarta, Indonesia: PrenadaMedia, 2020. https://www.google.com.my/books/edition/Pendidikan_Islam_dan_Neurosains/RhwREAAQBAJ?hl=en&gbpv=0.

²⁰ Suyadi. "Hybridisation of Islamic Education and Neuroscience: Transdisciplinary Studies of 'aql in the Quran and the Brain in Neuroscience." *Dinamika Ilmu*, December 15, 2019, 237–49. <https://doi.org/10.21093/di.v19i2.1601>.

²¹ M. Amin Abdullah is Indonesian Muslim scholar and philosopher who served as a Rector of UIN Sunan Kalijaga Yogyakarta and known for his concept of integration and interconnection between sciences. He is one of the central figures in the IOK.

²² Suyadi. *Pendidikan Islam dan Neurosains: Menelusuri Jejak Akal dan Otak dalam Al-Qur'an Hingga Pengembangan Neurosains dalam Pendidikan Islam* (version google books). 1st ed. Jakarta, Indonesia: PrenadaMedia, 2020. https://www.google.com.my/books/edition/Pendidikan_Islam_dan_Neurosains/RhwREAAQBAJ?hl=en&gbpv=0.

²³ Jailani, Mohammad. "Exploring the Development of Neuroscience in the Light of Islamic Perspectives: A Qualitative Literature Review." *Jurnal Studi Islam* 12, no. 1 (August 25, 2023): 99–118. <https://doi.org/10.33477/jsi.v12i1.3489>

often regarded as a secular discipline.²⁴ They argue that this perception arises due to the absence of literal mention of the brain in the Qur'ān, leading to a lack of a normative basis for neuroscience within Islamic texts. Other research suggests that the passive response of Islamic education toward neuroscience stems from concern about reinterpreting or introducing new meanings to some Qur'ānic concepts such as 'aql.²⁵ The proponents argue that the existing interpretation of several Qur'ānic concepts has resulted in Islamic education being more doctrinal than empirical.²⁶

Some researchers have attempted to establish that neuroscience does have a normative basis in the Qur'ān. They do this by examining Qur'ānic expressions that they believe pertain to the brain or brain activity. For instance, some studies argue that the term 'aql in the Qur'ān refers to the brain, suggesting that the concept of neuroscience in the Qur'ān can be traced through the concept of 'aql, as seen in sūrah-al-Anfāl: 22.

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﴿إِنَّ شَرَّ الدَّوَابِّ عِنْدَ اللَّهِ الصُّمُّ الْبُكْمُ الَّذِينَ لَا يَعْقِلُونَ (٢٠)﴾

The worst creatures in God's eyes are those who are (wilfully) deaf and dumb, who do not reason.²⁸

Other research concludes that Qur'ānic verses related to neuroscience can be identified through Qur'ānic terms associated with brain activity, such as *naẓara*, *tadabbara*, *faqiha*, and *tafakkara*²⁹. An example is al-Rūm: 8, which discusses the act of reflection:

²⁴ See: Mohammad Jailani, Suyadi Suyadi, Rena Latifa, and Siti Nurul Azkiyah, "Critical Analysis of 'Aql and Brain in the Qur'an and Neuroscience and Its Implications for the Development of Islamic Education," Proceedings of the 4th International Colloquium on Interdisciplinary Islamic Studies & 1st ICESIIS, Jambi, Indonesia, October 20–21, 2021, published February 2022 by EAI, <https://doi.org/10.4108/cai.20-10-2021.2316341>; Muhammad Faiz Rofdli and Suyadi Suyadi, "Tafsir Ayat Ayat Neurosains: 'Aql dalam Al Qur'an dan Relevansinya terhadap Pengembangan Berpikir Kritis dalam Pendidikan Islam," *Jurnal At Tibyan: Jurnal Ilmu Al Qur'an dan Tafsir* 5, no. 1 (June 30, 2020): 134–152, <https://doi.org/10.32505/tibyan.v5i1.1399>; Mohammad Jailani, "Exploring the Development of Neuroscience in the Light of Islamic Perspectives: A Qualitative Literature Review," *Jurnal Studi Islam* 12, no. 1 (July 2023): 99–118, <https://doi.org/10.33477/jsi.v12i1.3489>

²⁵ Kasno. "Aql Dan Otak Dalam Kajian Neurosains Dan Implikasinya Pendekatan Saintifik Dalam Pendidikan Islam." *Muaddib : Studi Kependidikan dan Keislaman* 1, no. 2 (December 19, 2019): 154. <https://doi.org/10.24269/muaddib.v1i2.2217>.

²⁶ Ibid

²⁷ Nurjanah, Asti Faticha. "Konsep 'Aql Dalam Al-Qur'an Dan Neurosains." *Nazhruna: Jurnal Pendidikan Islam* 1, no. 2 (October 17, 2018): 276–93. <https://doi.org/10.31538/nzh.v1i2.83>.

²⁸ Abdel Haleem, M. A. The Qur'an: A new translation by M.A.S. Abdel Haleem. Oxford: Oxford University Press, 2005.

²⁹ Rofdli, Muhammad Faiz, and Suyadi. "Tafsir Ayat-Ayat Neurosains ('Aql Dalam Al-Qur'an Dan Relevansinya Terhadap Pengembangan Berpikir Kritis Dalam Pendidikan Islam)." *Jurnal At-Tibyan:*

﴿أَوَلَمْ يَتَفَكَّرُوا فِي أَنفُسِهِمْ مَا خَلَقَ اللَّهُ السَّمَوَاتِ وَالْأَرْضَ وَمَا بَيْنَهُمَا إِلَّا بِالْحَقِّ وَأَجَلٍ مُّسَمًّى وَإِنَّ كَثِيرًا مِّنَ النَّاسِ بِلِقَاءِ رَبِّهِمْ لَكَفُرُونَ﴾ (٨)

Have they not thought about their own selves? God did not create the heavens and earth and everything between them without serious purpose and an appointed time, yet many people deny that they will meet their Lord.³⁰

Few studies argue that the term *nāṣiyah* in sūrah al-‘Alaq: 15-16 signifies the brain³¹:

﴿كَأَلَّا لِنَ لَمْ يَنْتَهُ لَنَسْفَعًا بِالنَّاصِيَةِ (١٥) نَاصِيَةٍ كَذِبَةٍ خَاطِئَةٍ (١٦)﴾

No! If he does not stop, We shall drag him by his forehead” “his lying, sinful forehead.”³²

Few studies include certain hadiths believed to provide a basis for neuroscience. This includes the hadith narrated by Abdullah bin ‘Amr³³:

قَالَ حَجَّ عَلَيْنَا عَبْدُ اللَّهِ بْنُ عَمْرٍو فَسَمِعْتُهُ يَقُولُ سَمِعْتُ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ يَقُولُ " إِنَّ اللَّهَ لَا يَنْزِعُ الْعِلْمَ بَعْدَ أَنْ أَعْطَاهُمُوهُ انْتِزَاعًا، وَلَكِنْ يَنْتَزِعُهُ مِنْهُمْ مَعَ قَبْضِ الْعُلَمَاءِ بِعِلْمِهِمْ، فَيَبْقَى نَاسٌ جُهَّالٌ يُسْتَفْتَوْنَ فَيُفْتَوْنَ بِرَأْيِهِمْ، فَيُضِلُّوْنَ وَيُضِلُّوْنَ

I heard the Prophet PBUH saying, "Allah will not deprive you of knowledge after he has given it to you, but it will be taken away through the death of the religious learned men with their knowledge. Then there will remain ignorant people who, when consulted, will give verdicts according to their opinions whereby they will mislead others and go astray.”³⁴

Jurnal Ilmu Alqur'an dan Tafsir 5, no. 1 (June 30, 2020): 134–52. <https://doi.org/10.32505/at-tibyan.v5i1.1399>.

³⁰ Abdel Haleem, M. A. *The Qur'an: A new translation by M.A.S. Abdel Haleem*. Oxford: Oxford University Press, 2005.

³¹ Jailani, Mohammad, Suyadi Suyadi, Nur Kholis, and Miftachul auda. “Critical Analysis of ‘Aql and Brain in the Paradigm of the Qur’an and Neuroscience and Its Contribution to the Development of Islamic Education.” *Taqaddumi: Journal of Quran and ḥadīth Studies* 3, no. 1 (June 30, 2023): 14–47. <https://doi.org/10.12928/taqaddumi.v3i1.8208>.

³² Abdel Haleem, M. A. *The Qur'an: A new translation by M.A.S. Abdel Haleem*. Oxford: Oxford University Press, 2005.

³³ Abu ‘Abdullah Ismā‘īl al-Bukhārī, *Sahīḥ al-Bukharī*, Tahqīq: Muṣṭafā Dīb al-Baghā, (Dimashq: Dār Ibn Kathīr. 5th edn., 1993), Hadīth 6877: 6.

³⁴ Abu ‘Abdullah Ismā‘īl al-Bukhārī, *Sahīḥ al-Bukharī*, Tahqīq: Muṣṭafā Dīb al-Bughā, (Dimashq: Dār Tūq al-Najāh. 1st edn., 2002), Hadīth 6877: 6.

These studies conclude that the Qur'ān revealed fifteen centuries ago, contains 'signals' about neuroscience, an area of knowledge that has only emerged in the modern era. Therefore, they argue for integrating neuroscience into Islamic education.³⁵

In the discourse of integrating neuroscience into Islamic education, the Qur'ān and its interpretation occupy an important position. This is evident from a number of studies that focus on analysing what proponents identify as "neuroscience verse" and their relation to the idea of integration. Proponents also argue that existing interpretations of certain Qur'ānic verses and concepts have significantly influenced the reception and development of neuroscience in Islamic education. In building their Qur'ānic argument, proponents attempt to directly analyse the verses of the Qur'ān rather than relying solely on established interpretations or other Islamic sciences.

Since the integration of neuroscience and Islamic education emerges from the broader agenda of IOK, such analyses of Qur'ānic verses are vital, as they constitute an important process in the effort to bring religion—in this case Islamic education—into dialogue with science, in this case neuroscience. Such analyses of Qur'ānic verses are also undoubtedly unique, as they reflect the role of the Qur'ān and interpretive approaches employed within IOK's conceptual framework.

However, the role of the Qur'ān and the methodological approaches employed in the implementation of IOK often drawn criticism. Critics argue that the Qur'ān is often approached superficially, without a systematic or rigorous methodology. Despite these critiques, there has been little in-depth research examining how the Qur'ān is actually engaged in this context, what interpretive methods are utilized, and why these methods are deemed inadequate from the perspective of Qur'ānic studies.

The integration of neuroscience into Islamic education is selected a case study because it addresses a highly contemporary and interdisciplinary issue that brings together social science (education) and natural science (neuroscience). Furthermore, this discourse is predominantly produced by scholars who do not specialise in Qur'ānic or *tafsīr* studies but instead specialise in education. Accordingly, this study seeks to examine how these scholars construct their arguments and the interpretive methods they

³⁵ Nurjanah, Asti Faticha. "Konsep 'Aql Dalam Al-Qur'an Dan Neurosains." *Nazhruna: Jurnal Pendidikan Islam* 1, no. 2 (October 17, 2018): 276–93. <https://doi.org/10.31538/nzh.v1i2.83>.

employ to identify and interpret relevant Qur'ānic verses related to contemporary interdisciplinary issue involving both social and natural science.

1.2 STATEMENT OF PROBLEM

The Qur'ān, as a source of knowledge, should be approached with a proper methodology to ensure that its message is truly understood and serves as a guideline in all intellectual and scientific endeavours. Prominent Muslim scholars emphasise the importance of understanding the Qur'ān comprehensively, using a careful and methodical approach. Fazlur Rahman cautions against partial and subjective interpretations by selectively reading Qur'ānic verses, describing it as a form of violence against the Qur'ān.³⁶ Taha Jabir al-Alwani promotes the importance of al-maqāṣid al-Qur'āniyya, and advocates a holistic and conceptual reading of the Qur'ān.³⁷ Seyyed Hossein Nasr highlights the importance of focusing on the principles of the Qur'ān.³⁸ In line with these perspectives, Kuntowijoyo promotes the idea of looking at the “Qur'ānic Paradigm”, which enables us to understand reality as the Qur'ān understands it.³⁹

However, the current approach to the Qur'ān employed in research implementing the paradigm of the integration of knowledge, has often drawn criticism for being superficial and lacking systematic and rigorous methods. According to the book “Islamic Higher Education in Indonesia: Continuity and Conflict,” the existing approaches can lead to flawed science, poor hermeneutics, and forced conclusions. This

³⁶ Fazlur Rahman. *Major themes of the qur'ān*. Minneapolis, MN: Bibliotheca Islamica, 1980.

³⁷Taha Jabir al-Alwani and Imad al-Din Khalil, *The Qur'an and the Sunnah: The Time-Space Factor* (Herndon, VA: International Institute of Islamic Thought, 1995), PDF file, accessed January 16, 2026, <https://iiit.org/wp-content/uploads/The-Quran-And-The-Sunnah-Time-And-Space-factor-Red.pdf>; Zainab Alwani, “Maqāṣid Qur'āniyya: A Methodology on Evaluating Modern Challenges and Fiqh al-Aqalliyyāt,” *The Muslim World* 104, no. 4 (October 2014): 465–87, <https://doi.org/10.1111/muwo.12073>;

³⁸ Nasr, Seyyed Hossein, Titus Burckhardt, and Huston Smith. *Ideals and realities of Islam*. Chicago: ABC International Group, 2011.

³⁹Wardani. “Posisi Al-Qur'an Dalam integrasi Ilmu : Telaah Terhadap Pemikiran Kuntowijoyo Dan M. Dawam Rahardjo.” *Nun: Jurnal Studi Alquran dan Tafsir di Nusantara* 4, no. 1 (May 4, 2019): 107–57. <https://doi.org/10.32495/nun.v4i1.38>.

approach often imposes predetermined conclusions on the texts, rather than allowing the texts to guide the inquiry.⁴⁰

Additionally, key figures advocating for the integration of knowledge in Indonesia have not sufficiently discussed how the Qur'ān should be approached within IOK. Some studies emphasise the need for clear guidelines on how to properly derive knowledge from the Qur'ān in the context of knowledge integration in Indonesia⁴¹.

This study seeks to fill that gap by taking the discourse on the integration of neuroscience into Islamic education as a case study. It aims to identify the limitations of the methodological approaches to the Qur'ān employed in this context and to evaluate the challenges involved in interpreting the Qur'ān in light of contemporary interdisciplinary issues.

1.3 SIGNIFICANCE OF THE STUDY

This research will fill a critical gap by providing in-depth examination of how the Qur'ān is actually engaged in the practice of IOK, specifically in the integration of neuroscience in Islamic education, with particular emphasis on examining the adequacy of the methods used to construct their Qur'ānic arguments and the interpretive methods employed. A thorough exploration of the Qur'ānic perspective is essential as a foundational step to ensure that in the practice of IOK, Qur'an is approached through sound, systematic and rigorous methodology.

For researchers in Islamic and Qur'ānic studies, this research will contribute to the literature on methodologies for interpreting the Qur'ān in relation to contemporary, multidisciplinary issues. It will address the challenge of approaching the Qur'ān systematically, enabling deeper and more impactful engagement with modern scientific discoveries and contemporary debates. This study will lay the groundwork for future research aimed at deriving thoughtful Islamic responses to complex and multidisciplinary issues from a Qur'ānic perspective. As future challenges will likely

⁴⁰ Lukens-Bull, Ronald. *Islamic higher education in Indonesia: Continuity and conflict*. New York, NY: Palgrave Macmillan, 2013.

⁴¹ Azmi, Memen Permata, and Azwir Salam. "Konstruksi Integrasi Islam Dan Ilmu Matematika Dalam Implementasi Kurikulum Pendidikan Matematika UIN SUSKA Riau." *JURING (Journal for Research in Mathematics Learning)* 5, no. 2 (June 30, 2022): 119. <https://doi.org/10.24014/juring.v5i2.14892>.

involve unfamiliar and complex topics, addressing them with oversimplified or inconsistent methods could result in shallow or artificial understandings.⁴²

For educators and curriculum developers, this research is expected to provide a sound framework and methodology for understanding the Qur'ānic perspective on contemporary issues in the field of education. This framework will support the development of Islamic education curricula that are firmly aligned with Qur'ānic guidance.

1.4 LITERATURE REVIEW

This literature review is divided into three parts. The first part examines the application of neuroscience, neuroeducation, and neurothology theories in religious education. This section will help the researcher analyse the background, development, and practical implementation of integrating neuroscience into religious education. It explores how theories and discoveries in neuroscience have influenced both Muslim and Christian religious education. Additionally, it will review the key issues and challenges within this topic from an interdisciplinary perspective, drawing from fields such as education, psychology, and neuroscience.

The second part focuses on Islamic conceptions of the mind, intelligence, and learning. This section aims to establish a foundation for future research that will extract Qur'ānic principles and guidance on modern discoveries about the brain and their relevance to education. Accordingly, the researcher will analyse previous studies that explore how the Qur'ān addresses concepts related to the mind, intellect, and learning, and how these Qur'ānic descriptions can be interpreted in light of contemporary scientific knowledge.

The third part reviews the literature on the role of Qur'ānic studies within the broader agenda of IOK in Indonesia, with a particular focus on the development of interpretative methodologies used in this discourse. It will also examine relevant studies

⁴²Wardani. "Posisi Al-Qur'an Dalam integrasi Ilmu : Telaah Terhadap Pemikiran Kuntowijoyo Dan M. Dawam Rahardjo." *Nun: Jurnal Studi Alquran dan Tafsir di Nusantara* 4, no. 1 (May 4, 2019): 107–57. <https://doi.org/10.32495/nun.v4i1.38>.

that explore the integration of knowledge from a Qur'ānic perspective in the Indonesian context.

1.4.1 Neuroscience in Religious Education

1.4.1.1 Brain-Based Learning in Islamic Education

In Indonesia, the integration of neuroscience into Islamic education primarily revolves around two main areas of discussion. The first area, which comprises theoretical studies, delves into conceptual aspects such as background, objectives, and methodologies of integration.⁴³ This focus is unique to studies in Indonesia and is not commonly found in other Muslim-majority countries. The second area focuses on practical application, such as how neuroscience can enhance teaching methods in classes, especially in primary and secondary education.⁴⁴ These studies investigate the application of neuroeducation theories in subjects such as the Qur'ān and ḥadīth studies,⁴⁵ *tahsīn*,⁴⁶ and Islamic Religious Education⁴⁷. Other Muslim-majority countries commonly engage in similar research but often refer to this practise as "brain-based learning".

⁴³ Suyadi. "Integrasi Pendidikan Islam Dan Neurosains Dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *Al-Bidayah: jurnal pendidikan dasar Islam*, 1, 4, no. 2012 (June 1, 2012). <https://doi.org/https://doi.org/10.14421/albidayah.v4i1.29>; Saifurrahman. "Desain Pembelajaran Keagamaan Islam Berbasis Neurosains." *AL-MURABBI: Jurnal Studi Kependidikan dan Keislaman* 6, no. 1 (July 8, 2019): 55–73. <https://doi.org/10.53627/jam.v6i1.3634>; Jailani, Mohammad. "Merging Minds: A Critical Analysis of Hybridising Islamic Education and Neuroscience." *EDUCAN: Jurnal Pendidikan Islam* 8, no. 1 (2024): 121–39. <https://doi.org/https://doi.org/10.21111/educan.v8i1.10767>.

⁴⁴ Munfarokhah, Ida Royani. "Neurosains Dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD", Master's thesis, Jakarta: Institut PTIQ Jakarta. 2020; Saputri, Yolanda Amelia. "Efektivitas Penerapan Pendekatan Neurosains Dalam Peningkatan Kemampuan Berfikir Kritis Peserta Didik Kelas VII Pada Pembelajaran Pendidikan Agama Islam di SMPN 1 Talang Padang Tanggamus", Bachelor's thesis, Bandar Lampung: UIN Raden Intan Lampung. 2022; Harahap, Zunaidi Rasid, and Suyadi. "Pengembangan Pendidikan Karakter Melalui Pendekatan Behaviorisme Berbasis Neurosains Di SD Muhammadiyah Purbayan." *Psikoislamedia: Jurnal Psikologi* 5, no. 1 (November 26, 2020): 38. <https://doi.org/10.22373/psikoislamedia.v5i1.6199>;

⁴⁵ Jailani, Mohammad, Suyadi Suyadi, and Muallimah Muallimah. "Pengembangan Pembelajaran Alquran aadis

Dengan Pendekatan Akal Bertingkat Ibnu Sina Di SMK Muhammadiyah 3 Yogyakarta Berbasis Neurosains: Di Masa Pandemi Covid-19." *SALAM: Jurnal Sosial dan Budaya Syar-i* 8, no. 4 (July 5, 2021). <https://doi.org/10.15408/sjsbs.v8i4.18995>.

⁴⁶ Mubin, Muh. Fathul. "Karakteristik Materi Pembelajaran Tahsinul Qur'an Berbasis Neurosains." *EDUSOSHUM: Journal of Islamic Education and Social Humanities* 1, no. 1 (July 2, 2021): 26–44. <https://doi.org/10.52366/edusoshum.v1i1.6>

⁴⁷ Wahid, Lalu Abdurrahman. "Pengembangan Pembelajaran Pendidikan Agama Islam Berbasis Pengembangan Potensi Otak Menggunakan Teori Neurosciences." *Tarbiyatuna: Jurnal Pendidikan Islam* 15, no. 1 (February 15, 2022): 54. <https://doi.org/10.36835/tarbiyatuna.v15i1.1446>.

For example, in Malaysia, one study on moral education explored the implementation of brain-based learning in teaching moral education modules based on sūrah Luqmān,⁴⁸ while another study, which also referred to this practise as “brain-based learning”, examined reinforcement approaches in Qur’ān memorisation activities among lower secondary students.⁴⁹ Similar studies are prevalent in the Middle East. In Kuwait, a study titled *A Programme for Teaching Islamic Education Based on the Theory of Brain-Based Learning to Develop Creative Thinking Skills among Fourth-Grade Pupils* examined the use of brain-based learning to improve creative thinking skills among fourth-grade pupils in Islamic religious education courses.⁵⁰ In Saudi Arabia, a study titled “*Effectiveness Strategy in the Light of Brain-Based Learning on Developing Lateral Thinking and the Attitude of Its Applying of Middle School Talented Students*” investigated the effectiveness of brain-based learning in developing lateral thinking skills in ḥadīth courses in a middle school.⁵¹ Another study examined the impact of brain-based learning on developing analytical and holistic thinking in teaching tawḥīd in secondary schools in Saudi Arabia.⁵² In Jordan, a study analysed the effectiveness of brain-based learning in understanding the concepts of tawḥīd among tenth graders.⁵³ Additionally, a study titled “*Evaluation of Teaching Performance for*

⁴⁸Marzuki, Izati Nabila, Tengku Fauzan Tengku Anuar, Ayub Awang, Md. Ariff Ariffin, and Tan Tse Guan. “Brain-Based Approach Element through Moral Education by Using Curriculum Lukman Al-Hakim.” Essay. In E-Proceedings International Academic Forum on Creative Contents (IAFCC) , 45–47. Kelantan, Malaysia: Faculty of Creative Technology and Heritage UMK, 2023.

⁴⁹ Bajuri, Mohamad Khairudin Bin, Rohaida Binti Mohd. Saat, Zulkifli Bin Mohd. Yusoff, Noor Naemah Binti AbdulRahman, and Durriyyah Sharifah Binti aasan Adli. 2014. “Pendekatan Peneguhan Bagi Aktiviti aafalan Al-Quran Dalam KalanganPelajar diPeringkat Menengah Rendah”. *Jurnal Islam Dan Masyarakat Kontemporari* 8 (June), 113-35. <https://journal.unisza.edu.my/jimk/index.php/jimk/article/view/120>.

⁵⁰ Al-Tamimi, Bashair Shaheen Suleiman. “A Program for Teaching Islamic Education Based on the Theory of Brain-Based Learning to Develop Creative Thinking Skills among Fourth-Grade Pupils.” *Journal of Research in Education and Psychology* 36, no 1 (January2021): 571-98. https://mathj.journals.ekb.eg/?_action=article&kw=88286&_kw=%D9%85%D9%87%D8

⁵¹ Yousof, Yahya Abdulkhaleq. “Effectiveness Strategy in the Light of Brain-Based Learning on Developing Lateral Thinking and the Attitude of Its Applying of Middle School Talented Students.” *The International Journal for Talent Development* 10, no. 2 (December 26, 2019): 165–88. <https://doi.org/10.20428/ijtd.v10i2.1585>.

⁵² Alsenaidi, Sami Fahad. “Fā’iliyyat ’istikhdām ’istrātījiyyat al-majmū’āt al-ta’āwuniyyah al-ṣughrah al-mu’tamidah ‘alā al-ta’allum al-mustanid ’ilā al-dimāgh fī tanmiyat al-tafkīr al-tahlīlī wa-al-shumūlī fī tadrīs muqarrar al-tawḥīd bil-marḥalah al-mutawassitah fī al-Mamlakah al-‘Arabiyyah al-Su’ūdiyyah”. *Dirāsāt ‘Arabiyyah fī al-Tarbiyyah wa-’Ilm al-Nafs* 84, no. 84 (April 1, 2017): 21–59. <https://doi.org/10.12816/0042053>

⁵³ Abu Latifeh, Shadi, Abdelkareem El- Salaheen, and Jamal Al- Henawi. “The Efficiency of the Use of Brain-Based Learning Strategy to Acquire Creed- Concepts in the Unit Creed Contained in the Books of Islamic Education for Students in Tenth Grade in Salt City.” *An-Najah University Journal for Research - B (Humanities)* 31, no. 3 (March 2017): 447–70. <https://doi.org/10.35552/0247-031-003-005>.

Secondary School Islamic Education Teachers in The Light of Teaching Practises That Are Compatible With Brain- Based Learning” evaluated the teaching performance of Islamic education teachers using brain-based learning theories at the secondary level in Saudi Arabia.⁵⁴ Most of these studies were motivated by concerns about the effectiveness of existing teaching methods in Islamic education institutions. A study by al-Tamimi argued that the textbooks used for Islamic subjects in Saudi Arabia insufficiently address activities that enhance creative thinking abilities, focusing primarily on memorisation and indoctrination instead.⁵⁵

1.4.1.2 Neuroeducation and Neurotheology in Christian Religious Education

The application of neuroscience theory in educational settings appears to have developed earlier within Christian religious education. The earliest literature on the topic dates back to 2002,⁵⁶ and by 2011, it became the theme of the Religious Education Association conference.⁵⁷ Unlike Islamic education, which tends to apply this approach in elementary and secondary education, Christian religious education has focused more on its application in adult religious education. For instance, a study by Kathy Winings, titled *"Brain-Based Learning, Neuroscience, and Their Impact on One Religious Educator,"* examined its use at the master's and doctoral levels in seminary settings.⁵⁸ Other studies have explored its application in non-formal church education.⁵⁹

⁵⁴ Ahmed Eljabily, Lamiaa Jadelrab, and Mona Abdullah Alajlan. “Evaluation of Teaching Performance For Secondary School Islamic Education Teachers in The Light of Teaching Practises That Are Compatible With Brain- Based Learning.” *Journal of Positive Psychology and Wellbeing*, 2022, 6, no. 2 (n.d.). <https://www.journalppw.com/index.php/jppw/article/view/11050>.

⁵⁵ Al-Tamimi, Bashair Shaheen Suleiman. “A Program for Teaching Islamic Education Based on the Theory of Brain-Based Learning to Develop Creative Thinking Skills among Fourth-Grade Pupils.” *Journal of Research in Education and Psychology* 36, no 1 (January 2021): 571-98. https://mathjournals.ekb.eg/?_action=article&kw=88286&_kw=%D9%85%D9%87%D8

⁵⁶ Weber, and Jean Marie. “Brain-Based Teaching/Learning and Implications for Religious Education.” *Momentum* 33, no. 4 (December 2002): 24–28. <https://eric.ed.gov/?id=EJ675195>.

⁵⁷ Seymour, Jack L. “Brain Matters: Neuroscience, Creativity, and Diversity—Preparing for the Fall 2011 Conference of the Religious Education Association.” *Religious Education* 106, no. 3 (May 2011): 243–44. <https://doi.org/10.1080/00344087.2011.569520>.

⁵⁸ Winings, Kathy. “Brain-Based Learning, Neuroscience, and Their Impact on One Religious Educator.” *Religious Education* 106, no. 3 (May 2011): 266–70. <https://doi.org/10.1080/00344087.2011.569648>.

⁵⁹ Champion-Jones, Paula. “Brain-Based Worship: Re-Membering the Mind-Body Connection.” *Brain-Based Worship: Re-Membering the Mind-Body Connection*, Dissertation, Portland: George Fox University. 2014.

Several studies reveal that this focus on neuroscience is driven by spiritual challenges faced by students, such as adhering to religious principles, practicing religious teachings, and forming habits.⁶⁰ These studies discuss how some students felt that undesirable spiritual and personal habits seemed deeply ingrained and difficult to change, even with robust religious education programmes.⁶¹ Despite understanding theological concepts, there is often a gap where these remain intellectual concepts rather than lived experiences. As a result, neuroscience, which explores the nervous system and brain to uncover the biological foundations of human behaviour, is seen as a potential solution.⁶² In Christian religious education, findings from neurotheology play a significant role. Dean G. Blevins, in his study, noted that his interest in brain studies for religious educators stems from the discoveries regarding the relationship between the brain and spiritual experience.⁶³

Other studies indicate that concerns about the effectiveness of methods in teaching religious doctrines are among the factors behind the development of this field. A dissertation titled "*Brain-based worship: Re-membering the mind-body connection*" discusses the use of neuroscience theories during worship services to more effectively transmit the Gospel message.⁶⁴ The integration of neuroeducation into Christian education has led to curriculum changes and the adoption of brain-based learning principles, with basic neuroeducation concepts and neurological insights being integrated into core religious education courses.⁶⁵

Studies in Islamic education, particularly in Indonesia, are largely motivated by educational challenges. These studies question the effectiveness of existing methods in addressing modern challenges amid the perceived underperformance of Muslims in

⁶⁰ Winings, Kathy. "Brain-Based Learning, Neuroscience, and Their Impact on One Religious Educator." *Religious Education* 106, no. 3 (May 2011): 266–70. <https://doi.org/10.1080/00344087.2011.569648>.

⁶¹ Winings, Kathy. "My Neurons Made Me Do It: Neuroeducation at the Intersection of Religion and Science." *Journal of Unification Studies* 12 (2011): 163–80. <https://journals.uts.edu/volume-xii-2011/111-my-neurons-made-me-do-it-neuroeducation-at-the-intersection-of-religion-and-science>.

⁶² Champion-Jones, Paula. "Brain-Based Worship: Re-Membering the Mind-Body Connection." *Brain-Based Worship: Re-Membering the Mind-Body Connection*, Dissertation, Portland: George Fox University. 2014.

⁶³ Blevins, Dean G. "Brain Matters: A Journey with Neuroscience and Religious Education." *Religious Education* 106, no. 3 (May 2011): 246–51. <https://doi.org/10.1080/00344087.2011.569562>.

⁶⁴ Champion-Jones, Paula. "Brain-Based Worship: Re-Membering the Mind-Body Connection." *Brain-Based Worship: Re-Membering the Mind-Body Connection*, Dissertation, Portland: George Fox University. 2014.

⁶⁵ Winings, Kathy. "Brain-Based Learning, Neuroscience, and Their Impact on One Religious Educator." *Religious Education* 106, no. 3 (May 2011): 266–70. <https://doi.org/10.1080/00344087.2011.569648>;

science and technology.⁶⁶ One of the key figures in this discourse argued that a scientific and empirical foundation is necessary for Islamic education to progress.⁶⁷ While Christian education is also driven by concerns about the effectiveness of teaching methods, it places additional emphasis on addressing religious issues such as crises within the church, particularly among younger adults.⁶⁸

1.4.1.3 Issues and Challenges from an Interdisciplinary Framework

As a multidisciplinary agenda, three main disciplines are involved in this issue: neuroscience, education, and Islamic studies. A review of existing literature reveals several challenges in bridging these fields. When examining efforts to connect neuroscience and education, experts in education tend to be divided into two groups. The first group consists of proponents who are optimistic about integrating neuroscience and education,⁶⁹ while the second group remains critical of this endeavour.⁷⁰

The critical group expresses concerns about translating neuroscience theories and discoveries into educational theory, policy, and practise. They argue that neuroscience findings alone cannot immediately prescribe what teachers should or should not do. This is because neuroscience, as the science of the brain, is not exclusively focused on human learning but is a distinct discipline that overlaps with educational studies. This group emphasises that the science of learning is a multi-

⁶⁶ Suyadi. "Integrasi Pendidikan Islam Dan Neurosains Dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *AlBidayah: jurnal pendidikan dasar Islam*, 1, 4, no. 2012 (June 1,2012). <https://doi.org/https://doi.org/10.14421/albidayah.v4i1.29>

⁶⁷ Suyadi. *Pendidikan Islam dan Neurosains: Menelusuri Jejak Akal dan Otak dalam Al-Qur'an Hingga Pengembangan Neurosains dalam Pendidikan Islam* (version google books). 1st ed. Jakarta, Indonesia: Prenada Media,2020.https://www.google.com.my/books/edition/Pendidikan_Islam_dan_Neurosains/RhwREAAQBAJ?hl=en&gbpv=0.

⁶⁸ Champion-Jones, Paula. "Brain-Based Worship: Re-Membering the Mind-Body Connection." *Brain-Based Worship: Re-Membering the Mind-Body Connection*, Dissertation, Portland: George Fox University. 2014.

⁶⁹ Tommerdahl, Jodi. "A Model for Bridging the Gap between Neuroscience and Education." *Oxford Review of Education* 36, no. 1 (February 2010): 97–109. <https://doi.org/10.1080/03054980903518936>; Suyadi. "Hybridisation of Islamic Education and Neuroscience: Transdisciplinary Studies of 'aql in the Quran and the Brain in Neuroscience." *Dinamika Ilmu*, December 15, 2019, 237–49. <https://doi.org/10.21093/di.v19i2.1601>.

⁷⁰Varma, Sashank, Bruce D. McCandliss, and Daniel L. Schwartz. "Scientific and Pragmatic Challenges for Bridging Education and Neuroscience." *Educational Researcher* 37, no. 3 (April 2008): 140–52. <https://doi.org/10.3102/0013189x08317687>; Donoghue, Gregory M., and Jared Cooney Horvath. "Neuroeducation: A Brief History of an Emerging Science." *Encyclopedia of Behavioral Neuroscience*, 2nd edition, 2022, 63237.<https://doi.org/10.1016/b978-0-12-819641-0.00077-3>;

faceted field, encompassing neurological, psychological, and sociocultural dimensions.⁷¹

Studies that explore the challenges of bridging neuroscience and Islamic studies are still limited. However, research on the intersection of psychology and Islamic studies provides some insight, as neuroeducation has historically emerged from the more mature discipline of educational psychology. One study highlights that a key challenge faced by the European Islamic psychology community in bridging psychology and Islamic studies is navigating the different epistemologies between modern science and the Islamic tradition.⁷² Another challenge is translating the different conceptual vocabulary used by modern sciences and Islamic tradition to describe the wide-ranging realm of cognition.⁷³

1.4.2 Qur'ānic Description of Mind, Intelligence, and Learning

1.4.2.1 Qur'ānic Conception of Mind

This research examined literature that interprets Qur'ānic verses related to reason, mind, and intellect within the context of the integration of neuroscience and Islamic education in Indonesia. In this section, the focus will be on contemporary studies that explore these Qur'ānic concepts in light of modern scientific knowledge, though not specifically tied to the IOK in Indonesia.

One such study, titled *"What is Thought: Take a Look at the Holy Qur'ān and the Principles of Neurosciences"*, attempts to draw connections between discoveries in neurosciences and the Qur'ān. The research advocates for this approach of linking discoveries of modern sciences with Qur'ānic concepts. It also argued that sūrah al-'Alaq: 15-16, can be seen as the Qur'ān's introduction to the study of the brain. In this study, the authors, who have backgrounds in neuroscience and medicine, utilised

⁷¹ Donoghue, Gregory M., and Jared Cooney Horvath. "Neuroeducation: A Brief History of an Emerging Science." *Encyclopedia of Behavioral Neuroscience*, 2nd edition, 2022, 63237. <https://doi.org/10.1016/b978-0-12-819641-0.00077-3>

⁷² Kaplick, Paul M., Yaqub Chaudhary, Abdullah Hasan, Asim Yusuf, and Hooman Keshavarzi. "An Interdisciplinary Framework for Islamic Cognitive Theories." *Zygon*® 54, no. 1 (February 17, 2019): 66–85. <https://doi.org/10.1111/zygo.12500>.

⁷³ Ibid

unstructured face-to-face interviews with experts in neuroscience and *tafsīr*, in addition to reviewing books of *tafsīr*.⁷⁴

Unlike previous research, the article "*A Preliminary Qur'ānic Review of Consciousness*" does not attempt to connect or verify modern scientific findings with Qur'ānic verses. Instead, it reviews the concept of consciousness through a multidisciplinary lens, incorporating psychology, cognitive theory, Eastern philosophy, and Islamic studies. This approach seeks to compare the Qur'ānic approach to consciousness with how other disciplines address the topic. The article then derives insights and lessons from the differences in how the Qur'ān approaches the subject, identifying the absence of acknowledgment of the soul as a core issue in other disciplines' discussions.⁷⁵

Another study titled, "*Anatomy of the Intellect in the Qur'ān: A Fresh Perspective*" by Muhammad Waqar Raza, compares neurobiological and Qur'ānic perspectives on the organ of intellect. The author draws on *ḥadīth*, Islamic philosophy, and an in-depth analysis of *tafsīr* literature. The study concludes that the Qur'ānic notion of intellect does not align with the neurobiological theory that the brain is the seat of intellect. Instead, the study advocates for a literal interpretation of the terms "heart" and "chest" in the Qur'ān when discussing the organ of intellect.⁷⁶

The article "*It's Time to Translate the Qur'ānic Words Nafs and Qalb as Referring to Mind and Intelligence*" attempts to identify and list Qur'ānic terms related to the mind and intelligence. The study aims to translate these terms into ones commonly understood within modern psychology, and assigning psychological themes to each term. While this study employs a linguistic approach to analyse the Qur'ānic

⁷⁴ Tekieh, Elaheh, Mohammad Hassan Nikbin, Hedayat Sahraei, Mostafa Ghaneyi, Masoomeh Kazemi, and Hamed Aliyari. "What Is Thought: Take a Look at the Holy Quran and the Principles of Neuroscience." *Iranian Red Crescent Medical Journal* 19, no. 11 (November 12, 2017). <https://doi.org/10.5812/ircmj.61689>.

⁷⁵ Naufanita, Hana, Nurwahidin, and Ali Ghazali. "A Preliminary Qur'ānic Review of Consciousness." *Journal of Strategic and Global Studies* 6, no. 1 (January 30, 2023). <https://doi.org/10.7454/jsjgs.v6i1.1114>.

⁷⁶ Raza, Muhammad Waqar. "Anatomy of the Intellect in the Quran: A Fresh Perspective." *Al-Bayan: Journal of Qur'an and ḥadīth Studies* 20, no. 2 (July 6, 2022): 182–216. <https://doi.org/10.1163/22321969-12340113>.

terms, it does not clearly explain the methodology used to identify the psychological themes.⁷⁷

From the literature above, we can see various methodologies and frameworks used to gain a Qur'ānic perspective regarding this topic. These include: drawing connection between the Qur'ān and new discoveries in neuroscience; comparing the Qur'ānic approach with other disciplines' approaches to this topic; evaluating the new discovery through a Qur'ānic framework; and translating different terms used in the Qur'ān and neuroscience. Some of these articles have conducted in-depth analyses to understand the nature of this modern science. These works critically analyse the issue and recognise contradictions between the Qur'ānic perspective and neuroscience on a deeper philosophical level.

1.4.2.2 Islamic Perspective on Intelligence and Learning

Neuroeducation, rooted in psychology and cognitive science, follows a conventional scientific approach that offers its own perspective on learning, education, and intelligence. The literature discussed below explores the Islamic perspectives on these concepts.

In “*the Book of Knowledge*”, al-Ghazali, a towering figure in the intellectual history of classical Islamic education argue that learning should be a process that transform the heart and should go beyond memorization of facts. True learning happens when the heart is cleansed and purified of blameworthy traits. Learning should aim at guiding rather than mere correcting or disciplining.⁷⁸

In his keynote address delivered at the “First World Conference on Muslim Education” titled, “*The Concept of Education in Islam*” Syed Muhammad Naquib al-Attas emphasise that in Islamic concept of learning and educational process, human

⁷⁷ Husain, Waqar. “It’s Time to Translate the Qur’ānic Words, Nafs & Qalb as Referring to Mind & Intelligence.” *Islamiyyat* 44, no. 2 (December 1, 2022): 77–95. <https://doi.org/10.17576/islamiyyat-2022-4402-06>.

⁷⁸ Abū Ḥāmid al-Ghazālī, *The Book of Knowledge*, trans. Kenneth Honerkamp (Louisville, KY: Fons Vitae, 2015), 49; Sebastian Günther, “Be Masters in That You Teach and Continue to Learn: Medieval Muslim Thinkers on Educational Theory,” *Comparative Education Review* 50, no. 3 (August 2006): 381, <https://doi.org/10.1086/503881>.

spiritual dimension plays a central role. He argues that human spiritual substance is the true seat of knowledge.⁷⁹

In his research titled "*Psychology of Learning: An Islamic Theory*," Alizi Alias analyses several conventional theories of learning from an Islamic perspective. The article concludes that the fundamental difference between the two approaches lies in the role of the human soul. From an Islamic viewpoint, the soul plays a central role in the learning process, in contrast to conventional theories, which generally exclude the soul from consideration.⁸⁰

Similarly, Achmad Ushuluddin, in his article "*Understanding Rūh as a Source of Intelligence in Islam*" explores the concept of *rūh* (soul) as a source of intelligence in the Qur'ān. This article presents a new perspective, suggesting that the ultimate source of intelligence, which remains unexplained by modern science, can be more holistically understood through the Qur'ānic perspective.⁸¹

1.4.3 Qur'ānic Studies and the Integration of Knowledge in Indonesia

Research exploring the role of Qur'ānic studies in the agenda of IOK in Indonesia is still limited. Most studies focus on the conceptual and theoretical aspects, discussing the Qur'ān's position as a source of knowledge and how its messages are interpreted in the integration process. However, there are very few studies examining how these ideas are practically applied in the field.

A study by Iskandar, titled "*Qur'ānic Studies and the Integration of Knowledge: A Case Study of UIN Sunan Gunung Djati Bandung*," investigates the role of Qur'ānic studies in the integration of knowledge at the Faculty of Ushuluddin at the State Islamic University (UIN) Bandung. The study advocates for the development of a dynamic and progressive approach to interpreting the Qur'ān, particularly concerning contemporary

⁷⁹ Syed Muhammad Naquib al-Attas, The Concept of Islamic Education, keynote address presented at the First World Conference on Muslim Education, Makkah, March 1977; excerpt published 1980, © Naquib al-Attas. Reproduced with permission, 17.

⁸⁰ Alias, Alizi, and Hariyati Shahrina Abdul Majid. "Psychology of Learning: An Islamic Theory." *International Journal of Islamic Thought* 4, no. 1 (2015): 63–80.

⁸¹ Ushuluddin, Achmad, Abd Madjid, Siswanto Masruri, and Iswandi Syahputra. "Understanding Ruh as a Source of Human Intelligence in Islam." *The International Journal of Religion and Spirituality in Society* 11, no. 2 (2021): 103–17. <https://doi.org/10.18848/2154-8633/cgp/v11i02/103-117>.

issues. It highlights the importance of a "from reality to text" approach in Qur'ānic studies to effectively support the integration of knowledge.⁸²

Another relevant study, "*The Position of the Qur'ān in the Integration of Knowledge: An Examination of the Thoughts of Kuntowijoyo and M. Dawam Rahardjo*," explores the perspectives of two pioneers in the IOK. This study identifies three key roles of the Qur'ān in the integration process: as a source of inspiration, as a source of knowledge, and as a starting point for developing theories. The study also examines the intellectual and social contexts that shaped these ideas, evaluating the originality, strengths, and weaknesses of their concepts.⁸³

The review of the literature on the integration of neuroscience in Islamic education in Indonesia reveals that no study has yet critically examined the interpretive methods employed by the proponents in formulating the Qur'ānic arguments. Therefore, this research aims to address this gap by providing a more in-depth analysis of how Qur'ānic verses are used within this agenda of integration, alongside a comprehensive review of the methodologies employed to extract meaning from these verses.

1.5 RESEARCH QUESTION

This study will try to answer the following questions:

1. How is the integration of neuroscience in Islamic education in Indonesia defined and grounded in its theoretical and contextual foundations?
2. How do proponents of integrating neuroscience into Islamic education build their Qur'ānic arguments and what interpretive methods do they use in this process?

⁸² Iskandar, Syahrullah. "Studi Alquran Dan Integrasi Keilmuan: Studi Kasus Uin Sunan Gunung Djati Bandung." *Wawasan: Jurnal Ilmiah Agama dan Sosial Budaya* 1, no. 1 (February 3, 2016): 86–93. <https://doi.org/10.15575/jw.v1i1.580>.

⁸³ Wardani. "Posisi Al-Qur'an Dalam Integrasi Ilmu : Telaah Terhadap Pemikiran Kuntowijoyo Dan M. Dawam Rahardjo." *Nun: Jurnal Studi Alquran dan Tafsir di Nusantara* 4, no. 1 (May 4, 2019): 107–57. <https://doi.org/10.32495/nun.v4i1.38>.

3. What are the limitations or weaknesses in the methods used by proponents to interpret the Qur'ān and build their Qur'ānic arguments for integrating neuroscience into Islamic education?

1.6 RESEARCH OBJECTIVES

The objective of this study are as follows:

1. To identify how the integration of neuroscience in Islamic education in Indonesia is defined and grounded in its theoretical and contextual foundations.
2. To analyse how proponents of integrating neuroscience into Islamic education build their Qur'ānic arguments and the interpretive methods they employ.
3. To evaluate the limitations or weaknesses in the methods used by proponents to interpret the Qur'ān and construct their Qur'ānic arguments for integrating neuroscience into Islamic education.

1.7 RESEARCH METHODOLOGY

This section presents the methods employed in the study to address the research questions. The study is based on a qualitative research design, utilising an evaluative case study. A case study is an in-depth examination of a single unit,⁸⁴ chosen when the contextual conditions are essential to understanding the phenomenon under investigation.⁸⁵ In this research, the case study approach was selected because the interpretation of the "neuroscience verses" cannot be fully understood without considering the context of IOK in Indonesia. According to Dumez, researchers conducting case studies must ask themselves, "What is my case a case of?"⁸⁶ This is essential, as the very nature of case studies involves comparison. In this research, the

⁸⁴ Gerring, John. "What Is a Case Study and What Is It Good For?" *American Political Science Review* 98, no. 2 (May 2004): 341–54. <https://doi.org/10.1017/s0003055404001182>.

⁸⁵ Yin, Robert K. *Case study research: Design and methods*. Thousand Oaks, Calif: SAGE Publications, 2003.

⁸⁶ Dumez, Hervé. "What Is a Case, and What Is a Case Study?" *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique* 127, no. 1 (June 17, 2015): 43–57. <https://doi.org/10.1177/0759106315582200>.

case under study is the case of how the Qur'ān, as a source of knowledge, is referenced and interpreted.

The evaluative case study approach allows for identifying the limitations and potential negative implications of current methodologies applied to the Qur'ān in the integration of neuroscience within Islamic education in Indonesia. Evaluating the current method is essential, as it has drawn several criticisms, yet little research has examined its specific limitations. This study employs an evaluative case study to provide an in-depth, comprehensive understanding of these limitations. For this qualitative research, the following methods are employed:

1. **Descriptive Approach:** This approach is used to map and present the discourse on the integration of neuroscience into Islamic education in Indonesia, particularly in relation to the first and second research questions. It serves to identify and describe the theoretical and contextual foundations, Qur'ānic arguments, and interpretive strategies formulated by proponents of this discourse. Descriptive approach is chosen because it is rooted in naturalistic inquiry, straightforward approach and focusing on direct descriptions, without deep theorisation or abstraction. It emphasise staying close to the data and committing to studying phenomena in their natural state.⁸⁷ This approach facilitates the mapping of the Qur'ānic verses they cite, the interpretations they propose, and the interpretive methods they use. Through this process, the discourse is described systematically and in detail, providing a clear representation of how proponents define integration and construct their arguments.
2. **Analytical Approach:** Analytical research goes deep inside the facts or the informations for critical evaluation and moves beyond presenting the discourse.⁸⁸ This approach is used to evaluate and critique the arguments and interpretive methods that have been mapped. It is particularly relevant to the second and third research questions. Regarding the second question, it is used to

⁸⁷ Steven Hall and Linda Liebenberg, "Qualitative Description as an Introductory Method to Qualitative Research for Master's-Level Students and Research Trainees," *International Journal of Qualitative Methods* 23 (2024), <https://doi.org/10.1177/16094069241242264>.

⁸⁸ Pradip Kumar Sahu, *Research Methodology: A Guide for Researchers in Agricultural Science, Social Science and Other Related Fields* (New Delhi: Springer, 2013), 6.

examine how the Qur'ānic arguments are constructed, the interpretive strategies involved, and the reasoning that supports them. Regarding the third question, the analytical approach is central as the research highlights the limitations and weaknesses of these exegetical methods. Thus, this dimension allows the study not only to present the discourse as it is, but also to critically assess its methodological coherence and implications.

3. **Descriptive Inductive Method:** The inductive method is employed because this study did not begin with a predetermined theoretical framework for how neuroscience should be integrated into Islamic education, nor with a fixed model of Qur'ānic interpretation. Instead, this method gathered data from the proponents' own writings and arguments, identified the Qur'ānic verses and the interpretive strategies they employed, and developed a broader understanding of their methodological tendencies from these observations. Inductive approach allows research findings to emerge from the dominant and significant themes inherent in the raw data, without the restraints imposed by structured methodologies.⁸⁹ This inductive orientation allowed the study to construct its critical evaluation from the ground up, drawing on patterns, strengths, and weaknesses directly from the textual evidence and interpretive practises analysed.

1.8 METHOD OF DATA COLLECTION AND ANALYSIS

1.8.1 Content Analysis

This study collected and used various documents as sources of data as it aims to analyse and interpret pre-existing materials within this discourse. These documents include books, academic journal articles, and institutional reports. In this study, document analysis serves as the sole method used due to the discursive and conceptual nature of the research object. Accordingly, the reality under investigation is present and articulated in text form. The idea of integration of neuroscience in Islamic education are formulated, debated and constructed primarily through academic writings, making scientific publications the primary locus where this phenomenon occurs. The selection

⁸⁹ David R. Thomas, "A General Inductive Approach for Analyzing Qualitative Evaluation Data," *American Journal of Evaluation* 27, no. 2 (2006): 237–246, <https://doi.org/10.1177/1098214005283748>.

of this method also aligns with the research objectives, which require close textual reading, analysis of argumentative methodology and critical evaluation of the quality of argumentative construction. Furthermore, limiting the data to published academic articles ensures data stability, verifiability and consistency.⁹⁰

Selection of Documents:

The process of conducting a document analysis begins with identifying the relevant documents for the study. The data for this study was collected through documentary research. There are two categories of data in this research:

Contextual Data: Data related to the broader discourse on the integration of neuroscience into Islamic education in Indonesia, specifically discussions concerning the integration of knowledge, Islamic education, and educational neuroscience. This data was gathered from academic sources, including books and journal articles that covers these topics in general.

Primary Data: The primary object of the research, namely the definition or concept of integration of neuroscience into Islamic education in Indonesia, as well as the Qur'ānic arguments and interpretive methods used by its proponents. The primary sources for this category include books, undergraduate and graduate theses, and journal articles. These documents were selected primarily through Google Scholar, based on the following criteria:

1. It discusses the concept of integration of neuroscience into Islamic education in Indonesia.
2. It includes analyses of Qur'ānic verses related to this idea.
3. It situates the integration of neuroscience in Islamic education within the broader IOK agenda in Indonesia.

⁹⁰ Glenn A. Bowen, "Document Analysis as a Qualitative Research Method," *Qualitative Research Journal* 9, no. 2 (August 2009): 27–40, <https://doi.org/10.3316/QRJ0902027>.

Since Professor Suyadi from Ahmad Dahlan University is the pioneer of this idea and explicitly links it to the IOK in Indonesia, documents that engaged with, cite, or build upon his works will serve as a primary basis for identifying relevant sources.

Based on these criteria, the final corpus of data for the second category, the primary object of inquiry, consists of 17 journal articles, 1 bachelor's thesis, 1 master's thesis, and 1 book.

1.8.2 Analysing Selected Data

Thematic analysis was used to map the definitions, theoretical and contextual foundations, Qur'ānic arguments, and interpretive strategies used by proponents of the integration of neuroscience into Islamic education in Indonesia. The researcher analysed the information gathered after data collection and began with labelling, where key terms, concepts, and arguments were identified within the text. This labelling served as the initial stage of coding, allowing the data to be systematically grouped by theme. Through this process, recurring patterns and ideas were identified, allowing for deeper analytical interpretation and critical evaluation. Critical analysis was then used to gain a comprehensive understanding of the limitations and weaknesses of the current approach.

CHAPTER TWO

INTRODUCTION TO THE INTEGRATION OF NEUROSCIENCE IN ISLAMIC EDUCATION IN INDONESIA

2.1 INTRODUCTION

This chapter serves as the theoretical and conceptual foundation for this study. It aims to present the essential elements underlying the discourse on the integration of neuroscience and Islamic education within the Indonesian context. This chapter is divided into three main parts.

The first section provides a conceptual overview. It discusses three major components: the idea of integration of knowledge in Indonesia, including its historical background, key figures, and models of implementation, especially the Integration-Interconnection model of Amin Abdullah; an introduction to neuroscience and the global development of neuroeducation as an interdisciplinary approach that bridges neuroscience and pedagogical practises; and foundational concepts in Islamic education, particularly emphasising the central role of the Qur'ān as its epistemological basis. This Qur'ānic foundation is crucial because it provides the justification for analysing the integration discourse through the lens of Qur'ānic studies and *tafsīr*.

The second section explores how the proponents of this integration discourse understand the core concepts introduced in the previous section. It describes their interpretation and adaptation of the ideas of integration of knowledge in Indonesia, neuroscience, neuroeducation, and Islamic education.

The third section analyses the background and intellectual context in which the discourse on the integration of neuroscience in Islamic education emerged. It includes a critique of Islamic education that motivated the search for innovation, the historical and institutional contexts in which this integration discourse took shape, and the platforms or mediums through which it has been articulated and disseminated.

2.2 THEORETICAL FRAMEWORK AND CONCEPTUAL FOUNDATIONS

2.2.1 Integration of Knowledge in Indonesia

The IOK in Indonesia emerged from concerns among Indonesian Muslim scholars, who criticised the dualism or dichotomy between Islamic and secular sciences.¹ Islamic and secular sciences are seen as mutually isolated and even disparaging toward one another.² This criticism refers to Ian G. Barbour's perspective on the relationship between religious and scientific studies.³ He identifies four models of the relationship between science and religion: conflict, independence, dialogue and integration. The IOK is also driven by the view that current Islamic studies are largely doctrinal in nature.⁴ Religious thinking is perceived as rigid because the authority of the text and the *salaf* is prioritised over other sources of intellectual authority. This is also believed to have led to the sacralisation of religious thought.⁵

The proponents of IOK see the need to restructure the relationship between Islam and science. They believe this is necessary because maintaining an independent relationship between religious knowledge and scientific knowledge results in a partial and non-comprehensive worldview.⁶ The reality of the modern world demands an integrative relationship among different fields of knowledge.⁷ Contemporary global issues must be approached from multiple perspectives. Hence, religious sciences must not remain sterile or isolated from engagement with other disciplines, as this is believed to undermine their relevance.⁸

¹ Kementerian Agama Republik Indonesia, Direktorat Pendidikan Tinggi Keagamaan Islam, Direktorat Jenderal Pendidikan Islam, *Pedoman Implementasi Integrasi Ilmu di Perguruan Tinggi Keagamaan Islam* (Makassar: Repositori UIN Alauddin Makassar, 1970), 15, <https://repositori.uin-alauddin.ac.id/17004/>.

² Ibid.

³ M. Amin Abdullah, *Multidisiplin, Interdisiplin, dan Transdisiplin: Metode Studi Agama dan Studi Islam di Era Kontemporer* (Yogyakarta: IB Pustaka, 2020).

⁴ Amin Abdullah, *Studi Agama; Normativitas atau Historisitas?* (Yogyakarta: Pustaka Pelajar, 1996), 61–77, 121–135.

⁵ Parluhutan Siregar, “Integrasi Ilmu-Ilmu Keislaman dalam Perspektif M. Amin Abdullah,” *MIQOT: Jurnal Ilmu-Ilmu Keislaman* 38, no. 2 (December 9, 2014): 340, <https://doi.org/10.30821/miqot.v38i2.66>.

⁶ Sumarni and Suprpto, “Implementasi Integrasi Ilmu di PTKI: Integrasi dalam Tridarma Perguruan Tinggi,” *EDUKASI: Jurnal Penelitian Pendidikan Agama dan Keagamaan* 20, no. 2 (2022): 121, <https://doi.org/10.32729/edukasi.v20i2.1246>.

⁷ Ibid., 126.

⁸ M. Amin Abdullah, *Multidisiplin, Interdisiplin, dan Transdisiplin: Metode Studi Agama dan Studi Islam di Era Kontemporer* (Yogyakarta: IB Pustaka, 2020).

The IOK aspires to build an open and constructive dialogical interaction between religious sciences and other disciplines. The process of integration focuses primarily on efforts to integrate the epistemological and axiological perspectives of Islam into the framework of today's general or secular sciences, accompanied by the development of knowledge that takes into account the ethical principles of Islam. In this concept, all disciplines are fundamentally regarded as equal in status within the hierarchy of knowledge. The interpretation of the Qur'ān is seen as having an equal standing to human understanding of the self and knowledge of the universe.⁹

The proponents also see the need to reform the methodology of Islamic studies. One of the key figures in the IOK in Indonesia is Amin Abdullah. He proposes the integration-interconnection approach as a new method for understanding the relationship between religion and science, along with multidisciplinary, interdisciplinary, and trans-disciplinary approaches as new frameworks for religious research and education in the contemporary era. In his concept of the "spider web model of knowledge," Amin Abdullah places the Qur'ān as the foundation for scientific development, but he also emphasises that Islam has never positioned divine revelation as the sole source of knowledge. According to him, there are two sources of knowledge: one derived from God and one derived from humans. The combination of these two is what he calls theo-anthropocentrism.¹⁰

Amin Abdullah advocates several new approaches in the method of interpreting the Qur'ān. The first is called the Contextual-Progressive approach. According to him, there are two important principles in the contextual-progressive model of interpretation: The first is that it is interactive. This means that readers from various fields of expertise can take part in the production of meaning. The second is that it is fluid, which means that interpretation should take into account the changes in time, language usage, and socio-historical conditions.¹¹

⁹ Kementerian Agama Republik Indonesia, Direktorat Pendidikan Tinggi Keagamaan Islam, Direktorat Jenderal Pendidikan Islam, *Pedoman Implementasi Integrasi Ilmu di Perguruan Tinggi Keagamaan Islam* (Makassar: Repositori UIN Alauddin Makassar, 1970), 16, <https://repositori.uin-alauddin.ac.id/17004/>.

¹⁰ Siregar, Parluhutan. "Integrasi Ilmu-Ilmu Keislaman Dalam Perspektif M. Amin Abdullah." *MIQOT: Jurnal Ilmu-ilmu Keislaman* 38, no. 2 (December 9, 2014). <https://doi.org/10.30821/miqot.v38i2.66>.

¹¹ M. Amin Abdullah, *Multidisiplin, Interdisiplin, dan Transdisiplin: Metode Studi Agama dan Studi Islam di Era Kontemporer* (Yogyakarta: IB Pustaka, 2020).

He also advocates the use of hermeneutics as a tool of analysis. Amin Abdullah criticises textualist and semi-textualist styles of interpretation, which, according to him, are rigid, exclusive, totalistic, and not in line with the principle of *ummatan wasaʿta*. In his book, he states:

For textualists, it is the Qurʾānic verses that are understood literally and textually that guide the life of Muslim individuals, and not what is required by the evolving needs of contemporary modern human beings.¹²

2.2.2 Neuroscience and Neuroeducation

2.2.2.1 Neuroscience

Neuroscience is a discipline that studies the nervous system.¹³ Neuroscience scientifically investigates the functions of the nervous system, including the brain, to understand the biological basis and neural mechanisms underlying behaviour, emotion, and cognition.¹⁴ Neuroscience research relies on experimental studies, clinical case analyses, and the use of animal models.¹⁵ Neuroscience seeks to understand the structures and functions of both the normal and abnormal brain.¹⁶ According to neuroscience, the flow of electrical signals through neural circuits gives rise to mind. Therefore, by gaining insight on how nervous system including the brain function, we can understand how we perceive, act, think, learn, and remember.¹⁷

Neuroscience originated from separate investigative pursuits conducted by scientists from various disciplines: medicine, biology, psychology, physics, chemistry, and mathematics.¹⁸ The term neuroscience and the modern study of the nervous system

¹² M. Amin Abdullah, *Multidisiplin, Interdisiplin, dan Transdisiplin: Metode Studi Agama dan Studi Islam di Era Kontemporer* (Yogyakarta: IB Pustaka, 2020).

¹³ Valerie Hedges, "What Is Neuroscience?" in *Introduction to Neuroscience*, Michigan State University Open Textbook Series, last modified December 15, 2022, para. 1, <https://openbooks.lib.msu.edu/intro neuroscience1/chapter/what-is-neuroscience/>.

¹⁴ Larry R. Squire et al., *Fundamental Neuroscience*, 4th ed. (Amsterdam: Academic Press, 2013), 3, https://books.google.co.id/books?id=QGzJFu_NyzcC&pg=PA3

¹⁵ Ibid, Para 12

¹⁶ Larry R. Squire et al., *Fundamental Neuroscience*, 4th ed. (Amsterdam: Academic Press, 2013), 3, https://books.google.co.id/books?id=QGzJFu_NyzcC&pg=PA3

¹⁷ Eric R. Kandel et al., *Principles of Neural Science*, 5th ed. (New York: McGraw-Hill, 2013), xli, <https://archive.org/details/PrinciplesOfNeuralScienceFifthKANDEL/page/n41/mode/1up>

¹⁸ Mark F. Bear, Barry W. Connors, and Michael A. Paradiso, *Neuroscience: Exploring the Brain*, 4th ed. (Philadelphia, PA: Lippincott Williams & Wilkins, 2015), 4, <https://seti.net/Neuron%20Lab/NeuronReferences/Neuroscience%20-%20Bear.pdf>.

were introduced in the the middle of the nineteenth century, marking the beginning of an era in which these disciplines began to work together collaboratively, sharing a common language and framework.¹⁹ In the modern era, neuroscience is studied across many different disciplines.²⁰ The field of medicine utilises neuroscience to diagnose and treat brain-related disorders.²¹ The field of psychology studies neuroscience to understand how brain activity relates to behaviour, emotion, and mental health.²² Scholars of computer science learn from neuroscience to develop intelligent systems.²³

Neuroscience is closely related one of today's most prominent technological developments which is Artificial Intelligence (AI). AI researchers study and understand the human brain to gain insights into how the brain work to develop better AI systems including machine learning. Neuroscience is also a source of inspiration and insight to achieve artificial human intelligence.²⁴

As it has developed, theories and discoveries in neuroscience have been applied to various scientific fields such as neurolinguistics,²⁵ neuromarketing,²⁶

¹⁹ Larry R. Squire et al., *Fundamental Neuroscience*, 4th ed. (Amsterdam: Academic Press, 2013), 3, https://books.google.co.id/books?id=QGzJFu_NyzcC&pg=PA3

²⁰ Georgetown University, "About Neuroscience," Georgetown University Interdisciplinary Program in Neuroscience, accessed July 3, 2025, <https://neuro.georgetown.edu/aboutneuroscience/#:~:text=Neuroscience%20has%20traditionally%20been%20classified,philosophy%2C%20psychology%2C%20and%20medicine.>

²¹ North Central College, "Neurology vs. Neuroscience: What's the Difference?" *News*, North Central College, last modified September 16, 2022, accessed July 4, 2025, <https://www.northcentralcollege.edu/news/2022/09/16/neurology-vs-neuroscience-whats-difference.>

²² American Psychological Association, "Exploring New Frontiers in Neuroscience," *Monitor on Psychology* 53, no. 1 (January 2022), <https://www.apa.org/monitor/2022/01/special-frontiers-neuroscience>.

²³ Padraig Gleeson et al., "Integrating Model Development across Computational Neuroscience, Cognitive Science, and Machine Learning," *Neuron* 111, no. 10 (May 17, 2023): 1526–1530, <https://doi.org/10.1016/j.neuron.2023.03.037>.

²⁴ Lorna Uden and Shijie Guan, "Neuroscience and Artificial Intelligence," in *Handbook of Research on New Investigations in Artificial Life, AI, and Machine Learning*, ed. Maki K. Habib (Hershey, PA: IGI Global, 2022), 212–241, <https://doi.org/10.4018/978-1-7998-8686-0.ch009>

²⁵ Ahmed Alduais, Abdullah Alduais, Meysam Amidfar, and Shabnam A. Alizadeh Incheh, "Neurolinguistics: A Scientometric Review," *Cogent Arts & Humanities* 10, no. 1 (April 9, 2023): Article 2197341, <https://doi.org/10.1080/23311983.2023.2197341>.

²⁶ Natalia Abuín Vences, Jesús Díaz-Campo, and Daniel Francisco García Rosales, "Neuromarketing as an Emotional Connection Tool Between Organisations and Audiences in Social Networks: A Theoretical Review," *Frontiers in Psychology* 11 (July 21, 2020): article 1787, <https://doi.org/10.3389/fpsyg.2020.01787>.

neuroeconomics,²⁷ neurolaw,²⁸ and neuroaesthetics.²⁹ These disciplines integrate insights and findings from neuroscience into the development of theoretical understanding and research, as an effort to address challenges and enhance the effectiveness of approaches within each field. In its application to the field of education, this study has evolved into a distinct discipline known as educational neuroscience or neuroeducation.

2.2.2.2 Neuroeducation

Neuroeducation aims to validly and meaningfully translate knowledge about how learning occurs at the brain and how the brain is affected by learning processes, into improvements in teaching practises, educational theory, and policy.³⁰ It is also useful for assessing learning outcomes and understanding students' potential.³¹ Moreover, it informs teachers and educators about the neurological mechanisms underlying various learning difficulties, such as dyslexia, and their possible interventions.³² Educational neuroscience also offers insights into how factors like anxiety, attention, relationships, and sleep impact educational outcomes.³³

²⁷ Natasha R. Senftleber, Christian M. Stenzel, and Robert Kurzban, "Neuroeconomics: The Neurobiology of Value-Based Decision-Making," *Nature Reviews Neuroscience* 9, no. 7 (June 11, 2008): 545–55. Published February 19, 2015 as an author manuscript on PMC, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332708/>.

²⁸ Tade M. Spranger, ed., *Neurolaw: Advances in Neuroscience, Justice & Security*, Palgrave Studies in Law, Neuroscience, and Human Behavior (Cham: Springer, 2021), <https://doi.org/10.1007/978-3-030-69277-3>.

²⁹ Marcos Nadal, Antoni Gomila, and Aleix Gálvez-Pol, "A History for Neuroaesthetics," in *An Introduction to Neuroaesthetics: The Neuroscientific Approach to Aesthetic Experience, Artistic Creativity, and Arts Appreciation*, ed. Jakob O. Lauring (Copenhagen: Museum Tusculanum Press, 2014), 3–49.

³⁰ Steve Masson, "Neuroeducation: Understanding the Brain to Improve Teaching," *Neuroeducation* 1, no. 1 (January 2012): 1–2, <https://doi.org/10.24046/neuroed.20120101.1>

³¹ Janet M. Dubinsky, S. Selcen Guzey, Janice L. Cooper, et al., "Contributions of Neuroscience Knowledge to Teachers and Their Practise," *Journal of Cognitive Neuroscience* 25, no. 5 (2019): 1–13, <https://doi.org/10.1177/1073858419835447>.

³² Gabrielle Wilcox, Laura M. Morett, Zachary Hawes, et al., "Why Educational Neuroscience Needs Educational and School Psychology to Effectively Translate Neuroscience to Educational Practise," *Frontiers in Psychology* 11 (2021): Article 618449, <https://doi.org/10.3389/fpsyg.2020.618449>

³³ Ibid.

Neuroeducation or educational neuroscience is a very young field of study.³⁴ Neuroeducation emerged from the more mature discipline of educational psychology.³⁵ Books, articles and programmes in educational neuroscience began to emerge in the 1990s.³⁶ This field became a formal academic discipline with the establishment of the Mind, Brain, and Education (MBE) programme at Harvard University in the early 2000s. The programme was pioneered by Kurt W. Fischer, together with Howard Gardner and David Rose.³⁷ This was the first degree programme of its kind in the world. The establishment of the International Mind, Brain, and Education Society and the launch of scholarly journals such as “*Mind, Brain, and Education*” further solidified the existence of this field as a core academic discipline.³⁸

Educational neuroscience is a relatively new and developing interdisciplinary field that combines knowledge from neuroscience, psychology, and education.³⁹ As a developing discipline, the scope, methods, and identity of neuroeducation have yet to be as clearly defined as those of more established fields such as physics or biology.⁴⁰ However, with the emergence of academic journals, dedicated study programmes, and a growing scientific community, this new interdisciplinary field is gradually evolving into a distinct area of study. It has also begun to develop a solid academic and practical foundation, allowing it to be recognised as a standalone discipline.⁴¹

Several universities in the United States, the United Kingdom, Australia, and some European countries has also offer masters or doctoral programmes in

³⁴ Gregory M. Donoghue and Jared Cooney Horvath, “Neuroeducation: A Brief History of an Emerging Science,” in *Reference Module in Neuroscience and Biobehavioral Psychology*, ed. [Editor Name(s)] (Amsterdam: Elsevier, January 2020), sec. 632, <https://doi.org/10.1016/B978-0-12-819641-0.00077-3>

³⁵ Ibid

³⁶ Educational neuroscience was introduced over 30 years ago : Cruickshank, William M. 1981. *A Developmental Approach to Learning Disabilities*. Syracuse, NY: Syracuse University Press; Fuller, Delores, and Philip Glendening. 1985. *Learning Disabilities: A Multidisciplinary Approach*. New York: Macmillan.

³⁷ Jill Anderson, “HGSE Remembers Kurt Fischer,” *Harvard Graduate School of Education*, April 2, 2020, <https://www.gse.harvard.edu/ideas/news/20/04/hgse-remembers-kurt-fischer>.

³⁸ Jill Anderson, “HGSE Remembers Kurt Fischer,” *Harvard Graduate School of Education*, April 2, 2020, <https://www.gse.harvard.edu/ideas/news/20/04/hgse-remembers-kurt-fischer>.

³⁹ John T. Bruer, “Where Is Educational Neuroscience?” *Educational Neuroscience* 1 (2016): 1–12, <https://doi.org/10.1177/2377616115618036>

⁴⁰ Marc S. Schwartz, “Educational Neuroscience: The Challenges in Crossing Disciplinary Boundaries,” abstract presented at the *3rd International Conference on Educational Neuroscience*, Abu Dhabi, United Arab Emirates, March 11–12, 2018, <https://doi.org/10.3389/conf.fnhum.2018.225.00004>.

⁴¹ Michael S. C. Thomas, Daniel Ansari, and Victoria C. P. Knowland, “Annual Research Review: Educational Neuroscience: Progress and Prospects,” *Journal of Child Psychology and Psychiatry* 60, no. 4 (April 2019): 477–492, <https://doi.org/10.1111/jcpp.12973>

neuroeducation.⁴² Some examples include the MSc in Educational Neuroscience at University College London, the Master of Science in Neuroscience and Education at Columbia University, and the Master of Educational Neuroscience at CQ University Australia.

As a relatively new and developing field, educational neuroscience has faced doubts and criticism from several academics. This group is pessimistic about the impact neuroscience has on educational practises.⁴³ They also question the concrete mechanisms for bridging the two fields. The question of how to accurately translate neuroscience into educational theory, policy, and practise has been one of the major challenges in this new field.⁴⁴

This group argues that a valid and meaningful translation between the laboratory and the classroom has not yet been achieved. According to a study titled “*Translating neuroscience, psychology and education*”, the primary form of translation most sought after and often claimed is prescriptive translation, where findings from neuroscience are expected to directly lead to effective recommendations for teaching and learning.⁴⁵ A study by Dubinsky further adds that the accurate dissemination of neuroscience findings to teachers and educators has been limited.⁴⁶ A lack of interdisciplinary training is also believed to contribute to poor communication between educators and neuroscientists.⁴⁷

Tommerdahl observes that the oversimplification of this relationship has led to the development of ineffective new pedagogical methods commonly referred to as "brain-based" approaches, which in fact lack a legitimate evidence base, including

⁴² Ibid.

⁴³ Gabrielle Wilcox et al., “Why Educational Neuroscience Needs Educational and School Psychology to Effectively Translate Neuroscience to Educational Practise,” *Frontiers in Psychology* 11 (January 14, 2021): 5, <https://doi.org/10.3389/fpsyg.2020.618449>.

⁴⁴ Gregory M. Donoghue and Jared Cooney Horvath, “Neuroeducation: A Brief History of an Emerging Science,” in *Reference Module in Neuroscience and Biobehavioral Psychology*, ed. [Editor Name(s)] (Amsterdam: Elsevier, January 2020), sec. 632, <https://doi.org/10.1016/B978-0-12-819641-0.00077-3>

⁴⁵ Gregory M. Donoghue and Jared C. Horvath, “Translating Neuroscience, Psychology and Education: An Abstracted Conceptual Framework for the Learning Sciences,” *Cogent Education* 3, no. 1 (December 2016): Article 1267422, <https://doi.org/10.1080/2331186X.2016.1267422>.

⁴⁶ Janet M. Dubinsky, S. Selcen Guzely, Marc S. Schwartz, et al., “Contributions of Neuroscience Knowledge to Teachers and Their Practise,” *The Neuroscientist* 25, no. 5 (2019): 394–407, <https://doi.org/10.1177/1073858419835447>.

⁴⁷ Daniel Ansari, Bert De Smedt, and Roland H. Grabner, “Neuroeducation – A Critical Overview of an Emerging Field,” *Neuroethics* 5, no. 2 (2011): 105–117, <https://doi.org/10.1007/s12152-011-9119-3>

practises such as brain-training, brain-based learning, and brain-gym. Tommerdahl argues that these practises are often based on overly simplified or even incorrect understandings of the brain, commonly known as “neuromyths.” As a result, most of these approaches have failed to positively impact teaching or learning.⁴⁸

According to Donoghue and Horvath, knowledge of the brain alone is insufficient to determine the most effective teaching or learning strategies. They argue that science of learning is a multi-faceted discipline that includes neurological, psychological, and sociocultural dimensions. They emphasise that the educational process cannot be reduced to merely developing brain potential while neglecting its social and cultural aspects.⁴⁹

2.2.3 Islamic Education

There are differing opinions among Muslim scholars regarding the Arabic/Qur’ānic terminology that best captures the essence of education in Islam.⁵⁰ To understand the Qur’ānic/Islamic perspective on a topic, discussing the precise Qur’ānic or Arabic terminology is crucial, as these concepts represent a distinct worldview and framework.

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The term *tarbiyyah* has been one of the most commonly used to denote “education.” Linguistically, *tarbiyyah* connotes the processes of *bringing out*, *developing*, *nurturing*, *fostering*, and *nourishing*, especially as applied to objects under one’s care.⁵² Tarbiyyah refers to the development of individual potential and the process of nurturing and guiding the child toward a state of completeness or maturity.⁵³ The

⁴⁸ Tommerdahl, Jodi(2010) 'A model for bridging the gap between neuroscience and education', Oxford Review of Education, 36: 1, PG 107///Neuroeducation – A Critical Overview of An Emerging Field

⁴⁹ Gregory M. Donoghue and Jared Cooney Horvath, “Neuroeducation: A Brief History of an Emerging Science,” in *Reference Module in Neuroscience and Biobehavioral Psychology*, ed. [Editor Name(s)] (Amsterdam: Elsevier, January 2020), sec. 632, <https://doi.org/10.1016/B978-0-12-819641-0.00077-3>

⁵⁰ J. M. Halstead, “An Islamic Concept of Education,” *Journal of Comparative Education* 40, no. 4 (November 2004): page range, accessed via JSTOR, <https://www.jstor.org/stable/4134624>

⁵¹ Jasser Auda, *Re-envisioning Islamic Scholarship: Maqāṣid Methodology as a New Approach*, 1st ed. (Swansea, UK: Claritas Books, 2021), 106.

⁵² Ahmad Fauzi Abdul Hamid, *Islamic Education in Malaysia*, S. Rajaratnam School of International Studies Monograph no. 18 (Singapore: RSIS, 2010), 7, accessed June 25, 2025, <https://www.jstor.org/stable/resrep05898.4>.

⁵³ M. Halstead, “An Islamic Concept of Education,” *Comparative Education* 40, no. 4 (November 2004): 522, accessed via JSTOR, <https://www.jstor.org/stable/4134624>

term *tarbiyyah* emphasises the development of individual potential to become *insān kāmil* (the perfect human being)⁵⁴, with a strong focus on holistic individual development.

The second concept that is also frequently used in discussions about education is *ta'lim*.⁵⁵ *Ta'lim*, derived from the root word *'allama* (to teach), refers primarily to the process of teaching and learning. It involves the imparting and receiving of knowledge, typically through training, instruction, or other forms of teaching. This concept places emphasis on knowledge acquisition.

The third concept, which some scholars believe most accurately represents the essence of Islamic education, is *ta'dīb*. Linguistically, it means *to be refined, disciplined, and cultured*. *Adab* essentially refers to the disciplining of the mind and soul, the acquisition of noble qualities, the performance of correct rather than erroneous actions, and the upholding of right over wrong.⁵⁶ It also includes internalising and adhering to fundamental social principles such as justice.

This study classifies Islamic educational thoughts into two camps, distinguished by their differing conception on the nature of the human being within the educational context. This focus is particularly pertinent to this study, as the discourse on the integration of neuroscience into Islamic education inevitably touches on issues regarding the nature of the human being, particularly the relationship between the brain and the mind. In Islamic educational thought, this topic relates not only to the physical dimension but also to metaphysics, which reflects a comprehensive understanding of the human being.

The first camp will be referred to as the *ta'dīb* camp. It encompasses scholarly views that highlight the centrality of metaphysical dimension of human being within the educational process. This concept constitutes one of the most prominent and distinctive perspectives, which highlights the uniqueness of Islamic education compared to other educational traditions.

⁵⁴ Ibid., 523.

⁵⁵ Ibid.

⁵⁶ Ahmad Fauzi Abdul Hamid, *Islamic Education in Malaysia*, S. Rajaratnam School of International Studies Monograph No. 18 (Singapore: RSIS, 2010), 7, accessed June 25, 2025, <https://www.jstor.org/stable/resrep05898.4>.

The second camp will be referred to as the *tarbiyyah* camp. It represents scholarly views that emphasises education as a process that develops human potential holistically, encompassing its physical, cognitive, spiritual, moral and emotional dimensions.

To maintain clarity and depth of analysis, this discussion is limited to two representative scholars from each perspective.

2.2.3.1 Education as *Ta'dīb*

One of the prominent classical scholars who emphasised spiritual and metaphysical dimensions in education is al-Ghazali, a towering figure in the intellectual history of classical Islamic education. He has been widely recognised as a foundational thinker in the philosophy and ethics of Islamic education.⁵⁷ Al-Ghazali's approach to education emphasised guidance⁵⁸ and firmly held that true knowledge is a form of divine illumination that transforms the heart.⁵⁹

Here I mean the knowledge of unveiling which is interpreted as a light that appears in the heart⁶⁰

In this view, the locus of education is the *qalb* (heart), not in the physical sense, but as a spiritual reality that connects the human being to God:

Know well that the entity that is striving toward God to realise proximity is the heart, not the physical body; nor do I intend by the heart that perceivable flesh [in the chest]⁶¹

⁵⁷ Avner Giladi, "Islamic Educational Theories in the Middle Ages: Some Methodological Notes with Special Reference to Al-Ghazali," *British Journal of Middle Eastern Studies* 14, no. 1 (1988): 4, <https://doi.org/10.1080/13530198808705448>; Sebastian Günther, "Be Masters in That You Teach and Continue to Learn: Medieval Muslim Thinkers on Educational Theory," *Comparative Education Review* 50, no. 3 (August 2006): 381, <https://doi.org/10.1086/503881>; J. Mark Halstead, "An Islamic Concept of Education," *Comparative Education* 40, no. 4 (November 2004): 521, accessed June 25, 2025, <https://www.jstor.org/stable/4134624>

⁵⁸ Sebastian Günther, "Be Masters in That You Teach and Continue to Learn: Medieval Muslim Thinkers on Educational Theory," *Comparative Education Review* 50, no. 3 (August 2006): 381, <https://doi.org/10.1086/503881>.

⁵⁹ Ibid., 382.

⁶⁰ Abū Hāmid al-Ghazālī, *The Book of Knowledge*, trans. Kenneth Honerkamp (Louisville, KY: Fons Vitae, 2015), 49

⁶¹ Abū Hāmid al-Ghazālī, *The Book of Knowledge*, trans. Kenneth Honerkamp (Louisville, KY: Fons Vitae, 2015), 156; Ahsen Nimet Cebeci, *The Holistic Approach to Knowledge and Education in Imām Abū Hāmid al-Ghazālī's System of Thought* (master's thesis, T.R. Ibn Haldun University, Alliance of Civilisations Institute, Department of Civilisation Studies, 2017).

Al-ghazali understands education as a process that carries a transcendental dimension, intimately connected to the sacred relationship between the human being and God. He believes that the essence of education lies in the cultivation of the spiritual substance of the human being.⁶²

Syed Muhammad Naquib al-Attas is a contemporary prominent thinker in Islamic education who is widely recognised for his concept of education as *ta'dīb*. The term *ta'dīb* is not a classificatory label applied in this section, but a foundational concept explicitly articulated by al Attas himself, with *adab* forming the core of his educational philosophy.

Al-Attas argues that the essence of Islamic education is “*the instilling and inculcation of adab in man.*” The concept of *adab* here encompasses intellectual, spiritual, and moral dimensions. He views human beings not merely as biological entities, but also as spiritual beings. This spiritual aspect is central to the educational process. He writes:

“*The reality underlying the definition of man is this spiritual substance.*”^{63 64}

In this framework, *adab* is not simply about proper behaviour, it is a recognition of the hierarchical order of knowledge and being, and one’s appropriate position within that order in accordance with one’s physical, intellectual, and spiritual capacities.⁶⁵

In sum, both al-Attas and al-Ghazali highlight the centrality of spiritual and ethical development in education. They emphasises the concept of education as a theological and spiritual activity. Their views and arguments on education are constructed from a religious perspective, with educational concepts deeply rooted in Islamic teachings and worldview. This stands in contrast to secular conceptions of

⁶² Sebastian Günther, “Be Masters in That You Teach and Continue to Learn: Medieval Muslim Thinkers on Educational Theory,” *Comparative Education Review* 50, no.3 (August 2006): 381, <https://doi.org/10.1086/503881>.

⁶³ Syed Muhammad Naquib al-Attas, *The Concept of Islamic Education*, keynote address presented at the First World Conference on Muslim Education, Makkah, March 1977; excerpt published 1980, © Naquib al-Attas. Reproduced with permission, 17.

⁶⁴ Sanusi Sanusi Ismail, “Al-Attas’s Philosophy of Islamic Education,” in *ARICIS Proceedings*, no. 1 (Banda Aceh: Universitas Islam Negeri Ar-Raniry, 2016), 346, <https://doi.org/10.22373/aricis.v1i0.957>.

⁶⁵ Syed Muhammad Naquib al-Attas, *The Concept of Islamic Education*, keynote address presented at the First World Conference on Muslim Education, Makkah, March 1977; excerpt published 1980, © Naquib al-Attas. Reproduced with permission, 17.

education, which promote value neutrality. This group's perspective is more philosophical in nature and places emphasis on the essence or true nature of education.

According to this perspective, human beings indeed consist of spiritual and metaphysical dimensions, but true knowledge is that which transcends the material and reaches the metaphysical-spiritual realm. While the physical organs serve as the entry points and instruments in the pursuit of knowledge, they are not its ultimate seat. Education, therefore, must look at the human being beyond their material existence, recognising the primacy of the soul, the heart, and the spiritual substance as the true recipients of knowledge.

2.2.3.2 Education as Tarbiyyah

The educational thought of classical Muslim scholars that view education as a process that develops and nurture the human potential holistically can be seen in the ideas of Ibn Sina. Although his contributions do not constitute a comprehensive philosophy of education, his writings contain meaningful *tarbawi* elements, which not only include cognitive aspects but also attend to emotional and physical development.

Ibn Sina showed a particular interest in the education of the young, addressing it as part of his broader discussion on the four stages of life. His approach begins with observations on the physical, emotional, and intellectual dimensions of child development, which he considers foundational for understanding education from infancy to adolescence.⁶⁶ He emphasises the importance of stable emotional conditions, viewing them as essential for safeguarding a child's physical and mental growth. For Ibn Sina, achieving harmony between the physical and mental aspects of education remains a critical requirement at every stage of learning.⁶⁷ Furthermore, he asserts that teachers must not only be pedagogically competent but also possess virtue and good moral character, highlighting the integral role of ethical formation in education.

⁶⁶ Sebastian Günther, "Be Masters in That You Teach and Continue to Learn: Medieval Muslim Thinkers on Educational Theory," *Comparative Education Review* 50, no. 3 (August 2006): 378, <https://doi.org/10.1086/503881>.

⁶⁷ Sebastian Günther, "Be Masters in That You Teach and Continue to Learn: Medieval Muslim Thinkers on Educational Theory," *Comparative Education Review* 50, no. 3 (August 2006): 378, <https://doi.org/10.1086/503881>.

Among contemporary scholars in Islamic education who view *tarbiyyah* as the Arabic/Qur'ānic term that best captures the essence of education in Islam is Abdullah Sahin.⁶⁸ In defining education, he drew attention to the original meaning of pedagogy. He argued that the term *tarbiyyah*, which connotes upbringing, care, and guidance, is remarkably close to the original Greek meaning of pedagogy, which literally means to “lead the child”.

Sahin emphasise that thinking about education Islamically requires a holistic and comprehensive perspective. He argues that education should facilitates human flourishing in its psychical, cognitive, spiritual, moral and emotional dimensions. He points out that:

In Islam, it is important to note that the concept of ‘tarbiyah’ does not depict education along dichotomic lines of religious or secular therefore, it cannot be limited to a form of religious education, instruction or nurture.....as a holistic, embodied and reflective process that facilitates human flourishing and the transformation of the human condition in its diverse psychical, cognitive, spiritual, moral and emotional articulations...As such, tarbiyah, goes beyond the confines of a disinterested cognitive focus implied by the word ‘study’ or a mere religious/moral instruction and training. For a tarbiyah-embedded critical philosophy of Islamic Education.⁶⁹

In contrast to al-Attas, who emphasises the essence of the educational process as fundamentally moral and metaphysical, Sahin foregrounds its pedagogical and developmental dimensions. Sahin argues that equating education with *ta’dīb* reduces the concept of education to a predominantly moral-spiritual and esoteric framework

He writes:

According to this approach, Islamic Education appears to be defined as an esoteric, spiritual framework in which the educational process is mostly identified with the term *adab/ta’dīb*, a set of coercive moral practises and training.⁷⁰

⁶⁸ Abdullah Sahin, “Critical Issues in Islamic Education Studies: Rethinking Islamic and Western Liberal Secular Values of Education,” *Religions* 9, no. 11 (October 30, 2018): 2, <https://doi.org/10.3390/rel9110335>.

⁶⁹ Abdullah Sahin, “Critical Issues in Islamic Education Studies: Rethinking Islamic and Western Liberal Secular Values of Education,” *Religions* 9, no. 11 (October 30, 2018): 2, <https://doi.org/10.3390/rel9110335>.

⁷⁰ Abdullah Sahin, “Critical Issues in Islamic Education Studies: Rethinking Islamic and Western Liberal Secular Values of Education,” *Religions* 9, no. 11 (October 30, 2018): 2, <https://doi.org/10.3390/rel9110335>.

Sahin argues that viewing education as *ta'dib* does not fully capture the true nature of Islamic education, as it tends to reflect a defensive stance against the hegemony of Western secular educational concepts.

In defining Islamic Education, Sahin argues that it does not necessarily require a dichotomy or separation between the religious and the secular. He refers to this approach as “a binary view of Islam and the secular West,” and critique the approach for emphasising an unbridgeable gap in how education is perceived between Islam and the secular liberal West.⁷¹

As Sahin notes in his article, Table 1 offers a summary of the often-perceived incompatibility between Islamic and Western secular values of education.⁷²

Table 2.1 A Binary View of Islamic and Western Educational and Pedagogic Values

Table 1. A binary view of Islamic and Western educational and pedagogic values.

Western Liberal Secular Education	Islamic Education
Human-centred	God-centred
Learner-led	Teacher/text-led
Freedom, autonomy	Obedience, reverence
Scepticism, rationality, criticality	Certainty, trust, piety, fidelity
Individualistic, personal fulfilment	Collectivist/religious fellowship (<i>ummah</i>) and discipleship
Free inquiry-based knowledge	Revelation, tradition-based knowledge
Materialistic, market-driven, dualist secularism	Spiritual, moral, holistic
Discovery, questioning	Instruction, memorization, transmission, indoctrination
Progressive/linear time perception	Retrospective, cyclical and apocalyptic time perception
Literate, organised, intellectual, scientific	Oral/aural, story-shaped nurture, unscientific
Democratic, open	Authoritarian, inward-looking
Measured, assessed, outcomes-based	Informal, repetitive, unmeasurable
Civic, inclusive	Intolerant to religious, gender, cultural difference, no interest in the study of other faith traditions or worldviews
Interpretative plurality, relativity of values and truth	Essentialist conformity, monolithic perception of values and truth & no role for personal interpretation
Gender equality	Gender inequality
Focused on 'this' world	This world seen as preparation for the 'next' world
Teachers seen as knowledgeable guides and co-learners	Teachers revered as repositories of knowledge

2.2.3.3 *Qur'ān as the Foundation of Islamic Education*

The philosophy of education in any society is deeply influenced by the traditions and beliefs upheld by that society. As such, educational principles will vary from one society to another, depending on the values and aspirations embraced by each. In the context of Islamic society, the Qur'ān provides a comprehensive worldview that shapes a

⁷¹ David C. Kinsey, review of *Crisis in Muslim Education* by Syed Sajjad Husain and Syed Ali Ashraf, and *Aims and Objectives of Islamic Education* by Syed Muhammad al-Naqib al-Attas, *Comparative Education Review* 26, no. 2 (June 1982): 297–301, <https://www.jstor.org/stable/1187459>.

⁷² Ibid.

Muslim's perspective on reality. Therefore, the principles contained in the Qur'ān must serve as the primary reference in formulating Islamic education.⁷³ The Qur'ān is the infallible, perfect, and absolute source of divine guidance. The educational principles it contains are direct instructions from God.⁷⁴ The Qur'ān not only serves as a source of legitimacy but also as a guide and foundation for true knowledge and ultimate truth.⁷⁵ Thus, any discussion of Islamic education cannot be separated from the Qur'ān as its point of departure and fundamental basis. The Qur'ān lays down the foundations for educational goals and methods and offers core principles that guide the selection of curriculum content. These general principles form the theoretical framework of Islamic education, encompassing the aims, methods, and substance of the educational process.

Abdurrahman Saleh Abdullah, in his dissertation titled *Educational Theory: A Qur'ānic Outlook*, explains how the Qur'ān, with its central position in Islamic education, shapes the meaning of educational theory within the Islamic framework. According to him, the Qur'ān shapes the perspective on what theory means in education. Abdullah states that a theory based on the Qur'ān as its main foundation cannot be equated with scientific theory. The truth of the Qur'ān is accepted because it comes from Allah, not because it can be proven through experimentation. The Qur'ān, as the foundation of Islamic education, is absolute and is not to be understood as a hypothesis or assumption that must be tested. Therefore, Islamic educational theory cannot be reduced to scientific theory, which relies solely on empirical verification. If Islamic educational theory is only understood as something that must be scientifically proven, then the Qur'ān would not be seen as a strong foundation, and its role in education would be regarded as relative.

He further mentions that the Qur'ān serves as the foundation of Islamic educational theory in the sense of “*a body of related principles which are intended to guide practise.*” He explains that in the educational field, scientific data may explain many aspects of children's behaviour, but “*the teacher who is provided with such information behaves in accordance with the values of his society.*” The purpose of

⁷³ Abdurrahman Saleh Abdullah, *Educational Theory: A Qur'ānic Outlook* (PhD diss., University of Michigan, 1979), 37-38.

⁷⁴ Brady Stimpson and Isaac Calvert, “Qur'ānic Educational Philosophy: Foundational Principles of Education in Islam's Holiest Text,” *Religions* 12, no. 2 (January 28, 2021): 82, <https://doi.org/10.3390/rel12020082>.

⁷⁵ *Ibid.*, 2.

theory in education is not only to explain why or how something happens, but to guide behaviour according to values. Therefore, Islamic educational theory is not merely concerned with explaining causes and effects, but its primary goal is to guide students' behaviour in accordance with the teachings of the Qur'ān.

However, Islamic education still allows the use of knowledge from other fields (such as psychology or science) as long as it aligns with the teachings of the Qur'ān. Thus, Islamic educational theory is a combination of divine guidance and beneficial human knowledge, all working together to direct teaching and learning.

The fundamental principles of education contained in the Qur'ān serve as the primary foundation for the development of Islamic educational theory. The practical details of this theory are the responsibility of educators to develop in accordance with the needs and context of the time. The Qur'ān provides space for contributions from other disciplines, as long as its core principles remain the main point of reference. Thus, Islamic educational theory can incorporate elements from various fields of knowledge, provided they align with and do not contradict the value structure outlined by the Qur'ān.

2.3 PROPONENTS' CONCEPTUALISATION

2.3.1 Proponents' Perspective on Integration of Knowledge in Indonesia

In the agenda of integrating neuroscience into Islamic education, the term "*integration*" is closely related to the broader agenda of IOK in Indonesia, particularly within Islamic Higher Education Institutions (PTKI).⁷⁶ This connection was explicitly stated by Suyadi, one of the pioneers in this discourse. Suyadi has explained this since his earliest article on the topic which was published in 2012.⁷⁷ He clearly stated that the agenda of integrating neuroscience into Islamic education was inspired by the rapidly growing discourse on the integration of knowledge within PTKIs in Indonesia.

⁷⁶ See Himayatul Izzati, "Potensi Pembelajaran Manusia: Perspektif Neurosains dan Islam," *Alifbata: Journal of Basic Education* 1, no. 1 (January 12, 2021): 64–77, <https://doi.org/10.51700/alifbata.v1i1.89>

⁷⁷ See Suyadi. "Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *Al-Bidayah: Jurnal Pendidikan Dasar Islam* 4, no. 1 (2012): 1–12. <https://doi.org/10.14421/al-bidayah.v4i1.9003>.

Suyadi has also extensively discussed this topic in his book titled *Pendidikan Islam dan Neurosains (Islamic Education and Neuroscience)*, which serves as a primary reference for the discourse.⁷⁸ In the book, he explicitly mentions that his ideas were inspired by the thoughts of Amin Abdullah and Ismail Raji al-Faruqi. Suyadi also explains that the book is a further development of his dissertation, which used an interdisciplinary and transdisciplinary framework as proposed by Amin Abdullah.⁷⁹

Suyadi describes the concept Islamisation of knowledge by Ismail Raji al-Faruqi, the scientification of Islam by Kuntowijoyo and the integration-interconnection of science by Amin Abdullah, the, as the gateways or entry points to the idea of integrating neuroscience into Islamic education.⁸⁰ Suyadi also explains that the idea of integration of neuroscience in Islamic education is an effort to actualise the vision of integration-interconnection of science by Amin Abdullah. He refers to this idea as a product of the integration-interconnection of science agenda.⁸¹

Suyadi and Jailani also employs Amin Abdullah's theory of integration and interconnection of knowledge, which emphasises the dialogue between religious interpretation and science as the paradigm of their research.⁸²

Although Suyadi was inspired by the IOK⁸³, he later proposed a new approach. He argues that the existing integration of knowledge approach has not yet been

⁷⁸ Suyadi, *Pendidikan Islam dan Neurosains: Menelusuri Jejak Akal dan Otak dalam Al-Qur'an Hingga Pengembangan Neurosains dalam Pendidikan Islam*. Jakarta: Prenada Media, 2020.

https://books.google.co.id/books/about/Pendidikan_Islam_dan_Neurosains.html?id=RhwREAAQBAJ

⁷⁹ Suyadi, *Dasar-Dasar Pemikiran Menuju Ilmu Neurosains Pendidikan Islam (Optimalisasi Potensi Otak dalam Pembelajaran Anak Usia Dini)* (doctoral diss., UIN Sunan Kalijaga Yogyakarta, 2016), accessed July 7, 2025, <http://digilib.uin-suka.ac.id/id/eprint/19927/>.

⁸⁰ Suyadi, *Pendidikan Islam dan Neurosains*, 43. https://books.google.co.id/books/about/Pendidikan_Islam_dan_Neurosains.html?id=RhwREAAQBAJ.

⁸¹ See Suyadi, *Pendidikan Islam dan Neurosains*, 41; see also Suyadi and Mohammad Jailani, "The Concept of 'Aql and Brain in the Quran and Neuroscience: A Concept Analysis of Nāṣiyah in Salman's Tafsir," *Ilmu Ushuluddin* 8, no. 2 (2021): 265, <https://journal.uinjkt.ac.id/index.php/ilmu-ushuluddin/article/view/22663>; and Mohammad Jailani, Suyadi Suyadi, and Dedi Djubaedi, "Menelusuri Jejak Otak dan 'Aql Dalam Alquran Perspektif Neurosains dan Pendidikan Islam di Era Pandemi Covid 19," *Tadris: Jurnal Pendidikan Islam* 16, no. 1 (June 5, 2021): 9, <https://doi.org/10.19105/tjpi.v16i1.4347>.

⁸² Suyadi and Mohammad Jailani, "The Concept of 'Aql and Brain," 258.

⁸³ Suyadi wrote his dissertation on Islamic Educational Neuroscience at UIN Sunan Kalijaga Yogyakarta where the integration-interconnection of sciences proposed by Amin Abdullah was the institution's official academic orientation.

empirically tested and remains largely within the realm of philosophical discourse.⁸⁴ He emphasised that the new approach he offers is distinct from both the integration of knowledge and the Islamisation of knowledge. However, he also noted that his proposed approach is a continuation and an "*empirical specialisation*" of those earlier agendas.⁸⁵

The new approach he proposes is the hybridisation approach. Through this approach, Islamic education will be hybridised with neuroscience to produce a new scientific variety that he terms *Neurosains Pendidikan Islam (Islamic educational neuroscience)*. He acknowledges that although the term *hybridisation* is commonly used in the natural sciences, it has also been increasingly adopted in the social sciences. According to Suyadi, this hybridisation approach not only contains "*comprehensive integrative elements*", but also emphasises empirical and implementable aspects.⁸⁶

All studies on the integration of neuroscience and Islamic education analysed in this study can be traced, either directly or indirectly, to Suyadi's foundational ideas. However, not all of these works explicitly state that the integration of neuroscience in Islamic education is inspired by the broader agenda of IOK, as clearly as Suyadi's works. Among those who explicitly articulate it are Izzati, Jailani, and Nurjanah. Their writings not only build upon Suyadi's conceptual framework regarding the integration of neuroscience and Islamic education but also echo Suyadi's assertion that this idea is inspired by the broader agenda of IOK.

Izzati clearly states that the idea of integrating neuroscience into Islamic education emerged from the spirit of integration and interconnection of knowledge that has been developing within Islamic higher education institutions in Indonesia.⁸⁷ Jailani

⁸⁴ Suyadi. "Hybridisation of Islamic Education and Neuroscience: Transdisciplinary Studies of 'Aql in the Quran and the Brain in Neuroscience." *Dinamika Ilmu* 19, no. 2 (2019): 237–249. <https://doi.org/10.21093/di.v19i2.1601>.

⁸⁵ See Suyadi, "Hybridisation of Islamic Education and Neuroscience," 254; See also Suyadi, *Pendidikan Islam dan Neurosains*, 63.

⁸⁶ Suyadi. "Hybridisation of Islamic Education and Neuroscience: Transdisciplinary Studies of 'Aql in the Quran and the Brain in Neuroscience." *Dinamika Ilmu* 19, no. 2 (2019): 237–249. <https://doi.org/10.21093/di.v19i2.1601>.

⁸⁷ Himayatul Izzati, "Potensi Pembelajaran Manusia: Perspektif Neurosains dan Islam," *Alifbata: Jurnal Pendidikan Dasar* 1, no. 1 (January 12, 2021): 64–77, <https://doi.org/10.51700/alifbata.v1i1.89>.

explicitly mentions that his research on the integration of neuroscience into Islamic education refers to Amin Abdullah's theory of integration.⁸⁸

Nurjanah states that this agenda is inspired by the spirit of IOK, which seeks to eliminate the dichotomy between religious sciences and secular sciences.⁸⁹ She stated that in this case, Islamic sciences represent by Islamic education, while the secular sciences, by neuroscience. This study also argues that the integration of knowledge is essential in order to eliminate the assumption that Islam is an outdated belief system that rejects scientific and technological progress.

2.3.2 Proponents' Perspective on Neuroscience and Neuroeducation

In discussing neuroscience and neuroeducation, most commonly addressed topics in this literature is the structure and function of the brain, particularly neurophysiology and neuroanatomy, as they are believed to relate closely to learning processes. Discussions on IQ, EQ, and SQ are also frequently found.⁹⁰ Nurjanah and Kasno discuss the functions of the left and right hemispheres of the brain.⁹¹ Suyadi emphasises that the neuroscience discussed within the framework of integrating neuroscience into Islamic education is different from the neuroscience used in the medical field.⁹² However, overall, the literature is largely dominated by the presentation of biological and physiological facts about the brain believed to be linked to learning processes.

According to Suyadi, this is important because discussions on neuroscience in education cannot be separated from the brain's neuroanatomy and neurophysiology.⁹³ Therefore, he argues that a fundamental competency for educators is mastering the

⁸⁸ Mohammad Jailani, "Exploring the Development of Neuroscience in the Light of Islamic Perspectives: A Qualitative Literature Review," *Jurnal Studi Islam* 12, no. 1 (July 2023): 104, <https://doi.org/10.33477/jsi.v12i1.3489>.

⁸⁹ Asti Faticha Nurjanah, Hernantito Sulkhan Hakim, Muhammad Taufiqurrohman Aljalil, and Nungki Nariska, "Konsep 'Aql dalam Al-Qur'an dan Neurosains," *Nazhruna: Jurnal Pendidikan Islam* 1, no. 2 (October 17, 2018): 289, <https://doi.org/10.31538/nzh.v1i2.83>.

⁹⁰ Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 116.

⁹¹ See Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains," 282; see also Kasno, "'Aql dan Otak dalam Kajian Neurosains...," 165; Suyadi and Jailani, "The Concept of 'Aql and Brain," 265; Muji and Pangestuti, "Teori Belajar Berbasis Neurosains," 34; Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 120; Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual*, 30; and Suyadi, *Pendidikan Islam dan Neurosains*, 85.

⁹² Suyadi, *Pendidikan Islam dan Neurosains*, 65.

⁹³ Suyadi, *Pendidikan Islam dan Neurosains*, 66.

basics of anatomy and neurophysiology.⁹⁴ Jailani argues that knowledge of neurophysiology and neuroanatomy is believed to improve the quality of learning and make the learning experience more enjoyable.⁹⁵

Suyadi believes that educators have thus far paid insufficient attention to how students' brains function. This neglect has led to the underutilisation of the brain's potential in learning.⁹⁶ For this reason, in discussions about neuroscience, he emphasises the importance of understanding the brain's role in education and the need for brain-based learning strategies.

We can observe that the literature always uses the term *neuroscience* instead of *neuroeducation*. Suyadi does not state that he adopts the concept of *neuroeducation*, nor does he use this term as part of his conceptual framework. This may be due to several possible reasons:

First, he aims to propose a new approach and a new scientific discipline that integrates neuroscience specifically for Islamic education, rather than merely adopting the existing field of neuroeducation. Neuroeducation is essentially the result of integrating neuroscience into general (secular) education. In this integration, neuroscience is the component being integrated into the field of education, ~~resulting in a new interdisciplinary field called neuroeducation.~~

Similarly, he also proposes the integration of neuroscience, but specifically into Islamic education. However, instead of adopting the term *neuroeducation*, he introduces a new term to reflect this distinct integration: Islamic Educational Neuroscience (*neurosains pendidikan Islam*). He positions it as a new scientific discipline.

Second, he criticises the Western-style application of *neuroeducation*, which he believes fails to adequately involve the role of teachers and educators in the scholarly discourse surrounding *neuroeducation* itself. In response, he proposes a new approach,

⁹⁴ Mohammad Jailani, Suyadi Suyadi, and Dedi Djubaedi, "Menelusuri Jejak Otak dan 'Aql Dalam Alquran Perspektif Neurosains dan Pendidikan Islam di Era Pandemi Covid-19," *Tadris: Jurnal Pendidikan Islam* 16, no. 1 (June 5, 2021): 12, <https://doi.org/10.19105/tjpi.v16i1.4347>.

⁹⁵ Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains," 289; Kasno, "Aql dan Otak dalam Kajian Neurosains...", 169.

⁹⁶ Suyadi, "Hybridisation of Islamic Education and Neuroscience," 237; Muji and Pangestuti, "*Teori Belajar Berbasis Neurosains*," 33.

hybridisation, which he argues serves as a more effective bridge between neuroscience and education, while still upholding and respecting the significant role of teachers within the broader scientific and educational framework.⁹⁷

In his discussion, Suyadi only briefly mentions the term *neuroeducation*, noting that the interdisciplinary application of neuroscience in education is commonly referred to by that term.⁹⁸ However, he places greater emphasis on highlighting the many criticisms, skepticism, and pessimism directed at the future of this discipline, as well as the lukewarm reception it has received from the field of education. In addressing neuroeducation, Suyadi and Jailani explores the existence of two opposing camps; one pessimistic and the other optimistic; regarding its development. This divide, he explains, stems from differing views on how to bridge two disciplines that are perceived to be very difficult to reconcile: the world of laboratory-based science and the reality of classroom-based education.⁹⁹

the application of neuroscience theories in Western education, such as brain-based learning and quantum teaching and learning often feels forced, as there is no strong bridge to truly connect the two disciplines.¹⁰⁰

The discussion in the literature is dominated by explorations of the brain from a neuroscience perspective, which are then used as a starting point to explain the learning process.¹⁰¹ There is relatively little discussion about the discipline of neuroeducation itself, including its development, theoretical foundations, or key findings.

Rofdli and Jailani employ neuroanatomical and neurophysiological findings to interpret Qur'ānic verses in their articles, which analyse these verses from a neuroscience perspective.¹⁰²

⁹⁷ Suyadi, "Hybridisation of Islamic Education and Neuroscience," 243.

⁹⁸ Ibid.

⁹⁹ Ibid.

¹⁰⁰ Jailani, Suyadi, and Djubaedi, "Menelusuri Jejak Otak dan 'Aql...," 10; Suyadi and Mohammad Jailani, "The Concept of 'Aql and Brain in the Quran and Neuroscience: A Concept Analysis of Nāṣiyah in Salman's Tafsir," *Ilmu Ushuluddin* 8, no. 2 (2021): 131–155, <https://journal.uinjkt.ac.id/index.php/ilmu-ushuluddin/article/view/22663>.

¹⁰¹ Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains," 289; see also Kasno, "Aql dan Otak dalam Kajian Neurosains...," 164.

¹⁰² See Muhammad Faiz Rofdli and Suyadi Suyadi, "Tafsir Ayat-Ayat Neurosains: 'Aql dalam Al-Qur'an dan Relevansinya terhadap Pengembangan Berpikir Kritis dalam Pendidikan Islam," *Jurnal At-Tibyan: Jurnal Ilmu Al-Qur'an dan Tafsir* 5, no. 1 (June 30, 2020): 134–152, <https://doi.org/10.32505/tibyan.v5i1.1399>; see also Mohammad Jailani, Suyadi Suyadi, Rena Latifa, and Siti Nurul Azkiyah, "Critical Analysis of 'Aql and Brain in the Qur'an and Neuroscience and Its Implications for the Development of Islamic Education," *Proceedings of the 4th International*

When discussing neuroscience and neuroeducation, most of the literature relies on semi-academic popular books published nationally, with minimal references to international academic sources. Only Suyadi's work draws on sufficiently strong and representative references that reflect the global discourse on neuroscience and neuroeducation.¹⁰³

Despite scepticism from certain groups, proponents of the integration of neuroscience into Islamic education remain optimistic that neuroscience and education can indeed be bridged. Suyadi argues that the contribution of neuroscience to the field of education is undeniable.¹⁰⁴ Asman argues that scientifically-based learning methods such as those informed by neuroscience have been proven to be more effective than traditional or conventional methods.¹⁰⁵ He also argues that in the West, neuroscience has become an important tool in the development of educational curriculum programmes.

2.3.3 Proponents' Perspective on Islamic Education

According to the proponents of neuroscience integration in Islamic education, the essence of Islamic education lies in the effort to optimise the whole potential of the human being holistically; physically, intellectually, and spiritually.¹⁰⁶ They do not emphasise that the essence of a human in education lies solely in the spiritual or metaphysical aspect. Instead, they emphasise that in education, a human being should be viewed as both a physical and metaphysical entity.¹⁰⁷ All of these human potentials

Colloquium on Interdisciplinary Islamic Studies & 1st ICESTIIS, Jambi, Indonesia, October, 2021, published February 2022 by EAI, <https://doi.org/10.4108/eai.20-10-2021.2316341>; and Vivi Indri Asrini and Suyadi, "Tafsir Ayat-Ayat Neurosains Pendidikan Islam: Telaah Tafsir Salman atas Konsep Nashiyah dalam Surat Al-Alaq," *IDE Guru: Jurnal Karya Ilmiah Guru* 8, no. 3 (2023): 528–537, <https://doi.org/10.51169/ideguru.v8i3.526>; and Suyadi Suyadi and Mohammad Jailani, "The Concept of 'Aql and Brain in the Quran and Neuroscience: A Concept Analysis of Nāṣiyah in Salman's Tafsir," *Ilmu Ushuluddin* 8, no. 2 (2021): 131–155, <https://journal.uinjkt.ac.id/index.php/ilmu-ushuluddin/article/view/22663>.

¹⁰³ See Suyadi, "Hybridisation of Islamic Education and Neuroscience,".

¹⁰⁴ Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 113.

¹⁰⁵ Asman, Suyadi, and Miftachul Huda, "Character Education as Brain Education: Spiritual Neuroscience Studies in Islamic Education," *Tarbiyatuna* 12, no. 2 (2021): 80, <https://doi.org/10.31603/tarbiyatuna.v12i2.4278>.

¹⁰⁶ See Suyadi, "Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI)," *Al-Bidayah: Jurnal Pendidikan Dasar Islam* 4, no. 1 (2012): 116. <https://doi.org/10.14421/al-bidayah.v4i1.9003>.

¹⁰⁷ See Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 117; see also Rofdli and Suyadi, "Tafsir Ayat-Ayat Neurosains...", 146-147.

are believed to stem from one central point: the brain.¹⁰⁸ Education is seen as a process of developing and strengthening human potential, with a particular emphasis on optimising the brain as the foundation of all human capabilities.

They conclude that the physical potential of a person will be of little use if the intellectual aspect is not developed optimally. Therefore, Islamic education must be able to balance the three essential elements within the human being: a healthy and strong body, a sharp and well-trained intellect, and a heart filled with faith in Allah.¹⁰⁹

Furthermore, the proponents believe that the ultimate goal of Islamic education is to shape the human being in a holistic manner. They argue that Islamic education should not merely be a pedagogical process that is metaphysical and philosophical in a doctrinal sense, as has often been the case. Rather, it should become a practical and grounded process, built upon scientific foundations and the neurophysiological potential of the human being as a starting point for development.¹¹⁰

With this approach, Islamic education operates within three primary dimensions: rational, emotional, and spiritual.¹¹¹ Education is no longer merely a doctrinal pedagogical process rooted in metaphysical and philosophical traditions, as has often been the case. Instead, it becomes a process grounded in scientific foundations that aim to develop the rational, emotional, and spiritual aspects of learners. Islamic education must nurture the intellect, promote critical thinking, and be based on hands-

¹⁰⁸See Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 111; see also Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains," and Kasno, "Aql dan Otak dalam Kajian Neurosains..."; Jailani *et al.*, "Critical Analysis of 'Aql and Brain..."; Rofldi and Suyadi, "Tafsir Ayat-Ayat Neurosains..."; Jailani, "Exploring the Development of Neuroscience..."; Jailani, Suyadi, and Djubaedi, "Menelusuri Jejak Otak dan 'Aql..."; Asrini and Suyadi, "Tafsir Ayat-Ayat Neurosains..."; Izzati, "Potensi Pembelajaran Manusia..."; Suyadi and Jailani, "The Concept of 'Aql and Brain,"

¹⁰⁹ Mohammad Jailani, Suyadi Suyadi, Rena Latifa, and Siti Nurul Azkiyah, "Critical Analysis of 'Aql and Brain in the Qur'an and Neuroscience and Its Implications for the Development of Islamic Education," *Proceedings of the 4th International Colloquium on Interdisciplinary Islamic Studies & 1st ICESTIIS*, Jambi, Indonesia, October 20–21, 2021, published February 2022 by EAI, <https://doi.org/10.4108/cai.20-10-2021.2316341>

¹¹⁰ Mohammad Jailani, Suyadi Suyadi, and Dedi Djubaedi, "Menelusuri Jejak Otak dan 'Aql Dalam Alquran Perspektif Neurosains dan Pendidikan Islam di Era Pandemi Covid-19," *Tadris: Jurnal Pendidikan Islam* 16, no. 1 (June 5, 2021): 4, <https://doi.org/10.19105/tjpi.v16i1.4347>.

¹¹¹ Ibid.

on experience.¹¹² Through this approach, it is hoped that individuals will be able to acquire knowledge through sound reasoning and avoid biases.¹¹³

The proponents of this approach base their view of holistic education on the philosophy of *insan kamil*.¹¹⁴ They argue that holistic Islamic education aligns with this concept, which views education as encompassing the physical, spiritual, and intellectual aspects of the human being. According to them, the concept of *insan kamil* rejects any dichotomy between the physical and metaphysical dimensions of humans. They believe that such a dichotomy has emerged because the current philosophy of Islamic education does not truly reflect the essence of Islamic education.¹¹⁵

This group also believes that Islamic education must embrace more innovation, particularly in adopting more scientific approaches to education. They assert that innovation is essential for Islamic education to face the challenges and realities of the modern world.

From this, we can see that their perspective on Islamic education aligns more closely with the concept of tarbiyyah, which emphasises the holistic development of a learner's potential.

2.4 BACKGROUND AND DEVELOPMENT OF THE DISCOURSE

2.4.1 Critique of Islamic Education

The idea of integrating neuroscience into Islamic education is proposed as a solution for the development of Islamic education. It originates from a critique of existing educational views and practises, with the criticism mainly directed toward traditional Islamic education.

¹¹²Mohammad Jailani, "Exploring the Development of Neuroscience in the Light of Islamic Perspectives: A Qualitative Literature Review," *Jurnal Studi Islam* 12, no. 1 (July 2023):111, <https://doi.org/10.33477/jsi.v12i1.3489>

¹¹³ Ibid.

¹¹⁴See Suyadi. "Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *Al-Bidayah: Jurnal Pendidikan Dasar Islam* 4, no. 1 (2012): 116-117. <https://doi.org/10.14421/al-bidayah.v4i1.9003>; see also Kasno Kasno, "Aql dan Otak dalam Kajian Neurosains dan Implikasinya Pendekatan Saintifik dalam Pendidikan Islam," *Muaddib: Studi Kependidikan dan Keislaman* 1, no.2 (December 19, 2019): 154–177, <https://doi.org/10.24269/muaddib.v1i2.2217>

¹¹⁵ Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 117.

2.4.1.1 The Problems

2.4.1.1.1 The Lack of Studies on the Brain and Neuroscience in Islamic Education

The first criticism relates to the limited development of neuroscience in the context of Islamic education. Proponents of this idea observe that Islamic education has, so far, paid little attention to utilising neuroscience studies for the improvement of educational processes.¹¹⁶ Islamic education is considered to be less responsive to the advancements of modern science, unlike what is happening in the West.¹¹⁷ They argue that the lack of discourse on neuroscience in Islamic education reflects an inadequate understanding of how the brain works and a neglect or underutilisation, of the brain's potential.¹¹⁸

2.4.1.1.2 Viewing Humans Holistically

They criticise the prevailing educational perspective on how humans are viewed. They argue that current practises and concerns in Islamic education focus too narrowly on the spiritual and metaphysical side of human beings.¹¹⁹ According to them, this causes Islamic education to overly emphasise aspects of faith, the heart, and the soul.¹²⁰ So far, Islamic education has mostly focused on the concept of 'aql and the

¹¹⁶Jailani, Suyadi, and Djubaedi, "Menelusuri Jejak Otak dan 'Aql..."; Suyadi, "Hybridisation of Islamic Education and Neuroscience," 238; Rofdli and Suyadi, "Tafsir Ayat-Ayat Neurosains...," 140

¹¹⁷ Jailani, Mohammad. "Merging Minds: A Critical Analysis of Hybridising Islamic Education and Neuroscience." *EDUCAN: Jurnal Pendidikan Islam* 8, no. 1 (February 2024): 123. <https://doi.org/10.21111/educan.v8i1.10767>; Suyadi. "Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *Al-Bidayah: Jurnal Pendidikan Dasar Islam* 4, no. 1 (2012): 1–12. <https://doi.org/10.14421/al-bidayah.v4i1.9003>; Muhammad Faiz Rofdli and Suyadi Suyadi, "Tafsir Ayat-Ayat Neurosains: 'Aql dalam Al-Qur'an dan Relevansinya terhadap Pengembangan Berpikir Kritis dalam Pendidikan Islam," *Jurnal At-Tibyan: Jurnal Ilmu Al-Qur'an dan Tafsir* 5, no. 1 (June 30, 2020): 134–152, <https://doi.org/10.32505/tibyan.v5i1.1399>

¹¹⁸Jailani, Suyadi, and Djubaedi, "Menelusuri Jejak Otak dan 'Aql..."; Suyadi, "Hybridisation of Islamic Education and Neuroscience,"; Suyadi, "Integrasi Pendidikan Islam dan Neurosains,":128;

Muji and Rindiyan Pangestuti, "Teori Belajar Berbasis Neurosains Telaah Surah Al-Alaq," *Tadiban: Journal of Islamic Education* 2, no. 2 (January–June 2022): 30–42, accessed July 7, 2025, <https://ojs.institutidayatullahbatam.ac.id/index.php/tadibanjournals/article/view/26>;

¹¹⁹Vivi Indri Asrini and Suyadi, "Tafsir Ayat-Ayat Neurosains Pendidikan Islam: Telaah Tafsir Salman atas Konsep Nashiyah dalam Surat Al-Alaq," *IDE Guru: Jurnal Karya Ilmiah Guru* 8, no. 3 (2023): 364, <https://doi.org/10.51169/ideguru.v8i3.526>.

¹²⁰ Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 118.

development of the spiritual dimension, while paying too little attention to the brain.¹²¹ As a result, the study of the brain has not become a central issue in Islamic education.

Yet, from their perspective, education is closely related to the brain. Education is a process of enhancing brain capacity.¹²² They argue that this neglect contradicts the concept of *Ulū al-Albāb*, which emphasises the importance of reason and the brain as key factors in determining human quality.¹²³ They further claim that Muslim scholars such as Ibn Sīnā and Al-Fārābī had already discussed the brain scientifically, but these insights have not been developed in Islamic education.¹²⁴

They see this as a theoretical conflict between Islamic education and neuroscience.¹²⁵ They highlight a difference in how human behaviour is understood: in Islamic thought, behaviour is believed to be rooted in spiritual issues, while in neuroscience, it is associated with a physical organ, namely the brain.¹²⁶

2.4.1.1.3 Teacher Competency

In the earliest literature found on the integration of neuroscience into Islamic education, written by Suyadi, he highlighted the curriculum of Islamic education faculties at Islamic higher education institutions in Indonesia. He observed that these curricula were almost entirely composed of other scientific disciplines; namely, the religious sciences that Islamic education teachers are expected to teach, such as *al-Fiqh*, *al-Tafsīr* and *al-‘Aqīdah*.¹²⁷

¹²¹ Suyadi, “Hybridisation of Islamic Education and Neuroscience.”

¹²² Suyadi, “Hybridisation of Islamic Education and Neuroscience,”; Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...,” 140

¹²³ Suyadi, “Hybridisation of Islamic Education and Neuroscience,”;

¹²⁴ Suyadi, “Learning Taxonomy of Islamic Education,”; Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘Aql...,” 4.

¹²⁵ Suyadi, “Hybridisation of Islamic Education and Neuroscience.”

¹²⁶ Asman, Suyadi, and Miftachul Huda. “Character Education as Brain Education: Spiritual Neuroscience Studies in Islamic Education.” *Jurnal Tarbiyatuna* 12, no. 2 (2021): 78. <https://doi.org/10.31603/tarbiyatuna.v12i2.4278>.

¹²⁷ Suyadi. “Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI).” *Al-Bidayah: Jurnal Pendidikan Dasar Islam* 4, no. 1 (2012): 118. <https://doi.org/10.14421/al-bidayah.v4i1.9003>.

Suyadi addressed the lack of focus on the discipline of educational science, knowledge about how to teach. He appeared to be concerned with issues of pedagogy. He points out:

Educators, both teachers and lecturers who study this science can do stimulation and intervention to optimise students' brain potential in an integrated manner in learning Islamic diversity.¹²⁸

This shows that Islamic education does not have a clear epistemological basis. As a result, teachers who graduate from educational institutions are only able to teach, but lack the knowledge that ought to be taught.¹²⁹

If this is left unaddressed, Islamic education will remain in perpetual backwardness, as it will be unable to develop knowledge on its own and will merely practise knowledge developed in other institutions.¹³⁰

This concept, including the course of Islamic Education Management, is adopted from the business and industrial world, so that managing an educational institution is no different from managing an industry.¹³¹

He believed that teaching neuroscience to future teacher could help them choose more effective teaching methods. According to him, a teacher not only needs to understand what they are teaching but also how to teach it effectively. Therefore, this critique is related to the science of Islamic education, the discipline of educating future teachers. As an academic in the faculty of education, Suyadi saw the importance of teaching neuroscience to prospective teachers so that the learning process could be optimised.

2.4.1.1.4 Educational and Teaching Methods

The proponents criticise Islamic education methods for being overly doctrinal and lacking empirical grounding.¹³² They highlight the challenge of translating normative,

¹²⁸ Suyadi. "Hybridisation of Islamic Education and Neuroscience: Transdisciplinary Studies of 'Aql in the Quran and the Brain in Neuroscience." *Dinamika Ilmu* 19, no. 2 (2019): 237–249. <https://doi.org/10.21093/di.v19i2.1601>.

¹²⁹ Suyadi. "Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *Al-Bidayah: Jurnal Pendidikan Dasar Islam* 4, no. 1 (2012): 1–12. <https://doi.org/10.14421/al-bidayah.v4i1.9003>. Translation: "This indicates that Islamic education does not have a clear epistemological basis. As a result, teachers graduating from educational institutions are only able to teach but do not possess the knowledge that is being taught."

¹³⁰ Ibid. Translation: "If this condition persists, Islamic education will remain in a state of perpetual backwardness, as it will be unable to develop knowledge on its own and will merely continue to practise knowledge produced by other institutions."

¹³¹ Ibid. Translation: "This concept, including the course on Islamic Education Management, is adopted from the world of business and industry, thereby reducing the management of educational institutions to the equivalent of managing an industrial enterprise."

¹³² Asman, Suyadi, and Miftachul Huda, "Character Education as Brain Education," 78,81.

spiritual, and metaphysical concepts of Islamic education into practical matters that teachers face in the classroom.¹³³ They criticise the tendency of Islamic education to focus on memorisation while neglecting studies such as multiple intelligences, Bloom's taxonomy, and critical thinking.¹³⁴

In their critique of Islamic education methods, Asman draws attention to the ineffectiveness of character education in *pesantren* (Islamic boarding schools). They observe that the methods used for character education in *pesantren* have been ineffective because students' behaviour is highly dependent on their environment. Once students leave the *pesantren*, their behaviour no longer reflects what they were taught. They believe this occurs because educational practises are not aligned with neuroscience theories.¹³⁵

The article also highlights that current Islamic education methods are suboptimal in addressing learning disorders among students. They criticise teachers' lack of understanding regarding students' neurological conditions, which leads to misdiagnosis and inappropriate responses to children with learning difficulties. They attribute this to the lack of neuroscience literacy in teacher education programmes, resulting in children with special needs often not receiving the proper support.

2.4.1.2 The Causes

2.4.1.2.1 Dichotomy

The proponents of this agenda argue that the focus of Islamic education solely on the spiritual and metaphysical aspects is a result of dichotomous thinking in Islamic thought, which tends to perceive reality through binary oppositions.¹³⁶ This perspective

¹³³ Vivi Indri Asrini and Suyadi, "Tafsir Ayat-Ayat Neurosains Pendidikan Islam: Telaah Tafsir Salman atas Konsep Nashiyah dalam Surat Al-Alaq," *IDE Guru: Jurnal Karya Ilmiah Guru* 8, no. 3 (2023): 364, <https://doi.org/10.51169/ideguru.v8i3.526>.

¹³⁴ Himayatul Izzati, "Potensi Pembelajaran Manusia: Perspektif Neurosains dan Islam," *Alifbata: Jurnal Pendidikan Dasar* 1, no. 1 (2021): 64–77, <https://doi.org/10.51700/alifbata.v1i1.89>; Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 113; Jailani, "Merging Minds," 123.

¹³⁵ Asman, Suyadi, and Miftachul Huda, "Character Education as Brain Education: Spiritual Neuroscience Studies in Islamic Education," *Tarbiyatuna* 12, no. 2 (2021): 78, <https://doi.org/10.31603/tarbiyatuna.v12i2.4278>.

¹³⁶ Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains,"; Rofdli and Suyadi, "Tafsir Ayat-Ayat Neurosains..."; Saputri, Yolanda Amelia. *Efektivitas Penerapan Pendekatan Neurosains dalam Peningkatan Kemampuan Berpikir Kritis Peserta Didik Kelas VIII pada*

separates the physical from the spiritual, the worldly from the hereafter. They also argue that this dichotomous view leads to modern sciences/disciplines such as neuroscience being seen as merely worldly matters and therefore considered less important.¹³⁷

2.4.1.2.2 Philosophy of Islamic Education

The proponents argue that the current philosophy of Islamic education does not yet truly represent authentic Islamic education, as it is primarily composed of the views of Muslim philosophers on education.¹³⁸ They believe that Islamic education has not been based on a philosophy that is genuinely formulated by educators, those who truly understand education or are experts and academics in the field.

They also contend that the current philosophy of Islamic education is heavily influenced by Western philosophy. The epistemology of Islamic education is seen as adopting Western epistemology. As a result, they argue that the philosophy of Islamic education lacks a solid scientific epistemological foundation. Therefore, they see the need for a reconstruction of the philosophy of Islamic education.¹³⁹

2.4.1.2.3 Monodisciplinary Approach and Linearity

They also view that the problems in Islamic education so far have been caused by a monodisciplinary approach to knowledge.¹⁴⁰ According to them, religious sciences and modern sciences must be approached in an interdisciplinary, multidisciplinary, and transdisciplinary manner. From this, we can see the influence of the concept of IOK that

Pembelajaran Pendidikan Agama Islam di SMPN 1 Talang Padang Tanggamus. Bachelor's thesis, UIN Raden Intan Lampung, 2022. <https://repository.radenintan.ac.id/22403/>; Jailani, "Merging Minds,"

¹³⁷ See Suyadi, "Integrasi Pendidikan Islam dan Neurosains," 128; see also Kasno, "Aql dan Otak dalam Kajian Neurosains...,"; Suyadi. *Pendidikan Islam dan Neurosains: Menelusuri Jejak Akal dan Otak dalam Al-Qur'an Hingga Pengembangan Neurosains dalam Pendidikan Islam*. Jakarta: Prenada Media, 2020.

¹³⁸ Suyadi. "Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI)." *Al-Bidayah: Jurnal Pendidikan Dasar Islam* 4, no. 1 (2012): 1–12. <https://doi.org/10.14421/al-bidayah.v4i1.9003>.

¹³⁹ Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains," 288; Kasno, "Aql dan Otak dalam Kajian Neurosains...,"; Rofldi and Suyadi, "Tafsir Ayat-Ayat Neurosains...," 149

¹⁴⁰ Suyadi, "Hybridisation of Islamic Education and Neuroscience," 240.

has been developing in Islamic higher education institutions (PTKI) in Indonesia on this agenda (the integration of neuroscience into Islamic education).

2.4.2 Forms of Integration of Neuroscience in Islamic Education in Indonesia

2.4.2.1 Orientation

Several studies discuss the integration of neuroscience into Islamic education as a shift in the orientation/direction of the development of Islamic education.¹⁴¹ The idea of integrating neuroscience into Islamic education is believed to be an effort to revive the holistic concept of Islamic education.¹⁴² This group emphasises that this change in orientation needs to occur not only in the practical realm but also in theory.¹⁴³ This group focuses more on the philosophical-conceptual side, such as the philosophical aspects that form the basis of the Islamic education curriculum. The discussion of the proposal from this idea is mostly at the strategic and conceptual level. The discussion of implementation is explained only in general and does not go into much technical detail. As Rofdli and Suyadi notes,

the results of this study will have implications for the paradigm of Islamic education, which originally focused only on developing morals based on the heart in a dichotomous manner, to the development of students' potential for critical thinking in a more holistic way with a more scientific approach.¹⁴⁴

Some arguments more specifically mention the discipline of neuroscience. This group emphasises that neuroscience should guide the new direction of the development of Islamic education. Islamic education needs to follow/pay attention to the developments/new discoveries in neuroscience. As one study illustrates,

This change is shown by accommodating the new developments in neuroscience.¹⁴⁵

¹⁴¹ Rofdli and Suyadi, "Tafsir Ayat-Ayat Neurosains...", 148;

Kasno, "Aql dan Otak dalam Kajian Neurosains...", 173;

Izzati, "Potensi Pembelajaran Manusia..."; Asman, Suyadi, and Miftachul Huda, "Character Education as Brain Education," 77; Asman, Suyadi, and Huda, "Character Education as Brain Education,"; Tafsir Ayat Ayat Neurosains

¹⁴² Rofdli and Suyadi, "Tafsir Ayat-Ayat Neurosains...", 139.

¹⁴³ Kasno, "Aql dan Otak dalam Kajian Neurosains...", 173.

¹⁴⁴ Rofdli and Suyadi, "Tafsir Ayat-Ayat Neurosains...", 139.

¹⁴⁵ Kasno, "Aql dan Otak dalam Kajian Neurosains...", 173

Some arguments place more emphasis on the paradigm in viewing ‘*aql*’ and the brain, without explicitly mentioning neuroscience. Neuroscience is positioned as a science that helps interpret that ‘*aql*’ is the brain. So, there is a paradigm shift in viewing the word ‘*aql*’ in the Qur’ān. The implication is that Islamic education should place more attention on maximising the potential performance of the brain. As noted in the literature,

There is a paradigm shift in viewing the relationship between intellect, heart, and brain.¹⁴⁶

The group that emphasises this changes in orientation also emphasises the role of educators/teachers in the process. Teachers are believed to first need to understand how the brain works by having basic knowledge of neuroscience.¹⁴⁷

2.4.2.2 Curriculum

Several articles that discuss the shift in the orientation of the development of Islamic education state that this change in orientation must be reflected in the Islamic education curriculum in a broad sense, covering everything related to the organisation of education.¹⁴⁸ This includes the philosophical aspects that form the foundation of the curriculum, teaching and learning strategies, as well as evaluation strategies and techniques. Neuroscience is internalised in the curriculum through the development of a curriculum that considers/refers to neuroscience theories or findings.¹⁴⁹

Some studies emphasise developing neuroscience-based Islamic education methods. These studies examine strategies or models of neuroscience-based learning/evaluation. Rofdli advocate for learning methods referred to as ‘Islamic Neuro story-telling’, ‘Quranic Neuro story-telling’, and ‘Prophetic Neuro story-telling’.¹⁵⁰

¹⁴⁶ Ibid.

¹⁴⁷ Neurosains Dalam Pembelajaran Agama Islam

¹⁴⁸ Kasno, “Aql dan Otak dalam Kajian Neurosains...,” 173; Rahmat Ryadhush Shalihin, Suyadi Suyadi, Desfa Yusmaliana, and Diyan Faturahman, “Rational Brain Transmutation Into Intuitive Brain Based on Neuroscience in Islamic Education,” in *Proceedings of the 2nd EAI Bukittinggi International Conference on Education (BICED 2020, 14 September 2020, Bukittinggi, West Sumatera, Indonesia)* (Mountain View, CA: EAI, March 25, 2021), 1–10, <https://doi.org/10.4108/eai.14-9-2020.2305691>

¹⁴⁹ Jailani, Mohammad. “Merging Minds: A Critical Analysis of Hybridising Islamic Education and Neuroscience.” *EDUCAN: Jurnal Pendidikan Islam* 8, no. 1 (February 2024): 121–139. <https://doi.org/10.21111/educan.v8i1.10767>.

¹⁵⁰ Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...,” 139.

Suyadi discuss how neuroscience can be integrated into Islamic education through the development of a learning taxonomy of Islamic education based on neuroscience.¹⁵¹

Several studies explain that neuroscience-based learning methods are used to improve students' skills and learning abilities, such as the development of critical thinking, cognitive abilities, and intellectual intelligence.

This neuroscience-based educational method is also being developed as part of efforts in character education. *Neuroscience-Based Character Education*. Saibah discusses character education in Islamic educational institutions using the theory of constructivism based on neuroscience.¹⁵² Zunaidi examines the development of character education through a behaviour-based approach grounded in neuroscience.¹⁵³

The implementation of neuroscience-based learning methods is proposed in various contexts. Some studies examine this in the realm of basic education, such as: Setyowati attempts to examine the implementation of brain-based learning in Islamic education (PAI) subjects at Islamic schools.¹⁵⁴ The study attempts to assess the application of method in the classroom. Others examine the implementation both inside and outside the classroom, such as the study by Asman, which explores character education in Islamic boarding schools (*pesantren*).¹⁵⁵

Suyadi proposes that the integration of Islamic education should begin at the higher education level.¹⁵⁶ He proposes that the discipline of neuroscience be included in the curriculum of faculties of education and teacher training. Prospective teachers

¹⁵¹ Suyadi, "Learning Taxonomy of Islamic Education: The Development of Aql and the Brain in Quran from a Neuroscience Perspective," *Millah: Jurnal Studi Agama* 21, no. 2 (2022): 361–410. <https://doi.org/10.20885/millah.vol21.iss2.art3>.

¹⁵² Saibah and Suyadi, "Constructivism of Neurosains-Based in Building the Qur'ani Character of SMP Muhammadiyah I Sleman Students," *Edukasi: Jurnal Pendidikan Islam* 8, no. 1 (2020): 96–106, <https://ejournal.staimta.ac.id/index.php/edukasi/article/view/246>.

¹⁵³ Zunaidi M. Rasid Harahap and Suyadi Suyadi, "Pengembangan Pendidikan Karakter Melalui Pendekatan Behaviorisme Berbasis Neurosains di SD Muhammadiyah Purbayan," *Psikoislamedia: Jurnal Psikologi* 5, no. 1 (2020): 38–?, <https://doi.org/10.22373/psikoislamedia.v5i1.6199>.

¹⁵⁴ Nurwastuti Setyowati, "Implementasi Metode Brain-Based Learning dalam Pendidikan Agama Islam," *ANNUR: Jurnal Studi Islam* 14, no. 1 (January–June 2022): 93–109, <https://doi.org/10.37252/annur.v14i1.219>.

¹⁵⁵ Asman, Suyadi, and Miftachul Huda, "Character Education as Brain Education: Spiritual Neuroscience Studies in Islamic Education," *Tarbiyatuna* 12, no. 2 (2021): 78, <https://doi.org/10.31603/tarbiyatuna.v12i2.4278>.

¹⁵⁶ Suyadi, "Integrasi Pendidikan Islam dan Neurosains,"

need to study neuroscience in order to create learning processes that optimise students' brain function.

The author recommends that the integration of neuroscience start with the PGMI (Pendidikan Guru Madrasah Ibtidaiyah) study programme, because PGMI covers many fields of knowledge (religion, science, social studies, arts, etc.).

2.4.2.3 New Discipline

The idea of forming a new discipline called *Islamic education neuroscience* has already appeared in early literature written by Suyadi in 2012.¹⁵⁷ In it, he proposed integrating the neuroscience discipline into the curriculum of faculties of education and teacher training, so that prospective teachers can better understand how their students' brains work, thus making learning methods more effective. However, at that time Suyadi was still using "integration of knowledge" approach instead of hybridisation. He writes,

Educators, both teachers and lecturers who study this science, can carry out stimulation and intervention to optimize students' brain potential in an integrated manner in learning Islamic diversity¹⁵⁸.

However, in an article he wrote in 2019, he offered a new approach to connecting neuroscience and Islamic education, which he called the hybridisation approach.¹⁵⁹ This proposal of hybridisation emerged because, according to Suyadi, the current bridge connecting neuroscience and education only serves as a means to implement neuroscience findings in the classroom. In this relationship, the role of neuroscientists is more dominant, the classroom becomes merely an object, and the role of educators is more passive. Therefore, he offers a hybridisation approach which, according to him, allows for collaborative and significant roles from both parties, neuroscientists and educators, to work together in maximising brain potential.

¹⁵⁷ Ibid.

¹⁵⁸ Suyadi, "Hybridisation of Islamic Education and Neuroscience,".

¹⁵⁹ Ibid

According to Suyadi, the discipline of Islamic education neuroscience will be on par with other more developed disciplines such as Islamic educational philosophy, Islamic educational psychology, and Islamic educational anthropology.¹⁶⁰

The development of Islamic education neuroscience as its own scientific discipline means developing its scientific foundations, how to bridge it, and how to formulate its theories, similar to research that discusses the development of neuroeducation as an interdisciplinary field. Developing the foundation for a curriculum that is based on/informed by neuroscience.

In general, the discussion on how to implement the idea of neuroscience in Islamic education in Indonesia is still dominated by normative and conceptual ideas. It has not yet focused on explanations at the operational level. The details of implementation are not elaborated in depth.

2.4.3 The Emergence and Development of the Discourse

Literature on the integration of neuroscience into Islamic education began to emerge in Indonesia around 2012.¹⁶¹ Most of this literature has been written by researchers and academics in the field of education, particularly those affiliated with Ahmad Dahlan University in Yogyakarta. One of the main initiators and key figures in this discourse is Suyadi, a professor of Islamic education at that university. Suyadi authored a book titled *Pendidikan Islam dan Neurosains* (Islamic Education and Neuroscience), published in 2020, which has since become a major reference in this field. The book is a development of his dissertation titled *Dasar-Dasar Pemikiran Menuju Ilmu Neurosains Pendidikan Islam (Optimalisasi Potensi Otak dalam Pembelajaran Anak Usia Dini)* [Foundational Ideas Towards the Science of Islamic Educational Neuroscience (Optimising Brain Potential in Early Childhood Learning)].¹⁶² Nearly all the articles used as data in this study refer to Suyadi's work. The key ideas concerning criticism of Islamic education, arguments for the necessity of integrating neuroscience into Islamic education, and the

¹⁶⁰ Suyadi, *Pendidikan Islam dan Neurosains: Menelusuri Jejak Akal dan Otak dalam Al-Qur'an Hingga Pengembangan Neurosains dalam Pendidikan Islam* (Jakarta: Prenada Media, 2020), viii.

¹⁶¹ Suyadi, "Integrasi Pendidikan Islam dan Neurosains,"

¹⁶² Suyadi, *Pendidikan Islam dan Neurosains*.

various forms this integration takes in the literature, can be traced back to Suyadi's thought.

In his book, Suyadi frequently references Taufiq Pasiak. Pasiak is another influential figure whose ideas are widely cited in literature concerning the integration of neuroscience and Islamic education.¹⁶³ He is a medical doctor specialising in neuroscience and is one of the first and most prominent figures to introduce neuroscience to the Indonesian Muslim general readership through his books, which primarily aim to raise readers' awareness of how to maximise their brain potential. His pioneering contributions have introduced the discourse on the Qur'ān and neuroscience to general readers Indonesia. Some of his frequently cited books include *Revolusi IQ/EQ/SQ: Antara Neurosains dan Al-Qur'ān* (Revolution of IQ/EQ/SQ: Between Neuroscience and the Qur'ān) and *Tuhan dalam Otak Manusia: Menyadari Kesehatan Spiritual Berdasarkan Neurosains* (God in the Human Brain: Realising Spiritual Health Based on Neuroscience).

Literature on the integration of neuroscience into Islamic education draws heavily on the foundational work of Taufiq Pasiak. Many of the central arguments on this topic are largely built upon Pasiak's original insights. The literature later develops or elaborates on these ideas with other resources, including works of *tafsīr*. One of the most referenced works by Taufiq Pasiak in this discourse is his best-selling book "Revolution of IQ/EQ/SQ: Between Neuroscience and the Qur'ān". This book primarily discusses the development and discoveries in neuroscience, along with the structure and function of the human brain according to neuroscience.¹⁶⁴ Among its ten chapters, three chapters explore the relationship between the brain, 'aql, and spirituality. In the literature, arguments regarding neuroscience and the Qur'ān often appear fragmented, incomplete, or reductive, making them somewhat difficult to fully grasp. An in-depth analysis of Taufiq Pasiak's book provides a more comprehensive understanding of the original ideas. Based on this analysis, it becomes evident that several key arguments about neuroscience and the Qur'ān in the literature, do not originate from the authors' direct analysis of the Qur'ān. This also sheds light on why,

¹⁶³ Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains,"; Kasno, "Aql dan Otak dalam Kajian Neurosains...,"; Jailani *et al.*, "Critical Analysis of 'Aql and Brain...,"; Rofdlil and Suyadi, "Tafsir Ayat-Ayat Neurosains...,"; Suyadi, "Hybridisation of Islamic Education and Neuroscience,"; Suyadi, "Learning Taxonomy of Islamic Education,".

¹⁶⁴ Taufiq Pasiak, *Revolusi IQ/EQ/SQ: Antara Neurosains dan Al-Qur'an* (Bandung: Mizan, 2002)

in discussions about the integration of neuroscience in Islamic education, the literature often focuses on ‘traces’ of the brain in the Qur’ān.

Based on my analysis, in the literature discussing the integration of neuroscience into Islamic education, there are three types of articles/discussions:

The first type consists of literature that focuses on promoting the idea of integrating neuroscience into Islamic education in Indonesia. Most of these works dedicate a chapter or section to discuss a Quranic perspective on this topic. These theoretical studies delve into conceptual aspects such as background, objectives, and methodologies of integration.¹⁶⁵

The second type concentrates on practical application, examining how neuroscience can enhance teaching methods in classes, especially in primary and secondary education. These studies investigate the application of neuroeducation theories in subjects such as the Qur’ān and ḥadīth studies, *tahsīn*, and Islamic Religious Education.¹⁶⁶

The third type consists of research that discusses the ‘neuroscience verses’ in the Qur’ān and relates its findings to the idea of integration. These works explicitly state that they examine verses related to neuroscience to demonstrate the ‘traces’ of neuroscience in the Qur’ān.¹⁶⁷

¹⁶⁵ See: Suyadi, “Hybridisation of Islamic Education and Neuroscience,”; Jailani, “Merging Minds,”; Asman, Suyadi, and Miftachul Huda, “Character Education as Brain Education,”; Heni Listiana et al., “Pengembangan Kurikulum Pendidikan Agama Islam Berbasis Neurosains Spiritual,”

¹⁶⁶ See: Mohammad Jailani, Suyadi Suyadi, and Muallimah Muallimah, “Pengembangan Pembelajaran Alquran Hadis dengan Pendekatan Akal Bertingkat Ibnu Sina di SMK Muhammadiyah 3 Yogyakarta Berbasis Neurosains di Masa Pandemi Covid-19,” *SALAM: Jurnal Sosial dan Budaya Syar-i* 8, no. 4 (2021): 1–14, <https://journal.uinjkt.ac.id/index.php/salam/article/view/18995>; Zunaidi M. Rasid Harahap and Suyadi, “Pengembangan Pendidikan Karakter melalui Pendekatan Behaviorisme Berbasis Neurosains di SD Muhammadiyah Purbayan,” *Psikoislamedia: Jurnal Psikologi* 5, no. 1 (2020): 38–50, <https://doi.org/10.22373/psikoislamedia.v5i1.6199>.

¹⁶⁷ Nurjanah et al., “Konsep ‘Aql dalam Al-Qur’an dan Neurosains; Kasno, “Aql dan Otak dalam Kajian Neurosains...,”; Jailani et al., “Critical Analysis of ‘Aql and Brain...,”; Rofdlī and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”.

CHAPTER THREE

QUR'ĀN AND THE INTEGRATION OF NEUROSCIENCE IN ISLAMIC EDUCATION IN INDONESIA

3.1 INTRODUCTION

This chapter examines how proponents of neuroscience integration into Islamic education construct their Qur'ānic arguments and the interpretive methods they employ. It analyses how relevant Qur'ānic verses are identified and interpreted, and how these methods support the justification for neuroscience integration into Islamic educational thought.

The first section presents the models and arguments offered by proponents of the integration. The second section of this chapter focuses on analysing the central object of this study: the interpretive methods employed by the proponents of the integration of neuroscience and Islamic education. While the first section presented the arguments put forth by these proponents, particularly from a Qur'ānic perspective, the second investigates the exegetical processes that underpin those arguments.

This section explores the models, methods, and styles of Qur'ānic interpretation used, and analyses the approaches and framework of interpretation, providing insight into how the arguments are structured and legitimised through specific interpretive frameworks. This section is essential to evaluate the epistemological basis of their conclusions and to assess the academic rigor and validity of their interpretive approach.

The data analysed in this chapter constitute the primary object of the research, consisting of articles presenting Qur'ānic arguments and the interpretive methods used by their proponents. The final corpus for this category of inquiry consists of 17 journal articles, 1 undergraduate thesis, 1 master's thesis, and 1 book. To facilitate discussion and referencing, each article analysed in this chapter has been assigned a unique code, as shown in Table 2.

Table 3.1 Coding of Articles Referenced in Chapter 3

No	Code	Title	Type	Author	Year
1	A1	Konsep ‘Aql Dalam Al-Qur’an dan Neurosains	Journal Article	Asti Faticha Nurjanah, Hernantito Sulkhan Hakim, Muhammad Taufiqurrohman Aljalil, Nungki Nariska	2018
2	A3	Aql dan Otak Dalam Kajian Neurosains dan Implikasinya Pendekatan Saintifik Dalam Pendidikan Islam	Journal Article	Kasno	2019
3	A4	Critical Analysis of Aql and Brain in the Qur'an and Neuroscience and Its Implications for the Development of Islamic Education	Journal Article	Mohammad Jailani, Suyadi, Rena Latifa, Siti Nurul Azkiyah	2021
4	A5	Tafsir Ayat-Ayat Neurosains: ‘Aql Dalam Al-Qur’an dan Relevansinya Terhadap Pengembangan Berpikir Kritis Dalam Pendidikan Islam	Journal Article	Muhammad Faiz Rofdli	2020
5	A6	Exploring the Development of Neuroscience in the Light of Islamic Perspectives:	Journal Article	Mohammad Jailani	2023

		A Qualitative Literature Review			
6	A7	Menelusuri Jejak Otak dan 'Aql Dalam Alquran Perspektif Neurosains dan Pendidikan Islam di Era Pandemi Covid-19	Journal Article	Mohammad Jailani, Suyadi, Dedi Djubaedi	2021
7	A8	Tafsir Ayat-Ayat Neurosains Pendidikan Islam: Telaah Tafsir Salman atas Konsep Nashiyah dalam Surat Al-Alaq	Journal Article	Vivi Indri Asrini, Suyadi	2023
8	A9	Potensi Pembelajaran Manusia : Perspektif Neurosains Dan Islam.	Journal Article	Himayatul Izzati	2021
9	A10	Tafsir Ayat-Ayat Neurosains dan Implikasinya Bagi Pengembangan Higher Order Thinking (HOT) Dalam Pendidikan Islam	Journal Article	Wikanti Iffah Juliani, Addinia Rizki Sabili,	2020
10	A11	The Concept of 'Aql and Brain in the Quran and Neuroscience: A Concept Analysis of Nāṣiyah in Salman's Tafsir	Journal Article	Suyadi, Mohammad Jailani	2021
11	A12	Teori Belajar Berbasis Neurosains Telaah Surah Al-Alaq	Journal Article	Muji, Rindiyaning Pangestuti	2022

12	B1	Hybridisation of Islamic Education and Neuroscience: Transdisciplinary Studies of 'Aql in the Quran and the Brain in Neuroscience	Journal Article	Suyadi	2019
13	B2	Integrasi Pendidikan Islam dan Neurosains dan Implikasinya Bagi Pendidikan Dasar (PGMI)	Journal Article	Suyadi	2012
14	B3	Learning Taxonomy of Islamic Education: The Development of Aql and the Brain in Quran from a Neuroscience Perspective	Journal Article	Suyadi	2022
15	B4	Merging Minds: A Critical Analysis of Hybridising Islamic Education and Neuroscience	Journal Article	Mohammad Jailani	2024
16	B.C2	Character Education as Brain Education: Spiritual Neuroscience Studies in Islamic Education	Journal Article	Asman, Suyadi, Miftachul Huda	2021
17	B.C3	Neurosains Dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD	Master's Thesis	Ida Royani Munfarokhah	2020
18	B.C4	Learning Disorders in Neuroscience	Journal Article	Khoirul Amin, Ana Kurnia Sari, Ermis	2024

		and Islamic Education Perspectives		Suryana, Sutarto, Suhono	
19	B.C5	Efektivitas Penerapan Pendekatan Neurosains Dalam Peningkatan Kemampuan Berpikir Kritis Peserta Didik Kelas Viii pada Pembelajaran Pendidikan Agama Islam di SMPN 1 Talang Padang Tanggamus	Bachelor's Thesis	Yolanda Amelia Saputri	2022
20	B.C6	Pengembangan Kurikulum Pendidikan Agama Islam Berbasis Neurosains Spiritual	Journal Article	Heni Listiana, Achmad Yusuf, Supandi, Moh. Wardi,	2021
21	C1	Pendidikan Islam dan Neurosains	Book	Suyadi	2021

To support the analysis, nearly every subchapter is accompanied by tables containing selected quotations taken directly from the main corpus. Some quotations are originally in English, while others have been translated into English. These tables serve as concrete evidence for the discussion, to enable the readers to see the original sources underlying the arguments presented in this chapter. By presenting direct quotations, these tables provide transparency and show connections between the data and the analytical claims made in this chapter.

3.2 ARGUMENTATION FROM THE QUR'ĀN

3.2.1 Results of Interpretation

As previously explained, the literature on the integration of neuroscience into Islamic education in Indonesia can be divided into three groups; the first focuses on the conceptual aspect of the idea, the second examines the practical implementation of this idea, and the third discusses the 'neuroscience verses' in the Qur'ān and relates its findings to the idea of integration. Among these three categories, the examination of Qur'ānic verses or interpretive efforts regarding specific verses can be found in both the first and third categories.

The discussion of Qur'ānic verses in both the first and third categories, presents a central argument: that the Qur'ān contains traces, signals, or discussions related to neuroscience.

However, if we examine the authors' explicit statements regarding the conclusions drawn from the verses they analyse, not all articles directly claim that these verses are related to neuroscience. Some articles conclude that there are traces of neuroscience in the Qur'ān because the verses are believed to discuss the brain.¹ Others reach similar conclusions by interpreting the verses as commands to use reason or as encouragement to study brain function.²

3.2.1.1 *Traces of Neuroscience in the Qur'ān*

Several articles directly conclude that the Qur'ān contains traces, foundations, indications, or signals of neuroscience. They use the term "neuroscience" explicitly and assert that it already exists or is discussed in the Qur'ān. For example, article A3 states that "what has been discovered in current neuroscience research actually already has a clear indication in the Qur'ān", articles A5 and A10 explicitly refer to verses about the concepts of '*aql*, *tadabbur*, and *tafakkur* as "Qur'ānic verses on neuroscience", and article A7 concludes that the word *nāṣiyah* in sūrah al-'Alaq: 15-16 represents a trace

¹ See: Jailani, Suyadi, and Djubaedi, "Menelusuri Jejak Otak dan 'Aql..."; Suyadi and Jailani, "The Concept of 'Aql and Brain,"; Suyadi, "Hybridisation of Islamic Education and Neuroscience,"; Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD*

² See: Juliani, Sabili, and Suyadi, "Tafsir Ayat-Ayat Neurosains..."; Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains,"; Kasno, "Aql dan Otak dalam Kajian Neurosains...,"

of neuroscience in the Qur'ān.³ Article A10 even explicitly states that “the term neuroscience also exists in the Qur'ān,” in the form of explanations about human brain activity. These articles do not only claim that neuroscience aligns with the Qur'ān, but also argue that it was already discussed in the Qur'ān long before it emerged as a modern scientific discipline. Table 3 presents selected quotations from articles that directly conclude that the Qur'ān contains traces, foundations, indications, or signals of neuroscience.

Table 3.2 Selected Quotations Indicating Traces of Neuroscience in the Qur'ān

Code	Quotation
A3	<i>“apa yang ditemukan dari penelitian neurosains pada saat ini sesungguhnya telah mempunyai sinyalemen yang cukup tegas didalam al-Qur'an”</i> <i>(What has been discovered through neuroscience research today actually already has quite a clear indication in the Qur'ān)</i>
A4	<i>“It turns out that the science of neuroscience in the 19th century was very broad and was already present in Islamic civilisation along with the revelation of the Qur'ān.”</i>
A5	<i>“Ayat-ayat Al-Qur'an tentang neurosains”</i> <i>(Qur'ānic verses about neuroscience)</i>
A6	<i>“The study of neuroscience in the 19th century was already expansive and present in Islamic civilisation since the revelation of the Qur'ān in the 7th century.”</i>
A7	<i>“Neurosains dalam pendidikan Islam mempunyai jejak basis neurobiologis dapat dilacak pada Alquran ... Kajian neurosains dapat dilacak jejaknya dalam alquran”</i>

³ Kasno, “Aql dan Otak dalam Kajian Neurosains...”; Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘Aql...”

	<i>(Neuroscience in Islamic education has traces of a neurobiological basis that can be found in the Qur'ān The traces of neuroscience can be found in the Qur'ān)</i>
A9	<i>"The verses of the Qur'ān which talk about the potential of learning and neuroscience describe the activity of the mind."</i>
A10	<i>"Neurosains dalam Al-Qur'an: Istilah neurosains juga terdapat dalam Al-Qur'an yaitu aktifitas otak...The purpose of this article is to interpret verses about neuroscience"</i> <i>(Neuroscience in the Qur'ān: The term neuroscience also exists in the Qur'ān, referring to brain activity. The purpose of this article is to interpret verses about neuroscience)</i>
A11	<i>"The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning of nāṣiyah."</i>
B1	<i>"The neuroscience that emerged in the 19th century was basically a development of the critical study of the concept of nāṣiyah in the Qur'ān ."</i>
B2	<i>"Jejak neurosain dalam al-Quran dapat dijumpai pada istilah-istilah yang digunakan Al-Qur'an untuk menyebut aktifitas otak"</i> <i>(Traces of neuroscience in the Qur'ān can be found in the terms used by the Qur'ān to refer to brain activity)</i>

3.2.1.2 References to the Brain in the Qur'ān

Several articles do not explicitly identify neuroscience as the subject of the verses, instead, they begin with the assumption that the Qur'ān speaks about the brain. For instance, articles A11 and B1 argue that one of the evidences that the Qur'ān discusses the brain is the use of the word *nāṣiyah* in sūrah al-‘Alaq: 15-16.⁴ The word *nāṣiyah* in this verse is interpreted as referring to the brain, namely the prefrontal cortex.

⁴ Suyadi and Jailani, "The Concept of 'Aql and Brain,"; Suyadi, "Hybridisation of Islamic Education and Neuroscience,"

Meanwhile, articles B.C3 and B1 believe that discussions about the brain in the Qur’ān can be found in verses that talk about the concept of ‘*aql* (intellect).⁵

However, although these studies do not explicitly mention the term “neuroscience” in their arguments regarding the conclusions drawn from the verses, they still consider those verses as hints or traces of neuroscience in the Qur’ān.

Table 3.3 Quotations on Qur’ān’s References to the Brain

Code	Quotation
A7	<i>“Basis Neurobiologis Otak dalam Alquran”</i> <i>(The neurobiological basis of the brain in the Qur’ān)</i>
B1	<i>“The concepts of nāṣiyah (forelock) and ‘aql (mind) in the Qur’ān have a correlation with the brain and mind in neuroscience”</i>
B.C3	<i>“Otak di dalam Al-Qur’an digambarkan dengan kata ‘Aql”</i> <i>(The brain in the Qur’ān is described using the word ‘aql”</i>

Table 3.4 Quotation Equating Qur’ānic References to the Brain with References to Neurosciences

Code	Quotation
A7	<i>“kajian Neurosains dapat dilacak jejaknya Dalam Alquran Surat al-Alaq ayat 15-16”</i>

⁵ Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master’s thesis, Institut PTIQ Jakarta, 2020); Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

	<i>(The study of neuroscience can be traced in the Qur'ān, specifically in sūrah al-'Alaq: 15-16)</i>
A11	<i>"The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning of nāṣiyah in the Qur'ān, which some commentators define as "the crown."</i>
B1	<i>"The neuroscience that emerged in the 19th century was essentially a development of the critical study of the concept of nāṣiyah in the Qur'ān."</i>

3.2.1.3 Command to Study the Brain

Traces of neuroscience in the Qur'ān, as concluded by several articles, are also derived from verses understood as commands, signals, or guidance. For example, in article A10, the phrase *"alladhīna lā ya'qilūn"* in sūrah al- Anfāl: 22 is interpreted as referring to "those who do not use their brains".⁶ This verse is then understood as a command for humans to "use their brains," as well as a signal to contemplate (*tadabbur*), reflect (*tafakkur*), examine, and study the brain as an organ. Article A1 also examines the same verse, although it does not explicitly mention the word "brain." Both articles A1 and A3 state that sūrah al-Anfāl: 22 and sūrah Yāsīn: 68 command humans to use their intellect (*'aql*).⁷ These studies conclude that the Qur'ān's emphasis on the importance of *'aql* is a directive to investigate, study, and optimise brain function. In these articles, the command to "use the brain," along with the signals to contemplate, reflect, and study the organ, is considered a trace of neuroscience in the Qur'ān.

Table 3.5 Quotations Interpreting Qur'ānic Verses as Command to Use the Brain

Code	Quotation
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⁶ Juliani, Sabili, and Suyadi, "Tafsir Ayat-Ayat Neurosains...";

⁷ Nurjanah et al., "Konsep 'Aql dalam Al-Qur'an dan Neurosains,"; Kasno, "Aql dan Otak dalam Kajian Neurosains...";

A10	<i>“hal ini merupakan hikmah tersembunyi untuk memotivasi manusia agar memperhatikan dirinya, menggunakan otaknya, untuk meneliti (men-tafakkuri dan men-tadabburi) tentang organ otak.⁸....Hal ini telah dijelaskan dalam QS. Al-Anfal ayat 22 sebagaimana bahwa Allah tidak menggunakan kalimat “yang tidak menggunakan otaknya”, hal ini merupakan hikmah tersembunyi untuk memotivasi manusia agar memperhatikan dirinya, menggunakan otaknya, untuk meneliti (men-tafakkuri dan mentadabburi) tentang organ otak”.</i> <i>(This is a hidden wisdom intended to motivate humans to reflect on themselves, to use their brains to examine (through tafakkur and tadabbur) the brainThis has been explained in sūrah al-Anfal: 22, where Allah does not use the phrase “those who do not use their brains”; this is a hidden wisdom to encourage humans to reflect on themselves, use their brains, and investigate (through tafakkur and tadabbur) the brain.)</i>
A1	<i>“Ayat alquran tersebut menunjukkan bahwa Allah menyuruh kita menggunakan akal”</i> <i>(This Qur’ānic verse shows that Allah commands us to use our intellect.)</i>
A3	<i>“Penjelasan-penjelasan ayat al-Qur’an di atas itu menunjukkan bahwa Allah memerintahkan manusia menggunakan akalanya sebagai alat berpikir untuk merefleksikan realitas agar bisa memunculkan pengetahuan. Bahkan wajib bagi manusia untuk menggunakan akal dan memberikan kedudukan yang tinggi terhadap akal. Dengan demikian endid manusia menggunakan akal dalam implikasinya”</i> <i>(The above explanations of Qur’ānic verses indicate that Allah commands humans to use their intellect as a tool for thinking in order to reflect on reality and derive knowledge. In fact, it is obligatory for humans to use their intellect and to give it a high status. Thus, humans are guided to use their intellect and its implications.)</i>

⁸ A10

Table 3.6 Quotation Equating Qur’ānic Command to Use the Brain with References to Neurosciences

Code	Quotation
A10	<i>“Neurosains dalam Al-Qur’an :..Istilah neurosains juga terdapat dalam Al-Qur’an yaitu aktifitas otak...The purpose of this article is to interpret verses about neuroscience”</i> <i>(Neuroscience in the Qur’ān: The term neuroscience is also found in the Qur’ān, referring to brain activity. The purpose of this article is to interpret verses about neuroscience.)</i>
A1	<i>“Neuroscience memiliki jejak dalam islam.... “Neurosains dalam islam: Konsep ‘aql dalam alquran”</i> <i>(Neuroscience has traces in Islam. “Neuroscience in Islam: The Concept of ‘Aql in the Qur’ān)</i>
A3	<i>“apa yang ditemukan dari penelitian neurosains pada saat ini sesungguhnya telah mempunyai sinyalemen yang cukup tegas didalam al-Qur’an.”</i> <i>(What has been discovered through current neuroscience research actually already has clear indications in the Qur’ān.)</i>

3.2.2 Neuroscience in the Qur’ān

3.2.2.1 ‘Aql

One of the most frequently discussed arguments in the literature is that Qur’ānic words derived from ‘*aql* represent a trace of neuroscience in the Qur’ān. The word ‘*aql* is used interchangeably with *akal*, the Indonesian word for “mind.” Suyadi, in his book, states that the “key word” to trace neuroscience in the Qur’ān is through the concept of *akal*. He literally uses the Indonesian term *akal*. Meanwhile, article B1 uses the Arabic word

‘aql, arguing that the concept of *‘aql* in the Qur’ān is related to the brain as an organ.⁹ In article A7, the terms *‘aql* and *akal* are used interchangeably as the “key concept” in identifying traces of neuroscience in the Qur’ān.¹⁰ Article A3 directly translates *‘aql* as *akal* in Indonesian and concludes that “the mention of the word *akal* in the Qur’ān” is a signal that neuroscience has been discussed in the Qur’ān.¹¹ Similarly, article A5 also translates *‘aql* as *akal* and equates the Qur’ānic emphasis on *akal* with neuroscience. As reflected in the following passage,

The Relevance of ‘Aql in Qur’ānic Verses to Islamic Education:..The Qur’ān encourages the use of intellect (*akal*) to reflect upon the signs of Allah’s greatness within the human self and in the universe. For example, Islamic education must be oriented toward *akal* (neuroscience), as shown in the research by Suyadi, which asserts that only scientific storytelling, or neurostorytelling, can develop children’s brain potential.¹²

Table 3.7 Quotations claiming that Qur’ānic Terms Derived from *‘Aql* Represent Traces of Neuroscience

Code	Quotation
C1	<i>“Temuan terhadap penelusuran jejak neurosains tersebut, bertumpu pada konsep “akal” sebagai kata kuncinya”</i> <i>(The findings on the traces of neuroscience are based on the concept of ‘aql (intellect) as the key term.)</i>
A7	<i>“Penelitian ini bertujuan menganalisis jejak Neurosains secara teologi yang tercantum pada Alquran....dan memiliki jejak secara kademisi dalam Alquran dan Hadits ya’ni yang berkaitan erat sebagai konsep ‘Aql dan Qolb.... Penelitian ini di dasarkan atas argument dipilihnya kata akal sebagai kata kunci menelusuri jejak Neurosains dalam pemikiran Islam bertumpu pada otaknya”.</i>

⁹ Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

¹⁰ Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘Aql...,”

¹¹ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

¹² Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

	<i>(This study aims to analyse the theological traces of neuroscience as stated in the Qur'ān... and identifies academic traces in the Qur'ān and Hadith, namely those closely related to the concepts of 'aql and qalb... This research is based on the argument that the word 'aql was chosen as the keyword for tracing the presence of neuroscience in Islamic thought, with a focus on the brain.)</i>
A3	<i>“Sinyalemen itu terlihat dari konsep-konsep yang termaktub dalam 49 kali penyebutan kata akal dalam al-Qur'an”</i> <i>(Such indications can be seen in the concepts embedded in the 49 mentions of the word 'aql in the Qur'ān.)</i>
A5	<i>“Relevansi 'Aql dalam Ayat-Ayat Al-Qur'an dengan Pendidikan Islam:... Al-Qur'an mendorong penggunaan akal dalam memikirkan tanda-tanda kebesaran Allah yang ada pada diri manusia itu sendiri dan juga yang ada pada alam semesta....Sebagai contoh pendidikan Islam harus berorientasi pada akal (neurosains), adalah sebagaimana penelitian yang dilakukan oleh Suyadi. Bahwa storytelling yang saintifik atau neurostorytelling saja lah yang dapat mengembangkan potensi otak anak”</i> <i>(The Relevance of 'Aql in Qur'ānic Verses to Islamic Education... The Qur'ān encourages the use of intellect to contemplate the signs of Allah's greatness found within the human self and the universe... For example, Islamic education must be oriented toward the intellect (neuroscience), as seen in the research by Suyadi, which argues that only scientific storytelling, or neurostorytelling, can develop a child's brain potential)</i>
B1	<i>“The results of the study showed that the concepts of nāṣiyah (forelock) and 'aql (mind) in the Qur'ān have a correlation with the brain and mind in neuroscience.”</i>

3.2.2.1.1 *Aql as Brain / 'Aql as an Organ*

Table 3.8 Quotations Stating that the Qur'ānic Term '*Aql* Refers to the Brain

Code	Quotation
A1	<i>“Dalam alquran istilah otak tidak dikenal, untuk menggambarkan kecerdasan menggunakan istilah akal”</i> <i>(In the Qur'ān, the term "brain" is not used; instead, the term 'aql (intellect) is used to describe intelligence)</i>
A3	<i>“Untuk menggambarkan kecedasan digunakanlah kata akal, namun istilah otak tidak dikenal al-Qur'an. Dalam dimensi jasmani, otaklah yang disebut merupakan makna akal...aql dalam alquran adalah simbosa potensi diskursif (kecerdasan intelektual) dan potensi intuitif (kecerdaan emosional)”</i> <i>(To describe intelligence, the word akal is used, but the term “brain” is not found in the Qur'ān. In the physical dimension, the brain is considered to represent the meaning of akal... 'Aql in the Qur'ān symbolizes both discursive potential (intellectual intelligence) and intuitive potential (emotional intelligence).</i>
B.C3:	<i>“Otak di dalam Al-Qur'an digambarkan dengan kata 'Aql atau akal. Otak merupakan makna nalar dalam dimensi fisik.”</i> <i>(The brain in the Qur'ān is described using the word 'aql or akal. The brain is understood as the physical manifestation of reason.)</i>
A7	<i>“Basis Neurobiologis Otak dalam Alquran Dapat ditelusuri jejaknya dengan bertumpu pada konsep akal sebagai kata kuncinya.”</i> <i>(The neurobiological basis of the brain in the Qur'ān can be traced by relying on the concept of akal as the key term.)</i>
B1	<i>“The results of the study showed that the concepts of nasiyah (forelock) and 'aql (mind) in the Qur'ān have a correlation with the brain and mind in neuroscience.”</i>

Article B.C3 clearly states that the word ‘*aql*’ in the Qur’ān refers to the brain.¹³ Article B1 does not explicitly state that the meaning of ‘*aql*’ in the Qur’ān is the brain, but it states that the concept of ‘*aql*’ in the Qur’ān correlates with the brain.¹⁴ Articles A1 and A3, state that the literal translation of the word “brain” in Arabic does not appear in the Qur’ān, and argue that the concept of *akal*¹⁵ in the Qur’ān refers to the brain, based on the argument that both terms are associated with intelligence.¹⁶

Table 3.9 Quotations Explaining the Arguments and Debates on Interpreting ‘*Aql*’ as Referring to the Brain

Code	Quotation
A3	<i>“To describe intelligence, the word akal is used, although the term “brain” is not found in the Qur’ān. In the physical dimension, the brain is considered to represent the meaning of akal... ‘Aql in the Qur’ān symbolizes both discursive potential (intellectual intelligence) and intuitive potential (emotional intelligence)...”</i>
A3	<i>”Adanya ketakutan reinterpretasi terhadap kata akal... Menyamakan akal dengan otak dianggap mereduksi maknanya ke dalam konteks material...Menurut Taufiq Pasiak (2017: 59-60) Pernyataan paradigma lama mengatakan bahwa “Otak sebagai seonggok daging yang terpisahkan dengan memori dan pikiran”. Bahkan, setengah pendapat dari kalanganpun juga mempertentangkan antara akal dan otak. Salah satu dari tokoh yang membedakan antara otak dan akal tersebut ialah Harun Nasution. Pendapatnya, bahwa pikiran (akal) bukanlah otak melainkan daya berpikir yang terdapat dalam jiwa manusia.”</i>

¹³ Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master’s thesis, Institut PTIQ Jakarta, 2020)

¹⁴ Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

¹⁵ ‘*aql* and *akal* are used interchangeably in this study

¹⁶ Nurjanah et al., “Konsep ‘Aql dalam Al-Qur’an dan Neurosains,”; Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

	<i>(There is a fear of reinterpretation of the word ‘aql... Equating ‘aql (intellect) with the brain is considered to reduce its meaning to a merely material context....According to Taufiq Pasiak (2017: 59–60), the old paradigm stated that “the brain is merely a lump of flesh, separate from memory and thought.” In fact, some scholars have opposed equating ‘aql and the brain. One of the figures who made a clear distinction between the two is Harun Nasution. He argued that thought (‘aql) is not the same as the brain but rather a cognitive capacity that exists in the human soul.)</i>
B7	<i>“Harun Nasution menyatakan bahwa akal dalam pengertian Islam berbeda dengan otak, akal adalah daya berfikir yang terdapat dalam jiwa manusia daya sebagaimana digambarkan dalam Al-Qur‘an untuk memperoleh pengetahuan dengan cara memperhatikan alam sekitarnya...Otak yang berfungsi tersebut disebut akal, inilah yang membedakan antara manusia dengan binatang melata, dan manusia dengan manusia. —Al-insanu hayawanun nathiqun, manusia adalah hewan yang berpikir- man as the animal that reasons”. Sebagaimana di dalam Qs Al-Anfaal ayat 22)</i> <i>(Harun Nasution stated that ‘aql in the Islamic understanding differs from the brain; ‘aql is a thinking power found in the human soul, a power described in the Qur‘ān as a means to gain knowledge by observing the surrounding world... The brain that functions in this way is referred to as ‘aql; this is what distinguishes humans from animals and from one another. “Al-insānu ḥayawānūn nāṭiq,” meaning man is the animal that reasons (as in al-Anfāl: 22).)</i>
B3	<i>“In the 13th century, the concept of ‘aql was understood metaphysically as rūḥ (spirit), nafs (soul), and qalb (heart). Even the hierarchical theories of thinking developed by Al-Farabi and Ibn Sina were understood in a metaphysical rather than a scientific framework.”</i>

Articles A3 and A7 argue that the brain is the physical dimension of *‘aql/akal*.¹⁷ Article A3 criticises the view that separates *‘aql* from the brain, seeing it as an outdated paradigm.¹⁸ This criticism also appears in article B3, which states that “in the 13th century, the concept of *‘aql* was understood metaphysically,” and thus Ibn Sīnā and Al-Fārābī’s views on the hierarchy of thinking were still interpreted from a metaphysical standpoint and “had not yet been studied scientifically”.¹⁹ Article A3 argues that the current reluctance to reinterpret *‘aql* as the brain stems from a fear of reducing its meaning to a purely material concept.

Table 3.10 Quotations Explaining the Function of *‘Aql* in Relation to the Brain

Code	Quotation
A5	<i>“Dengan demikian, makna ‘aql dalam Al-Qur’an adalah simbiosis potensi intuitif (kecerdasan emosional) dan potensi diskursif (kecerdasan intelektual) dalam usaha mengetahui, memikirkan, merenungkan, menyelami, memahami, dan merasakan berbagai fenomena fisik maupun informasi metafisik. Dengan menggabungkan dua kecerdasan tersebut, manusia diharapkan bisa sampai pada hakikat terakhir, kebenaran tertinggi, asal dari semua yang ada. Maka aktivitas ta‘aqqul yang sebenarnya adalah simbiosis antara potensi emosional dan potensi intelektual yang mampu memberi umpan balik positif pada manusia, yakni mematuhi ketentuan Allah (taqwa).”</i> <i>(Thus, the meaning of ‘aql in the Qur’ān is a symbiosis of intuitive potential (emotional intelligence) and discursive potential (intellectual intelligence) in the effort to know, think, reflect, explore, understand, and feel various physical phenomena as well as metaphysical information. By combining these two forms of intelligence, humans are expected to arrive at the ultimate essence, the highest truth, the origin of all that exists.</i>

¹⁷ Kasno, “Aql dan Otak dalam Kajian Neurosains...”; Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘Aql...,”

¹⁸ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

¹⁹ Suyadi, “Learning Taxonomy of Islamic Education,”

	<i>Hence, the true activity of ta‘aqqul is the symbiosis between emotional and intellectual potential that provides positive feedback to humans, namely, obedience to Allah (taqwa).)</i>
A3	<i>“Aql dalam alquran adalah simbosa potensi diskursif (kecerdasan intelektual) dan potensi intuitif (kecerdaan emosional) Untuk menggambarkan kecerdasan digunakan kata ‘aql, dalam dimenssi jassmani, otaklah yang disebut merupakan makna akal”</i> <i>(Aql in the Qur’ān is the symbiosis of discursive potential (intellectual intelligence) and intuitive potential (emotional intelligence) ... To describe intelligence, the word ‘aql is used; in the physical dimension, the brain is considered to represent the meaning of akal.)</i>
B1	<i>“Neurobiologically, the brain behind the "crown" (nāṣiyah) is the prefrontal cortex. This part of the brain functions to think critically, plan, motivate, and initiate good and bad actions, including expressing honesty or lies (Pasiak, 2012). In the Qur’ān, such brain functions are comparable to ‘aql or thought....In the Qur’ān, such brain functions are comparable to ‘aql or thought. Even in the Indonesian language dictionary, the word sense is translated as “thinking power,” which also derives from the word ‘aql in the Qur’ān.”</i>
A10	<i>“Fungsi dari aql tersebut berupa fi’il (kata kerja), ini menunjukkan bahwa Al-Qur”an menjelaskan berpikir dengan akal adalah sebuah proses mengikat ilmu pengetahuan secara terus-menerus dan bukan merupakan hasil perbuatan.”</i> <i>(The function of ‘aql is expressed in the form of verbs (fi’il), indicating that the Qur’ān explains thinking with ‘aql as a continuous process of binding knowledge, not as a completed result.)</i>

A5	<i>“Sumber data dalam penelitian ini adalah tafsir ayat-ayat Al-Qur’an tentang aktifitas berpikir atau ‘Aql.....Terdapat banyak ayat dalam Al-Qur’an yang menyebutkan tentang aktifitas akal.”</i> <i>(The data source for this study is the interpretation of Qur’ānic verses about thinking activities or ‘aql... There are many verses in the Qur’ān that mention the activity of ‘aql.)</i>
B7	<i>“Sebagaimana di dalam Qs Al-Anfaal ayat 22... Di kalangan Mu‘tazilah akal memiliki fungsi dan tugas moral disamping untuk memperoleh pengetahuan akal.”</i> <i>(As stated in sūrah al-Anfal: 22... Among the Mu‘tazilah, ‘aql not only serves the function of acquiring knowledge but also has a moral function and responsibility.)</i>

3.2.2.1.2 The Function of ‘Aql

Discussions about the relationship between ‘aql and the brain mostly consist of the discussions about the concept of intelligence,²⁰ and the similar functions of ‘aql and the brain.²¹ Article A3 argues that the word ‘aql is used in the Qur’ān to describe intelligence. The article states that ‘aql in the Qur’ān is “a symbiosis of discursive potential (intellectual intelligence) and intuitive potential (emotional intelligence”).²² Articles A10 and A5 argue that the concept of ‘aql in the Qur’ān appears exclusively in verb forms which signify action to highlight its role as a faculty of the intellect.²³ Article B1 highlights the similarity between ‘aql and the brain in their shared ability to think, plan, motivate, and initiate both good and bad deeds. As reflected in the following passage,

Neurobiologically, the brain behind the crown (nāṣiyah) is the prefrontal cortex. This part of the brain functions to think critically, plan, motivate,

²⁰ A5

²¹ Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

²² Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

²³ Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

and initiate good and bad deeds, including expressing honesty or lies (Pasiak, 2012). In the Qur’ān, such brain functions are similar to ‘aql or thought.²⁴

3.2.2.1.3 Importance of ‘Aql

In the literature, the concept of ‘aql is considered a trace of neuroscience not only based on the argument that ‘aql refers to the brain. Several articles strengthen their argument by ...that ‘aql is discussed in many places in the Qur’ān signifies its importance in human life, as expressed in article A6:

Meanwhile, the term ‘aql in the Qur’ān is mentioned in various forms and verb conjugations, totaling 49 occurrences. Implicitly, the Qur’ān places great emphasis on the importance of intellect and its application in life, particularly in seeking the truth.²⁵

The Qur’ān’s emphasis on the importance of ‘aql, believed to be reflected in the frequency of its mention, is one of the recurring arguments in the literature.

Article B.C3 relate this point/adds that that ‘aql (interpreted as the brain) is what distinguishes humans from other creatures and makes them the best of creations on earth.

Article A9 also argues that the important the position of intellect is in Islamic is evident from the various contexts of verses that speak about ‘aql in that it appears. Article A5 also concludes that “The Qur’ān places great emphasis on ‘aql”.²⁶

3.2.2.1.4 Command to Use ‘Aql

Table 3.11 Quotations on Qur’ānic Command to Use ‘Aql

Code	Quotation
A1	<i>“pernyataan” ayat alquran di tersebut menunjukkan bahwa Allah menyuruh kita menggunakan akal” (Q.S 8:22: allatziina laa ya’qiluun, Q.S 36:68: afalaa ya’qiluun)</i>

²⁴ Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

²⁵ Jailani, “Exploring the Development of Neuroscience...,”

²⁶ Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

	<i>(The statement” of the Qur’ānic verse shows that Allah commands us to use our intellect (‘aql)” (al-Anfāl: 22: alladhīna lā ya‘qilūn, Yāsin: 68: afalā ya‘qilūn)</i>
A5	<i>“Relevansi ‘Aql dalam Ayat-Ayat Al-Qur’an dengan Pendidikan Islam”... Al-Qur’an mendorong penggunaan akal dalam memikirkan tanda-tanda kebesaran Allah yang ada pada diri manusia itu sendiri dan juga yang ada pada alam semesta....Sebagai contoh pendidikan Islam harus berorientasi pada akal (neurosains)”</i> <i>(the relevance of ‘aql in Qur’ānic verses to Islamic education”... “The Qur’ān encourages the use of ‘aql in reflecting on the signs of Allah’s greatness within the human self and in the universe. For example, Islamic education must be oriented toward ‘aql (neuroscience).)</i>

In the discussion of ‘aql as a trace of neuroscience, articles A1, A5, conclude the same point/interpretation from Qur’ānic verses on ‘aql. both emphasise that the Qur’an commands for humans to use the intellect ‘aql. Article A1 interpret verses sūrah al-Anfāl: 22. And Yāsin: 68

Command to use their intellect to reflect on Allah’s creation. To reflect . signalling that attention to neuroscience, as the discipline that study the brain is inspired by reflecting on the creation of human brain.

Article B3 highlights the concept of *ulū al-albāb* as one of the hints of neuroscience in the Qur’ān because it appreciate people who use their ‘aql/brain.²⁷ These studies interpret the concept of *ulū al-albāb* in the Qur’ān as referring to individuals with exemplary character. From this perspective, they argue that human excellence is determined by one’s thoughts and brain function. They conclude that *ulū al-albāb* represents those who have achieved optimal brain performance.

²⁷ Suyadi, “Learning Taxonomy of Islamic Education,”

3.2.2.2 Nāṣiyah

3.2.2.2.1 *The Meaning of Nāṣiyah in Tafsīr Salman: Scientific Interpretation of Juz ‘Amma of Sūrah al-‘Alaq: 15-16*

Table 3.12 Quotations Highlighting *Tafsīr Salman: Scientific Interpretation of Juz ‘Amma* as the Reference in Interpreting Nāṣiyah

Code	Quotation
B1	<i>“The trace of neuroscience in the Qur’ān can be identified through the concept of nāṣiyah (crown) mentioned in QS. 96:15–16. In Salman’s interpretation, the term nāṣiyah (fontanel) is understood as referring to the brain (ITB, 2014).”</i>
A4	<i>“Research findings indicate that the meaning of nāṣiyah is identical to that of “forehead.” In Salman’s interpretation, what is meant by “the crown” is the brain, especially the prefrontal cortex.”</i>
A6	<i>“The Brain and Neuroscience in Salman’s Interpretation.”</i>
A11	<i>“The results of the study show that the meaning of nāṣiyah is identical to “forehead.” In Tafsir Salman’s interpretation, what is meant by the crown is the brain, particularly the prefrontal cortex. Therefore, nāṣiyah is seen as a neurobiological trace of the brain in the Qur’ān.”</i>
A12	<i>“Tafsir Salman pada penafsiran naasiyah sebagai ubun-ubun, Di dalam ilmu fisiologi terkait ubun-ubun kerap dipadankan dengan otak depan atau lobus frontal. Naasiyah diterjemahkan sebagai pusat kesadaran, baik ke hendak jahat maupun baik. Ubun-ubun yang merupakan bagian empuk pada kepala (bagian kepala dekat dahi), bagian puncak kepala.”</i> <i>(Tafsir Salman’s interpretation of nāṣiyah as the ubun-ubun (fontanel). In physiological terms, the fontanel is often equated with the forebrain or frontal lobe. Nāṣiyah is interpreted as the centre of consciousness, whether for good or evil intent. The ubun-ubun refers to the soft part of the head (the area near the forehead), at the crown of the head.)</i>

A8	“menganalisis konsep Nāṣiyah dalam Tafsir Salman yang terdapat dalam QS. Al-Alaq ayat [96]: 15-16.” (Analyses the concept of nāṣiyah in Tafsir Salman found in QS. Al-‘Alaq [96]:15–16.)
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Nearly all studies that discuss *nāṣiyah* as a trace of neuroscience in the Qur’ān refer to the interpretation of the word *nāṣiyah* in sūrah al-‘Alaq: 15-16 in a tafsir book titled *Tafsīr Salman: Scientific Interpretation of Juz ‘Amma* (2014).

This *tafsīr* was compiled by 26 contributors, most of whom are experts in various natural sciences. It was initiated by a team from the Salman Mosque at the Bandung Institute of Technology (ITB). the team that initiate this tafsir explained that the motivation behind the this *tafsīr* is the belief that Qur’ān contains scientific signs that need to be uncovered. They stated that they are also inspired by the establishment of the Committee on Scientific Signs in the Qur’ān and Sunnah by the Muslim World League, *Rābiṭah al-‘Ālam al-Islāmī*.

Article B1 argue that *nāṣiyah* is a “trace of neuroscience” because in *Tafsir Salman: Scientific Interpretation of Juz ‘Amma* (2014), *nāṣiyah* in sūrah al-‘Alaq: 15-16 refers to a part of the brain . Articles A4 and A11 state the book interprets *nāṣiyah* as the brain, specifically, the “prefrontal cortex.” Article A12 cites an explanation from *Tafsir Salman: Scientific Interpretation of Juz ‘Amma* that, physiologically, the *ubun-ubun* (*nāṣiyah*) is often equated with the frontal lobe.

3.2.2.2.2 The Function of Nāṣiyah

Table 3.13 Quotations on the Similarity of Functions between Nāṣiyah and the Prefrontal Cortex

Code	Quotation
A4	"Nāṣiyah, whose function is the same as the brain..."

B1	<i>“Neurobiologically, the brain located behind the crown (nāṣiyah) is the prefrontal cortex. This part of the brain is responsible for critical thinking, planning, motivation, and initiating both good and bad actions, including expressing honesty or lying (Pasiak, 2012). In the Qur’ān, such brain functions are similar to ‘aql or thought.”</i>
A4	<i>“Research findings confirm that the meaning of nāṣiyah is identical to “forehead.” In Salman's interpretation, the crown refers to the brain, especially the prefrontal cortex.”</i>
A7	<i>“Secara neurobiology bagian otak yang berada dibalik ubun-ubun adalah kortek prefrontal yang tiada lain bertanggung jawab terhadap berpikir kritis, perencanaan, motivasi dan inisiasi berbuat baik dan buruk, termasuk menyatakan kejujuran dan kebenaran atau kebohongan. Dengan demikian diistilahkan nasyiyah dalam Alquran surat al-Alaq ayat 15-16 adalah otak manusia khususnya kortek prefrontal.”</i> <i>(Neurobiologically, the part of the brain located behind the ubun-ubun (crown) is the prefrontal cortex, which is responsible for critical thinking, planning, motivation, and initiating both good and bad actions, including declaring honesty or falsehood. Thus, the term nāṣiyah in Qur’ān sūrah al-‘Alaq: 15-16 refers to the human brain, particularly the prefrontal cortex.)</i>
A11	<i>“The study shows that the meaning of nāṣiyah corresponds to “forehead.” In Salman’s interpretation, the term refers to the brain, especially the prefrontal cortex. Therefore, nāṣiyah is considered a neurobiological trace of the brain in the Qur’ān.”</i>
A12	<i>“dalam tafsir ayat ini berfokus pada kata “naashiyah” yang memiliki arti ubun-ubun. Pada ayat ini tidak menyebutkan orang tersebut, namun ubun-ubun kepala. Ayat ini sangat penting dikaji yang pertama ialah bagian depan otak manusia bertanggung jawab atas pengendalian motorik gerak sadar dan pengendalian ekspresi emosi dan perilaku moral yang dikenal sebagai lobus frontal”</i>

	<i>(The interpretation of this verse focuses on the word nāṣiyah, meaning the crown of the head. The verse does not mention the person, but the nāṣiyah itself. This verse is important to study because the front part of the human brain is responsible for controlling voluntary motor movements and regulating emotional expression and moral behaviour, known as the frontal lobe)</i>
A12	<i>“Tafsir Salman pada penafsiran naasiyah sebagai ubun-ubun, Di dalam ilmu fisiologi terkait ubun-ubun kerap dipadankan dengan otak depan atau lobus frontal. Naasiyah diterjemahkan sebagai pusat kesadaran, baik ke hendak jahat maupun baik.”.</i> <i>(In Tafsir Salman, nāṣiyah is interpreted as the ubun-ubun (crown of the head). In physiology, this part is often equated with the front of the brain or the frontal lobe. Nāṣiyah is described as the centre of consciousness, governing both good and evil intentions.)</i>
A12	<i>“dalam surah Al-Alaq Dengan penyebutan kata nasiyah yang diartikan sebagai ubun-ubun. Bagian ini memiliki peran penting dalam sistem berfikir manusia (frontal lobe) dan sebagai jaminan pertanggung jawaban atas perbuatan keji dan mungkar yang telah diperbuat manusia”.</i> <i>(In sūrah al-‘Alaq, the use of the word nāṣiyah, understood as ubun-ubun, refers to a region that plays a key role in the human thinking system (frontal lobe), and as the locus of accountability for one’s immoral and wicked deeds.)</i>
B1	<i>“Neurobiologically, the brain behind the crown is the prefrontal cortex. This part of the brain functions to think critically, plan, motivate, and initiate good and bad deeds, including expressing honesty or lies (Pasiak, 2012) ... Thus, the term nāṣiyah in QS. Al-‘Alaq [96]:15–16 refers to the human brain, specifically the prefrontal cortex, which functions as ‘aql (thought).”</i>

Articles A4, A7, and B1 explicitly interpret *nāṣiyah* as the brain/prefrontal cortex based on the argument of functional similarity between the two.²⁸ Article B1 highlights the function of the prefrontal cortex, describing it as the part of the brain that functions to “think critically, plan, motivate, and initiate good and bad deeds, including expressing honesty or lies.” According to Article A7, the function of the prefrontal cortex is “to be responsible for critical thinking, planning, motivation, and initiating good and bad actions, including expressing honesty and truth or falsehood.” Meanwhile, Article A12 cites a view that the function of the frontal lobe, as the front part of the human brain, is responsible for controlling voluntary motor movement as well as regulating emotional expression and moral behaviour.²⁹

Table 3.14 Quotations Arguing that the Qur’ān Uses the Term *Nāṣiyah* to Refer to the Brain in the Absence of the Term “Brain”

Code	Quotation
B1	<i>“Historically, the term “brain” did not exist in the 7th century CE, the period when the Qur’ān was revealed. Therefore, the Qur’ān used a term commonly understood by society at that time, nasiyah or fontanel.”</i>
B1	<i>“The terms nasiyah and ‘aql had already emerged since the 7th century, but the terms brain and neuroscience only appeared in the 19th century and began to be discussed in the mid-1960s (Squire [ed.], 2008). Therefore, it is understandable that the Qur’ān does not explicitly mention the word brain, let alone neuroscience, because Arab society at the time did not yet understand what lies behind the nasiyah, which is the brain, now studied under neuroscience.”</i>

²⁸ Jailani *et al.*, “Critical Analysis of ‘*Aql and Brain*...”; Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘*Aql*...”; Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

²⁹ Muji and Pangestuti, “Teori Belajar Berbasis Neurosains,”

C1	<i>“istilah otak belum muncul pada abad 7 masehi, ketika alquran diturunkan, sehingga alquran menggunakan istilah umum yang telah dipahami masyarakat yakni nasiyah”</i> <i>(The term brain had not yet emerged in the 7th century CE, when the Qur’ān was revealed. Thus, the Qur’ān used a general term that was already understood by society at the time, namely nāṣiyah)</i>
A7	<i>“Secara historis kata, definisi otak belum muncul pada abad VII M ketika Alquran diturunkan, sehingga Alquran menggunakan pengertian umum yang telah banyak dikenal oleh masyarakat yakni nasiyah atau ubun-ubun.”</i> <i>(Historically, the definition of the word brain had not yet emerged in the 7th century CE when the Qur’ān was revealed. Therefore, the Qur’ān used a general concept that was commonly known in society, nasiyah or crown of the head.)</i>
A8	<i>“Hasil dari penelitian ini yakni mengargumentasikan bahwa istilah kata dari Nasiyah telah muncul sejak lama sebelum Al-Qur’an diturunkan sedangkan istilah dari otak baru muncul pada abad ke-19. Maka dari itu, tidak mengherankan jika interpretasi klasik belum menggunakan pendekatan ilmu saraf (neurosaintifik) “</i> <i>(The results of this study argue that the term nāṣiyah had existed long before the Qur’ān was revealed, whereas the term brain only appeared in the 19th century. Thus, it is not surprising that classical interpretations did not employ a neuroscientific approach.)</i>

3.2.2.2.3 Why Doesn't the Qur'ān Explicitly Mention the Term "Brain"?

To strengthen the argument for interpreting *nāṣiyah* as the brain, several articles offer explanations as to why the Qur'ān uses the term *nāṣiyah* instead of explicitly using the word 'brain'.

Articles B1 and A7 argue that the Qur’ān uses the word *nāṣiyah* to refer to the brain because the term brain had not yet emerged at the time the Qur’ān was revealed.³⁰ Therefore, the Qur’ān used a term already understood by Arab society, *nāṣiyah*. Article B1 states: “the Arab society did not yet understand what lies behind the crown (*nāṣiyah*), which is the brain, whose studies are now known as neuroscience.” Article B1 also adds that “the term brain and neuroscience only emerged in the nineteenth century and were discussed in the mid-1960s.”

Meanwhile, Article A8 slightly shifts the point of analysis by questioning why *nāṣiyah* had not previously been associated with the brain or neuroscience in classical *tafsīr* works. Article A8 states:

The result of this study argues that the term *nāṣiyah* had existed long before the Qur’ān was revealed, while the term brain only appeared in the 19th century. Therefore, it is not surprising that classical interpretations did not use a neuroscientific approach.³¹

3.2.2.3 Brain Activity

Table 3.15 Quotations Explaining Qur’ānic Terms on Brain and Mind Activity as Traces of Neuroscience

Code	Quotation
B2	<i>“Sedangkan neurosain mempunyai jejak di dalam Islam. Jejak neurosain dalam al-Quran dapat dijumpai pada istilah-istilah yang digunakan Al-Qur'an untuk menyebut aktifitas otak, seperti: tafakkur (berpikir), tadabur (merenung), tabashshur (memahami) dan lain sebagainya”.</i> <i>(Meanwhile, neuroscience has traces in Islam. The trace of neuroscience in the Qur’ān can be found in the terms used by the Qur’ān to refer to brain activities, such as tafakkur (thinking), tadabbur (reflecting), tabashshur (understanding), and others.)</i>

³⁰ Suyadi, “Hybridisation of Islamic Education and Neuroscience,”; Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘Aql...,”

³¹ Asrini and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

A10	<i>“Istilah neurosains juga terdapat dalam Al-Qur’an yaitu aktifitas otak yang meliputi tafakkur (berpikir), tadabbur (merenung), dan tabaṣṣur (memahami)”</i> <i>(The term neuroscience is also found in the Qur’ān, referring to brain activity, which includes tafakkur (thinking), tadabbur (reflecting), and tabaṣṣur (understanding).)</i>
A5	<i>“Ayat ayat alquran tentang neurosains dapat dilacak melalui istilah” kunci yang menyebut aktivitas otak”</i> <i>(Qur’ānic verses related to neuroscience can be traced through key terms that refer to brain activity.)</i>
A9	<i>“The verses of the Qur’ān that talk about the potential of learning and neuroscience describe the activity of the mind and the brain as tools for learning, understanding, studying, and analysing. These signals can be traced through key terminology related to human brain activity.”</i>
A9	<i>“Terdapat banyak isyarat di dalam al-Qur’an yang menjelaskan tentang aktivitas akal, ayat al-Qur’an yang tentang akal bisa di temuai pada terminology yang menyebutkan aktivitas otak (Neourosain)”</i> <i>(There are many indications in the Qur’ān that describe the activity of the intellect. The verses in the Qur’ān that refer to the intellect can be found in terminology that describes brain activity (neuroscience).)</i>
A5	<i>“Sumber data dalam penelitian ini adalah tafsir ayat-ayat Al-Qur’an tentang aktifitas berpikir atau ‘Aql.... Ayat-ayat Al-Qur’an tentang neurosains dapat dilacak melalui istilah-istilah kunci yang menyebut aktifitas otak.... Terdapat banyak ayat dalam Al-Qur’an yang menyebutkan tentang aktifitas akal”</i> <i>(The data source in this study is the interpretation of Qur’ānic verses about thinking activity or ‘aql... Qur’ānic verses on neuroscience can be traced through key terms that refer to brain activity... There are many verses in the Qur’ān that mention the activity of the intellect.)</i>

Several terms in the Qur’ān that are believed to describe brain or mind activity (*‘aql*), Qur’ānic terms associated with brain activity, are also interpreted as traces of neuroscience in the Qur’ān. These terms include: *naẓara*, *tadabbara*, *faqiha*, and *tafakkara*. Articles B2, A10, A9, and A5 state that these traces can be found in the Qur’ānic terms used to refer to brain activity.³²

Table 3.16 Qur’ānic Terms Interpreted as Referring to Brain or Mind Activity

Key Word	Verse
تفكر	3:190, 3:191, 2:219, 6:50, 7:176, 7:184, 10:24, 13:3, 16:11, 16:44, 16:69, 30:8, 30:21, 34:46, 39:42, 45:13, 59:21, 74:18
تدبر	38:29, 47:24
تذكر	3:190, 3:191, 16:17, 51:47–49, 39:9
تفقه / فقه	7:179, 17:44, 16:97–98, 9:12
تبشر	The verse is not mentioned.
نظر	50:6–7, 86:5–7, 88:17–20
اعتبر	The verse is not mentioned.
توسم	The verse is not mentioned.

³² Suyadi, “Integrasi Pendidikan Islam dan Neurosains,”; Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”; Izzati, “Potensi Pembelajaran Manusia...,”; Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...”

فَهْم	21:78–79
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In articles B3, A3, A5, and A9, these same terms are discussed in relation to the concept of '*aql*'.³³ Article B3 refers to these terms as the semantic field of '*aql*',³⁴ while article A3 describes them as meanings contained within the concept of '*aql*'.

3.2.2.4 *Khalīfah Fī Al-Ard*

In articles A10 and B.C3, verses about the role of humans as *khalīfah* (vicegerent) on earth are also discussed in relation to the traces of neuroscience in the Qur'ān, although not explicitly labeled as such.³⁵ Both articles argue that the verses regarding the human role as *khalīfah* contain indications about the brain. They contend that Allah appointed humans as *khalīfah* on earth because humans are the most perfect of all creatures on earth, and this perfection is due to their possession of '*aql*' (intellect). In article A10, '*aql*' is interpreted as "the brain's extraordinary ability." Meanwhile, article B.C3 explains that humans were made *khalīfah* on earth because Allah SWT has endowed humans with the best attributes.

Table 3.17 Quotations Linking Qur'ānic Verses on *Khalīfah* to Traces of Neuroscience in the Qur'ān

³³ Suyadi, "Learning Taxonomy of Islamic Education,"; Kasno, "Aql dan Otak dalam Kajian Neurosains...,"; Rofldi and Suyadi, "Tafsir Ayat-Ayat Neurosains...,"; Izzati, "Potensi Pembelajaran Manusia...,"

³⁴ In the contemporary era, Qur'ānic interpretation using the semantic approach is popularly associated with Toshihiko Izutsu (Izutsu, 1956). In another sense, regarding Qur'ānic semantics according to Izutsu, it refers to an analytical study of a key word in the Qur'an in order to uncover its *weltanschauung* (worldview), showing that the Qur'an possesses a clear vision concerning the universe. In Izutsu's thought, a semantic field is a group of interrelated words whose meanings are understood through their connections to one another. A word's meaning is not isolated but shaped by its position within this network. This semantic field reflects the underlying worldview of the text, such as the Qur'ānic worldview.

³⁵ Juliani, Sabili, and Suyadi, "Tafsir Ayat-Ayat Neurosains...,"; Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master's thesis, Institut PTIQ Jakarta, 2020),

Code	Quotation
A10	<i>“Demikianlah Allah SWT menciptakan manusia yang dilengkapi dengan kemampuan otak yang luar biasa sehingga diberi beban untuk menjadi khalifah di dunia ini. Seperti yang terdapat di dalam Qs. Al-Baqarah 30-31, dan 33”</i> <i>(Thus, Allah SWT created humans equipped with extraordinary brain capabilities, thereby entrusting them with the responsibility of becoming khalīfah (vicegerents) on this earth, as stated in sūrah al-Baqarah: 30-31 and 33.)</i>
A10	<i>“Sebagaimana penjelasan di atas, dapat disimpulkan bahwa manusia diciptakan dengan sebaik-baik penciptaan dengan dibekali akal. Kemampuan manusia inilah yang akhirnya membedakan dengan makhluk lain yang diciptakan Allah , sehingga amanah untuk menjadi khalifah diberikan kepada manusia”</i> <i>(As explained above, it can be concluded that humans were created in the best form and endowed with intellect (‘aql). It is this capability that distinguishes humans from other creatures created by Allah, and thus the trust (amanah) to become khalīfah was given to them.)</i>
B.C3	<i>“Demikianlah Allah SWT menciptakan manusia yang dilengkapi dengan kemampuan otak yang luar biasa sehingga diberi beban untuk menjadi khalifah di dunia ini. Seperti yang terdapat di dalam Qs. Al-Baqarah 30-31”</i> <i>(Thus, Allah SWT created humans equipped with extraordinary brain capabilities, thereby entrusting them with the responsibility of becoming khalīfah on this earth, as stated in sūrah al-Baqarah: 30–31.)</i>
B.C3	<i>“Otak prefrontal banyak dikaitkan dengan fungsi eksekutif yaitu fungsi yang sangat penting bagi manusia sebagai seorang khalifah di dunia.....Demikianlah Allah SWT menciptakan manusia yang dilengkapi dengan kemampuan otak yang luar biasa sehingga diberi</i>

	<i>beban untuk menjadi khalifah di dunia ini... Untuk menjalankan misi-misinya sebagai khalifah fi al-ardh, yakni pemelihara, pengelola, dan penjaga bumi, maka Allah memberi bekal atau modal berupa fitrah, 'aql, nafs, dan qalb... Sebagai khalifah, seorang muslim wajib memiliki fisik yang kuat”.</i> <i>(The prefrontal brain is often associated with executive function, which is crucial for humans in their role as khalīfah on earth. ... Thus, Allah SWT created humans equipped with extraordinary brain capacity to carry out their mission as khalīfah fi al-ard, that is, as guardians, managers, and caretakers of the earth. To support this mission, Allah provided humans with essential faculties such as fitrah (natural disposition), 'aql, nafs (self), and qalb (heart). As a khalīfah, a Muslim is required to have physical strength.)</i>
A10	<i>“Allah menciptakan manusia sebagai makhluk yang unggul dari ciptaan lainnya, bahkan kedudukannya melebihi malaikat dalam penciptaannya. Hal ini tertuang dalam QS. Al-Isra dan At-Tiin..... Dalam tafsir Ibnu Katsir telah dijelaskan bahwa kedua ayat ini merupakan penjelasan dari penciptaan manusia dengan segala keunggulannya. Allah SWT telah memberi manusia sifat yang sebaik-baiknya, anggota tubuh yang seimbang, sempurna, dan tidak kekurangan suatu apapun. Kesemuanya itu semata-mata adalah tanda-tanda kekuasaan Allah atas penciptaan dan pengembalian manusia pada hari kebangkitan. Keunggulan manusia dalam penciptaannya juga berimplikasi dengan kesanggupannya dalam menerima amanah sebagai khalifah di bumi”</i> <i>(Allah created humans as superior beings among His creations, even above the angels in their creation. This is reflected in sūrah al-Isra and al-Tin. According to Ibn Kathir's interpretation, these two verses explain the excellence in the creation of humans. Allah SWT has endowed humans with the best characteristics, a balanced and perfect physique, lacking in nothing. All of these are signs of Allah's power in the creation and resurrection of humankind. The excellence</i>

	<i>of humans in their creation also implies their capacity to carry the trust as khalīfah on earth.)</i>
B.C3	<i>“Islam sebagai agama yang membawa misi rahmatan lil alamin sangat menekankan manusia melaksanakan amanahnya untuk menggerakkan segala potensinya karena ia sebagai khalifah di bumi. Amanah itu ialah bagaimana manusia mampu memahami rahasia Illahi yang disimpan dibalik alam jagad raya ini. Dengan akal manusia mampu menciptakan ilmu pengetahuan yang akan menjawab semua misteri dibalik alam jagad raya ini”</i> <i>(Islam, as a religion that carries the mission of rahmatan lil ‘alamin (mercy to all creation), strongly emphasises that humans must fulfil their trust by maximising all of their potential as khalīfah on earth. This trust involves how humans are capable of understanding the Divine secrets hidden behind the universe. With intellect (‘aql), humans are able to develop knowledge that will unveil all the mysteries of the universe.)</i>

3.2.2.5 *Aḥsani Taqwīm*

In addition to the concept of humans as caliphs on earth, there is also the concept of *aḥsani taqwīm* or the most perfect being, which is believed to suggest a connection to the brain. Article A10, for instance, argues that sūrah al-Isrā’: 70, which mentions the superiority of humans over other creatures, and sūrah al-Tīn: 4, which states that humans were created in the best form, contain indications related to the brain.³⁶ This article supports its argument by referring to Ibn Kathīr’s interpretation of these verses, in which he mentions that one form of human superiority lies in physical perfection. This is linked to the idea that the human brain is the most perfect among all creatures. Other writers argue that when the Qur’ān refers to humans as the most perfect beings, the comparison is made with animals, and what distinguishes the two is the human capacity for thought. Therefore, they believe that these verses imply a reference to the

³⁶ Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

brain. Article B.C3 cites sūrah al-A'raf: 179, which describes people who have hearts, eyes, and ears but do not use them to understand, see, or hear Allah's guidance.³⁷ ~~They are then likened to cattle.~~ The author of this article understands that the verse implies the importance of brain function, as it shows that the difference between humans and animals lies in cognitive ability.

3.2.3 Implications of the Traces of Neuroscience in the Qur'ān

After explaining the traces of neuroscience in the Qur'ān, these articles then discuss the implications of these findings for Islamic education. The authors conclude that the presence of traces of neuroscience in the Qur'ān carries several important implications. First, these traces can serve as a theological justification for integrating neuroscience into Islamic education, as well as initial evidence legitimising the presence and development of this science from an Islamic perspective. Second, they serve as a basis for developing a new paradigm in Islamic education that focuses on utilising the brain's potential and human cognitive abilities, including integrating neuroscience findings into Islamic curricula and learning approaches. Qur'ānic verses that were previously understood only spiritually are now given an additional dimension as guidance for advancing scientific knowledge and brain-based education within the Islamic framework.

In addition, the authors emphasise that the presence of neuroscience traces in the Qur'ān can serve as a foundation for developing critical, creative, and innovative thinking within Islamic education systems. These traces are seen as normative and theological grounds for promoting the development of the potential of *'aql* (reason) in students. This finding is also considered to demonstrate the harmony between religion and science, as the Qur'ān is believed to contain early signals that align with modern neuroscience discoveries, indicating no contradiction between revelation and scientific knowledge. Furthermore, some authors state that neuroscience has, in fact, been implicitly present in Islamic civilisation since the revelation of the Qur'ān, even if it had not yet been systematically recognised as it is today. More broadly, this idea also provides moral and spiritual motivation for students to better understand themselves,

³⁷ Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master's thesis, Institut PTIQ Jakarta, 2020)

comprehend the function of their brains, and be encouraged to study and reflect on the biological and mental realities within themselves, following the Qur’ānic verses that emphasise the importance of thinking, using reason, and contemplating God’s creation.

3.3 METHOD OF INTERPRETATION

3.3.1 The Presence of Preconceived Notions

In this section, I will argue that in the interpretive process of Qur’ānic verses within this body of literature, the outcome of the interpretation was predetermined. That outcome is the assertion that neuroscience has traces in the Qur’ān (i.e., the existence of traces of neuroscience in the Qur’ān). An analysis of the interpretive process shows that this predetermined conclusion significantly influences the subsequent interpretive steps.

Table 3.18 Quotations Reflecting the View that the Qur’ān Contains No Traces of Neuroscience

Code	Quotation
A4	<i>"The main problem in this research is that neuroscience has so far been considered a secular science because there is no explicit trace of it in the Qur’ān. Therefore, this science is less developed in Islamic education because it does not have formal legitimacy in sources of Islamic law related to scientific studies, namely the Qur’ān and Sunnah."</i>
A5	<i>“Pengembangan akal pikiran atau berpikir kreatif inovatif dalam Pendidikan Islam selama ini dipandang tidak memiliki landasan normatif dan teologis dalam Alquran.... menganalisis konsep ‘Aql dalam Al-Qur’an sebagai landasan normatif-teologi berpikir kritis, kreatif dan inovatif dalam pendidikan Islam”</i> <i>(The development of reason or creative and innovative thinking in Islamic education has so far been seen as lacking normative and theological foundations in the Qur’an... This study analyses the concept of ‘Aql in the</i>

	<i>Qur'ān as a normative-theological foundation for critical, creative, and innovative thinking in Islamic education.)</i>
A6	<i>“Penelitian bertujuan untuk menyelidiki hubungan antara neurosains dan prinsip-prinsip Islam, dengan mengatasi pandangan bahwa neurosains belum dianggap sebagai disiplin ilmu Islam karena muncul setelah turunnya Al-Qur'an dan As-Sunnah pada abad ke-7”</i> <i>(This research aims to investigate the relationship between neuroscience and Islamic principles by addressing the view that neuroscience has not yet been considered an Islamic scientific discipline, as it emerged after the revelation of the Qur'ān and Sunnah in the 7th century.)</i>

Articles A4, A5, and A6 clearly state that their examination of Qur'ānic verses is motivated by the assumption that there is no trace of neuroscience in the Qur'ān.³⁸ Article A6 explicitly states that the study aims to evaluate or refute this assumption. The analysis of Qur'ānic verses in these works seeks to demonstrate that neuroscience does indeed have “traces in the Qur'ān.”

Table 3.19 Quotations on Verses Already Labelled as “Neuroscience Verses”

Code	Quotation
A10	<i>“The purpose of this article is to interpret verses about neuroscience”</i>
A9	<i>“The verses of the Al-Quran which talk about the potential of learning and neuroscience, describe the activity of the mind”</i>

³⁸ Jailani *et al.*, “Critical Analysis of ‘Aql and Brain...’”; Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Jailani, “Exploring the Development of Neuroscience...”

Article A10 states that the study was conducted to interpret “verses about neuroscience”.³⁹ From this, it is evident that even before the interpretation was carried out, the verses had already been labeled as “verses about neuroscience.” A similar case can be seen in article A9, which states that “the verses that talk about neuroscience are those that describe the activity of the mind.”⁴⁰ This phrase gives the impression of answering the question, “Which Qur’ānic verses discuss neuroscience?” This strengthens the argument that “identifying neuroscience-related verses” was a goal predetermined from the outset.

Table 3.20 Quotations Indicating that Interpretations Begin from the Belief that the Qur’ān Discusses Neuroscience

Code	Quotation
A5	<i>“Ayat-ayat Al-Qur’an tentang neurosains dapat dilacak melalui istilah-istilah kunci yang menyebut aktifitas otak.”</i> <i>(Qur’ānic verses about neuroscience can be traced through key terms that refer to brain activity.)</i>
A7	<i>“Neurosains dalam pendidikan Islam mempunyai jejak basis neurobiologis dapat dilacak pada AlquranKajian neurosains dapat dilacak jejaknya dalam alquran”</i> <i>(Neuroscience in Islamic education has neurobiological traces that can be identified in the Qur’ān.)</i>
B2	<i>“Jejak neurosain dalam al-Quran dapat dijumpai pada istilah-istilah yang digunakan Al-Qur'an untuk menyebut aktifitas otak”</i>

³⁹ Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,” .

⁴⁰ Izzati, “Potensi Pembelajaran Manusia...,”

	<i>(The study of neuroscience can be traced in the Qur'ān. Traces of neuroscience in the Qur'an can be found in the terms used by the Qur'ān to refer to brain activity.)</i>
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Phrases such as “Qur’ānic verses about neuroscience can be traced through” (A5), “neuroscience can be traced in the Qur’ān” (A7), and “traces of neuroscience in the Qur’ān can be found in the terms” give a strong impression that the interpretive process or analysis of Qur’ānic verses in these articles begins with a pre-existing belief that the Qur’ān discusses neuroscience.⁴¹ These articles then aim to demonstrate that neuroscience has a presence in the Qur’ān that can be “traced” or “found.”

The use of phrases such as “can be traced,” “can be found,” and “contains traces” indicates that interpretation does not begin with an open question, but rather with a presupposition that the Qur’ān indeed addresses neuroscience. The interpretive process is then carried out to support and reveal that assumption.

From a linguistic and logical perspective, the use of terms such as “traced” or “found” implies that something already exists and merely needs to be discovered, suggesting a post-justificatory line of reasoning rather than an open inquiry.

In addition, statements such as “neuroscience has traces in Islam”, “neuroscience has clear indications in the Qur’ān”, and “it turns out that neuroscience in the 19th century was already present in Islamic civilisation along with the revelation of the Qur’ān”, indicate that the main focus of the analysis is on neuroscience itself, rather than a thorough investigation of the Qur’ānic verses being referenced.⁴²

Table 3.21 Quotations Indicating Neuroscience as the Main Focus Rather than the Qur’ānic Verses

⁴¹ Rofdlī and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘Aql...,”

⁴² Nurjanah et al., “Konsep ‘Aql dalam Al-Qur’an dan Neurosains,”; Kasno, “Aql dan Otak dalam Kajian Neurosains...”; Jailani et al., “Critical Analysis of ‘Aql and Brain...,”

Code	Quotation
A1	<i>“Neuroscience memiliki jejak dalam islam..“Neurosains dalam islam: Konsep ‘aql dalam alquran”</i> <i>(Neuroscience has traces in Islam... “Neuroscience in Islam: The Concept of ‘Aql in the Qur’ān)</i>
A3	<i>“apa yang ditemukan dari penelitian neurosains pada saat ini sesungguhnya telah mempunyai sinyalemen yang cukup tegas didalam al-Qur’an.”</i> <i>(What has been discovered through contemporary neuroscience research in fact already has clear indications in the Qur’ān.)</i>
A4	<i>“It turns out that the science of neuroscience in the 19th century was very broad and was already present in Islamic civilisation along with the revelation of the Qur’ān.”</i>
A5	<i>“Ayat-ayat Al-Qur’an tentang neurosains”</i> <i>(Verses of the Qur’ān about neuroscience)</i>
A6	<i>“The study of neuroscience in the 19th century was already expansive and present in Islamic civilisation since the revelation of the Qur’ān in the 7th century.”</i>
A7	<i>“Neurosains dalam pendidikan Islam mempunyai jejak basis neurobiologis dapat dilacak pada Alquran... Kajian neurosains dapat dilacak jejaknya dalam alquran”</i> <i>(Neuroscience in Islamic education has neurobiological foundations that can be traced in the Qur’ān.... The study of neuroscience can be traced in the Qur’an.)</i>
A9	<i>“The verses of the Qur’ān which talk about the potential of learning and neuroscience describe the activity of the mind.”</i>
A10	<i>“Neurosains dalam Al-Qur’an:. Istilah neurosains juga terdapat dalam Al-Qur’an yaitu aktifitas otak...”</i>

	<i>(Neuroscience in the Qur’ān: ...The term neuroscience is also found in the Qur’ān, referring to brain activity.....The purpose of this article is to interpret verses about neuroscience.)</i>
A11	<i>“The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning of (nāṣiyah).”</i>
B1	<i>“The neuroscience that emerged in the 19th century was basically a development of the critical study of the concept of nāṣiyah in the Qur’ān.”</i>
B2	<i>“Jejak neurosain dalam al-Quran dapat dijumpai pada istilah-istilah yang digunakan Al-Qur'an untuk menyebut aktifitas otak “</i> <i>(Traces of neuroscience in the Qur’ān can be found in the terms used by the Qur’ān to refer to brain activity.)</i>

However, several articles, in their statements regarding the purpose of the study, state that the interpretation process begins with an exploration of Qur’ānic verses. Articles A3, A4, and A8 clearly indicate that the initial objective of the study is to analyse verses, terms, or concepts in the Qur’ān such as ‘aql and nāṣiyah, with neuroscience being used as the perspective through which interpretation is carried out.⁴³

Table 3.22 Quotations Indicating an Initial Focus on Analysing Qur’ānic Verses, Terms, Or Concepts

Code	Quotation
A3	<i>“This article aims to examine the concept of ‘aql based on the neuroscience and the Qur’ān perspective”</i>
A4	<i>“The purpose of this study is to analyse the meaning of nasyiyah in the interpretation of Salman from a neo-science perspective..... Research</i>

⁴³ Kasno, “Aql dan Otak dalam Kajian Neurosains...”; Jailani *et al.*, “Critical Analysis of ‘Aql and Brain...”; Asrini and Suyadi, “Tafsir Ayat-Ayat Neurosains...”

	<i>results prove that the meaning of nasyiyah is identical to the meaning (forehead)”</i>
A8	<i>“maka dari itu artikel ini bertujuan untuk menganalisis konsep nasyiyah dalam Tafsir Salman yang terdapat dalam QS. Al-Alaq ayat [96]: 15-16”</i> <i>(Therefore, this article aims to analyse the concept of nāṣiyah in Tafsir Salman as found in sūrah al-‘Alaq: 15-16.)</i>

Studies that have predetermined from the outset that there are traces of neuroscience in the Qur’ān, and then set their discussion to demonstrate those traces, have thus established the orientation of their analysis to focus on the existence of signs or indicators ~~believed to be~~ "traces" of neuroscience. As a result, their analysis is confirmatory in nature. In this context, a “trace” is interpreted as the presence of terms, words, or concepts that can be directly associated with neuroscience.

Because these articles narrow their focus to proving the existence of neuroscience traces in the Qur’ān, the nature of their analysis is no longer exploratory or aimed at uncovering the Qur’ān’s broader perspective. For example, they do not begin with open-ended questions such as how the Qur’ān views human cognition, the human body, or how neuroscience might be understood from the Qur’ān’s perspective.

3.3.2 The Brain as a Starting Point to Explore Neuroscience in the Qur’ān

As previously explained, the starting point in the analysis of this literature is neuroscience, a phenomenon of the modern world that is, of course, not explicitly mentioned in the Qur’ān. To address this issue, these works of literature focus their attention on the term “neuroscience” by identifying its core as the study of the brain.

In this context, the “brain,” as the object of study in neuroscience, is used as an entry point to identify signals, traces, or verses in the Qur’ān that are considered to be related to neuroscience. This is evident from the reasoning behind the selection of

keywords or concepts, namely, the choice of terms believed to describe brain activity, share the same function as the brain, or directly refer to the brain.

Table 3.23 Quotations Indicating the Brain as the Starting Point for Exploring Neuroscience in the Qur'ān

Code	Quotation
A5	<i>“Ayat-ayat Al-Qur'an tentang neurosains dapat dilacak melalui istilah-istilah kunci yang menyebut aktifitas otak”</i> <i>(Verses of the Qur'ān related to neuroscience can be traced through key terms that mention brain activity.)</i>
A10	<i>“Istilah neurosains juga terdapat dalam Al-Qur'an yaitu aktifitas otak”</i> <i>(The term neuroscience is also found in the Qur'ān, namely in references to brain activity...)</i>
B2	<i>“Jejak neurosain dalam al-Quran dapat dijumpai pada istilah-istilah yang digunakan Al-Qur'an untuk menyebut aktifitas otak”</i> <i>(Traces of neuroscience in the Qur'an can be found in the terms the Qur'ān uses to refer to brain activity)</i>

Table 3.24 Quotations Showing Verses Linked to the Brain Interpreted as Neuroscience in the Qur'ān

Code	Quotation	
	Brain in the Qur'ān	Neuroscience in the Qur'ān
A7	<i>“Basis Neurobiologis Otak dalam Alquran”</i>	<i>“kajian Neurosains dapat dilacak jejaknya Dalam Alquran Surat al-Alaq ayat 15-16”</i>

	<i>(The Neurobiological Basis of the Brain in the Quran)</i>	<i>(Neuroscience studies can be traced in the Quran, specifically in sūrah al-‘Alaq 15-16.)</i>
A11	<i>“The discovery of the concept of nāṣiyah as the neurobiological basis of the brain in the Quran”</i>	<i>“The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning (nāṣiyah) in the Quran which some commentators define as “the crown”</i>
B1	<i>“the concepts of nasiyah (crown) and aql (mind) in the Quran have a correlation with the brain and mind in neuroscience”</i>	<i>“the neuroscience that emerged in the 19th century was basically a development of the critical study of the concept of nashiyah in the Quran”</i>
A10	<i>“hal ini merupakan hikmah tersembunyi untuk memotivasi manusia agar memperhatikan dirinya, menggunakan otaknya, untuk meneliti (men-tafakkuri dan men-tadabburi) tentang organ otak. “ (This is a hidden wisdom intended to motivate humans to pay attention to themselves, to use their brains, and to reflect (tafakkur and tadabbur) on the brain as an organ.)</i>	<i>“Neurosains dalam Al-Qur’an: ... Istilah neurosains juga terdapat dalam Al-Qur’an yaitu aktifitas otak ...” (The purpose of this article is to interpret verses about neuroscience “Neuroscience in the Qur’ān.... The term neuroscience is also found in the Qur’ān, referring to brain activity.... The purpose of this article is to interpret verses about neuroscience)</i>

Table 3.25 Quotations Indicating the Brain as the Starting Point for Exploring Neuroscience in Qur’ānic Verses about ‘Aql

Code	Quotation	
	‘Aql in the Qur’ān	Neuroscience in the Qur’ān
A1	“Dalam alquran istilah otak tidak dikenal, untuk menggambarkan kecerdasan menggunakan istilah akal” (In the Qur’ān, the term "brain" is not used; to describe intelligence, the term 'aql is used.)	“Neurosains dalam Al-Qur’an :Istilah neurosains juga terdapat dalam Al-Qur’an yaitu aktifitas otak.....The purpose of this article is to interpret verses about neuroscience” (Neuroscience has traces in Islam "Neuroscience in Islam The concept of ‘aql in the Qur’ān)
A3	“aql dalam alquran adalah simbosa potensi diskursif (kecerdasan intelektual) dan potensi intuitif (kecerdaan emosional) “ (‘Aql in the Qur’ān symbolizes both discursive potential (intellectual intelligence) and intuitive potential (emotional intelligence).	“apa yang ditemukan dari penelitian neurosains pada saat ini sesungguhnya telah mempunyai sinyalemen yang cukup tegas didalam al-Qur’an.” (What has been discovered in current neuroscience research actually already has clear indications in the Qur’ān.)
A7	“Basis Neurobiologis Otak dalam Alquran Dapat ditelusuri jejaknya dengan bertumpu pada konsep akal sebagai kata kuncinya.” (The neurobiological basis of the brain in the Qur’ān can be traced	“kajian Neurosains dapat dilacak jejaknya Dalam Alquran Surat” (Neuroscience studies can be traced in the Qur’ān through sūrahs...)

	<i>by referring to the concept of 'aql as the key term.)</i>	
B1	<i>"The results of the study showed that the concepts of nasiyah (crown) and „aql (mind) in the Qur'ān have a correlation with the brain and mind in neuroscience"</i>	<i>"the neuroscience that emerged in the 19th century was basically a development of the critical study of the concept of nashiyah in the Qur'ān"</i>

Table 3.26 Quotations Indicating the Brain as the Starting Point for Exploring Neuroscience in Qur'ānic Verses about Nāṣiyah

Code	Quotation
B1	<i>"The trace of neuroscience in the Qur'ān can be traced through the concept of "nasiyah" (crown) which is stated in QS. 96: 15-16. In Salman's interpretation, the term "nasiyah" (fontanel) is a term intended to refer to the brain (ITB, 2014)."</i>

Code	Quotation	
	Nāṣiyah in the Qur'ān	Neuroscience in the Qur'ān
A4	<i>"Research results prove that the meaning of nasiyah is identical to the meaning (forehead). In Salman's interpretation, what is</i>	<i>"It turns out that the science of neoruscians in the 19th century was very broad and was already present in Islamic civilisation along with the revelation of the Qur'ān"</i>

	<i>meant by the crown is the brain, especially the prefrontal cortex.”</i>	
A11	<i>“Results of the study show that the meaning of <i>nāṣiyah</i> is identical to the meaning (forehead). In Salman’s interpretation, what is meant by the crown is the brain, especially the prefrontal cortex. Therefore, <i>nāṣiyah</i> is a neurobiological trace of the brain in the Quran.”</i>	<i>“The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning (<i>nāṣiyah</i>) in the Quran which some commentators define as “the crown”</i>

3.3.3 Identifying Traces

The approach used to identify traces of neuroscience in the Qur’ān is by examining references to the brain in the Qur’ān. There are two approaches found in the literature for identifying such traces:

3.3.3.1 Key Words

The first type focuses on words or terms. These words or terms are considered to be directly related to the brain. They are directly interpreted/understood as referring to the brain or its functions. Included in this category are the word *nāṣiyah*, the concept of ‘*aql*’ (words derived from the root ‘*aql*’), and verbs associated with brain activity, such as *tafakkur*, *tadabbur*, and others.

Arguments concerning brain/neuroscience traces based on literal terminology are most commonly found in the literature. This terminology-based approach tends to focus on the fact that these terms appear in the Qur’ān. A "trace" in the Qur’ān is

interpreted as a term that is literally mentioned. Therefore, the analysis is conducted to determine whether the Qur'ān mentions certain specific terms.

Table 3.27 Quotations Highlighting a Keyword-Based Approach to Identifying Traces of Neuroscience in the Qur'ān

Code	Quotation
A5	<i>“Ayat ayat alquran tentang neurosain dapat dilacak melalui istilah” kunci yang menyebut aktivitas otak”</i> <i>(Verses of the Qur'ān related to neuroscience can be traced through key terms that refer to brain activity)</i>
A9	<i>“these signals can be traced through key terminology related to human brain activity.”</i>
A10	<i>“Istilah neurosains juga terdapat dalam Al-Qur'an yaitu aktifitas otak”</i> <i>(The term neuroscience is also found in the Qur'ān, namely in references to brain activity)</i>
A7	<i>“Temuan terhadap penelusuran jejak neurosains tersebut, bertumpu pada konsep “akal” sebagai kata kuncinya”</i> <i>(The findings from the tracing of neuroscience references are based on the concept of ‘aql as the key term).</i>
B2	<i>“Traces of neuroscience in the Qur'ān can be found in the terms it uses to describe brain activities, such as tafakkur (thinking), tadabbur (reflecting), tabashshur (understanding), and others. The creative interpretation of tafakkur is considered as a form of neuroscience within these terms.”</i>
A11	<i>“The findings of the Neuroscience tracing rest on the concept of “reason” as the keyword”</i>

A1	<i>“In the Qur’ān, the term 'brain' is not used; instead, the term ‘aql (intellect) is employed to describe intelligence. The brain represents the meaning of ‘aql in its physical dimension.”</i>
A8	<i>“This finding can be traced back to studies in Islamic education and neuroscience, with the concept of ‘aql (intellect) serving as the key term.”</i>
A11	<i>“Nāṣiyah is a neurobiological trace of the brain in the Qur’ān.”</i>

Table 3.28 Keywords Believed to Indicate Traces of Neuroscience in the Qur’ān

No	Keywords	Verses
1	عقل	8:22
2	ناصية	96:15, 96:16, 11:56, 55:42, 96:13, 96:16, 55:42,
3	تفكر	3: 190, 3:191, 2:219, 6:50, 7:176, 7:184, 10:24, 13:3, 16:11, 16:44, 16:69, 30:8, 30:21, 34:46, 39:42, 45:13, 59:21, 74:18

4	تدبر	47:24
5	تذكر	3:190, 3:191
6	تفقه	7:179
7	تبصر	The verse is not mentioned.
8	نظر	The verse is not mentioned.
9	اعتبر	The verse is not mentioned.
10	توسم	The verse is not mentioned.

3.3.3.2 Concept

Meanwhile, the second pattern does not focus on specific terms but rather on the overall meaning of the verse. The connection to the brain is drawn from the conceptual meaning of the verse, rather than the literal meaning of individual words. The association between the brain and the selected terms/concepts is more reflective, semantic, and indirect. Included in this category are verses that discuss the concept of humans as vicegerents on earth (sūrah al-Baqarah: 30) and verses about humans as perfect beings (sūrah al-Tīn: 4). These concepts are then linked to neuroscience as a scientific explanation of human superiority. These articles conclude that the special status of humans is related to the superiority of the human brain, thus interpreted as the Qur'ān's implicit indication of neuroscience.

Table 3.29 Concepts Believed to Indicate Traces of Neuroscience in the Qur'ān

No	Concept	Verse
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1	أحسن تقويم	95:4
2	خليفة في الأرض	2:30, 2:31

3.3.4 Compiling Verses

After presenting the key terms or concepts believed to be traces of neuroscience in the Qur’ān, these articles attempt to compile verses that contain such terms or concepts.

The approach generally used in compiling these verses focuses on mapping the terms by stating how many times they appear in the Qur’ān, and conducting morphological analysis of these terms, observing variations in word forms such as past and present verb forms (*al-fi ‘l al-māḍī*, *al-fi ‘l al-muḍāri ‘*). In some articles like A5 and A9, from the total number of identified verses, several are selected for detailed discussion.⁴⁴

Article A2 mentions the number of occurrences and word forms of a term in the Qur’ān, without stating the specific verse or sūrah, nor providing the full verse text.

In the Qur’ān it is explained that the word ‘aql (intellect) is mentioned 49 times in the past verb form, including ‘aqala (1 time), ya’qilun (22 times), na’qilu (1 time), ya’qiluha (1 time), ta’qilun (24 times), and 48 times in the present verb form.⁴⁵

In the same article, it is stated that the word *tazakkara* appears in 40 different verses, but only 2 locations are mentioned:

Tazakkara appears in more than 40 verses in the Qur’ān such as QS. 16:17 and QS. 39:9. The word *tazakkara* means to remember, to gain, to receive a lesson, to pay attention, and to study.

Article A3 compiles verses containing the concept of ‘aql, then connects it to the word *faqih* in the Qur’ān:

Based on 49 verses that mention ‘aql, the meaning includes understanding, thinking, and comprehension. However, the concept of

⁴⁴ Rofdlī and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Izzati, “Potensi Pembelajaran Manusia...,”

⁴⁵ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

thinking is also expressed in the Qur’ān using other words such as *faqiha*, which means to understand (QS. 17:44, QS. 16:97-98, QS. 9:12).⁴⁶

Articles A5 and A9 state how many times the term *tafakkara* appears in the Qur’ān, specifying the sūrah and verse.⁴⁷ Then they select four verses, including the full Arabic text and translation, a synthesis of the compiled verses, and a brief discussion.

Meanwhile, Article A10 maps the distribution of the word *tafakkur* in the Qur’ān by listing the relevant verses, but without synthesising the verses or discussing their content.

The term neuroscience is also found in the Qur’ān, referring to brain activity such as *tafakkur* (thinking), *tadabbur* (contemplating), and *tabaṣṣur* (understanding). Some Qur’ānic verses that use these neuroscience-related terms (*tafakkur*) include: al-Baqarah : 219; Ali-Imran: 191; al-An‘am: 50; al-A‘raf : 176 & 184; Yunus : 24; al-Ra‘d: 3; al-Nahl: 11, 44 & 69; al-Rum: 8 & 21; Saba’: 46; al-Zumar: 42; al-Jatsiyah: 13; al-Hasyr: 21; and al-Muddatstsir: 18.⁴⁸

Articles A8, A11, and B1 focus on the word *nāṣiyah* in sūrah al-‘Alaq: 15-16.⁴⁹

3.3.5 Synthesis: Conclusion from the Compilation of Verses

After compiling verses that contain terms such as *‘aql*, these articles attempt to formulate general conclusions about the concept of intellect in the Qur’ān. Articles A5, A9, and A6 emphasise that the frequency of the term *‘aql* appearing in the Qur’ān indicates the importance of intellect in human life. In this case, linguistic frequency is used as an indicator of emphasis on meaning.⁵⁰

Table 3.30 Quotations Showing Examples of Synthesis from Compiled Verses

Code	Quotation
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⁴⁶ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

⁴⁷ Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Izzati, “Potensi Pembelajaran Manusia...,”

⁴⁸ Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

⁴⁹ Asrini and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Suyadi and Jailani, “The Concept of ‘Aql and Brain,”; Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

⁵⁰ Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Izzati, “Potensi Pembelajaran Manusia...”; Jailani, “Exploring the Development of Neuroscience...,”

A5	<i>“sementara itu lafal ‘aql....terdapat dalam alquran di 49 tempat...hal itu secara tersirat, alquran sangat memberi perhatian besar terhadap akal”</i> <i>(Meanwhile, the word ‘aql appears in 49 places in the Qur’ān... this implicitly shows that the Qur’ān pays significant attention to the intellect.)</i>
A9	<i>“persebaran ayat yang berbicara tentang akal dengan berbagai konteksnya, telah menunjukkan betapa pentingnya posisi akal dalam ajaran islam”</i> <i>(The distribution of verses that speak about intellect in various contexts shows how important the role of ‘aql is in Islamic teachings.)</i>
A6	<i>“Meanwhile, the term "aql" in the Qur'an is mentioned in various forms and verb pronunciations, totaling 49 occurrences. Implicitly, the Qur'an places great emphasis on the importance of intellect and its application in life, particularly in seeking the truth”.</i> <i>(Meanwhile, the term ‘aql in the Qur'an is mentioned in various forms and verb conjugations, totaling 49 occurrences. Implicitly, the Qur’ān places great emphasis on the importance of intellect and its application in life, particularly in seeking the truth.)</i>
A6	<i>“Qur'an's emphasis on the importance of ‘aql which believed to be manifested by the frequency with which the terms appear throughout the Qur'an is one of the recurring arguments in the literature.”</i> <i>(The Qur'an's emphasis on the importance of ‘aql, believed to be manifested by the frequency of its occurrence throughout the Qur’ān, is one of the recurring arguments in the literature.)</i>

In analysing the compilation of verses containing the concept of *‘aql*, one article highlights the changes in word forms/morphological analysis as the basis for drawing conclusions. After analysing various verses, they conclude that the Qur’ān emphasises

the command to “use reason.” All verb forms derived from *‘aql* are understood as calls to use the intellect and to think.

All the word forms of *‘aql* contained in the Qur’ān command us to always use reason when thinking... the intellect functions to think and to search for understanding... (M. Arif Setiawan, 2019).

3.3.6 Linguistic Analysis

Articles discussing *‘aql* and *nāṣiyah* as traces of neuroscience present a basic linguistic analysis of these terms. This linguistic analysis includes morphological analysis, lexical meaning analysis, and definitions from Arabic dictionaries (*mu‘jam*).

Article A1 mentions two meanings of *‘aql*: to prevent and to restrain. However, this discussion refers to a secondary source, specifically a journal article:

Akal comes from the Arabic word *al-‘aql*, which means to prevent and to restrain.⁵¹

Article A10 explains the root of the word *‘aql* and lists three meanings: understanding, comprehension, and thinking. This explanation also relies on a secondary source (a journal article):

Linguistically, *‘aql* in Arabic comes from the word *al-‘aql*. Its root is *‘aqala–ya‘qilu–‘aqlan*, which means to understand, to comprehend, or to think.⁵²

Article A5 conducts morphological analysis of the word *tafakkur* as it appears in four different verses in the Qur’ān:

The word *tafakkur* (thinking) appears in four places in the form of verbs with various morphological changes.⁵³

Articles A1, A10, and A5 emphasise that the word *‘aql* in the Qur’ān is used in verb form and conclude that this implies an emphasis on the process or activity of thinking.⁵⁴

Table 3.31 Examples of Linguistic Analysis

⁵¹ Nurjanah et al., “Konsep ‘Aql dalam Al-Qur’an dan Neurosains,”;

⁵² Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

⁵³ Rofdlı and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

⁵⁴ Rofdlı and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”; Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”; Rofdlı and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

Code	Quotation
A1	<i>“Al-quran menggunakan kata al-‘aql dalam bentuk kata kerja, ini maknanya adalah akal merupakan suatu proses, bukan subyek yang bekerja, berfikir dan memahami”</i> <i>(The Qur’ān uses the word al-‘aql in verb form. This implies that the intellect is a process, not merely a subject that thinks and understands.)</i>
A10	<i>“Fungsi dari aql tersebut berupa fi’il (kata kerja), ini menunjukkan bahwa Al-Qur’an menjelaskan berpikir dengan akal adalah sebuah proses mengikat ilmu pengetahuan secara terus-menerus dan bukan merupakan hasil perbuatan”</i> <i>(The function of ‘aql appears as a verb (fi’il), which indicates that in the Qur’ān, thinking with the intellect is described as an ongoing process of binding knowledge, not merely the outcome of an action.)</i>

3.3.7 Providing Supporting Arguments

After identifying terms or concepts in the Qur’ān, these articles present several arguments supporting the connection between those terms/concepts and the brain as an organ. As previously explained, the brain is used as an entry point for interpreting and understanding neuroscience from the Qur’ānic perspective. These arguments are constructed through reasoning approaches, references to *tafsīr* scholarly opinions, and scientific support.

3.3.7.1 Reasoning Approach

3.3.7.1.1 Functional Equivalence

1. ‘Aql

The similarity in function between *'aql* in the Qur'ān and the brain in neuroscience becomes one of the arguments in several articles asserting that *'aql* is a trace of neuroscience in the Qur'ān. The word *'aql*, which in the Qur'ān denotes activities such as thinking, understanding, reasoning, and choosing, is believed to mirror what the brain does in neuroscience. The two are equated because their functions or modes of activity are considered similar.

Article A10 emphasises thinking as the primary function of *'aql*, arguing that this is reinforced by the fact that the concept of *'aql* in the Qur'ān is always expressed in verb form. The author then links this emphasis to the function of the brain as the organ responsible for thinking, thereby presenting *'aql* in the Qur'ān as functionally equivalent to the brain in neuroscience.

The function of *'aql* is expressed in verb form, which shows that the Qur'ān describes thinking through intellect... This illustrates human thinking activity... The centre of human thought activity lies in the intellect and the brain.⁵⁵

Article A5 argues that verses about *'aql* in the Qur'ān emphasise the "activity of *'aql*." In another paragraph, the article equates *'aql* with thinking activity. It also argues that linguistically, *'aql* is associated with functions of knowing, classifying, and categorising. The Qur'ān is also said to frequently "question" the function of *'aql*. Additionally, the article states that *'aql* has broader functions such as contemplating, reflecting, exploring, understanding, and feeling.

The Qur'ānic verses about thinking or *'aql*... There are many verses in the Qur'ān that mention the activity of intellect... Linguistically, *'aql* is connected to the potential and function of knowing, as well as the abilities of classification and categorisation that influence control and direction... The Qur'ān also frequently questions the function of *'aql*... *'Aql* in the Qur'ān is a symbiosis of intuitive potential (emotional intelligence) and discursive potential (intellectual intelligence) in the pursuit of knowing, thinking, reflecting, exploring, understanding, and feeling both physical phenomena and metaphysical information.⁵⁶

Article B1 also discusses the functional similarity between a specific part of the brain in neuroscience and the function of *'aql* in the Qur'ān. The article argues that both

⁵⁵ Juliani, Sabili, and Suyadi, "Tafsir Ayat-Ayat Neurosains...",

⁵⁶ Rofdlil and Suyadi, "Tafsir Ayat-Ayat Neurosains...",

the brain and *'aql* share the same functions: to think critically, plan, motivate, and initiate good and bad deeds.

This part of the brain functions to think critically, plan, motivate, and initiate good and bad deeds... In the Qur'ān, such brain functions are similar to *'aql* or thought.⁵⁷

This article argues that *'aql* (or *akal*, used interchangeably in the literature) is not only responsible for thinking and acquiring knowledge but also has a moral function. While stating that *akal* has various functions, it simultaneously affirms that *akal* is a function of the brain, *akal* is understood as the result of brain activity that involves thinking, seeking knowledge, and being morally accountable.

Akal has both cognitive and moral functions besides acquiring knowledge... Akal functions to think, to search for understanding... The functioning brain is referred to as akal.⁵⁸

2. *Nāṣiyah*

Nāṣiyah is associated with the brain because linguistically, *nāṣiyah* refers to the front part of the head (forehead), while the prefrontal cortex, a part of the frontal lobe, lies directly behind the forehead. The prefrontal cortex is a section of the frontal lobe but not the entire frontal lobe.

Neurobiologically, the part of the brain behind the forehead is the prefrontal cortex.⁵⁹

Neurobiologically, the brain behind the crown is the prefrontal cortex.⁶⁰

Moreover, the term *nāṣiyah* is believed to be used in the Qur'ān to indicate the brain, especially the prefrontal cortex and frontal lobe, based on functional parallels.

This is supported by the interpretation of the function of *nāṣiyah* in relation to Abu Jahl's behaviour and characteristics in sūrah al-'Alaq: 15-16, which describe the *nāṣiyah* as "lying" and "sinful", functions often linked in neuroscience to moral

⁵⁷ Suyadi, "Hybridisation of Islamic Education and Neuroscience,"

⁵⁸ Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master's thesis, Institut PTIQ Jakarta, 2020)

⁵⁹ Jailani, Suyadi, and Djubaedi, "Menelusuri Jejak Otak dan 'Aql...,"

⁶⁰ Suyadi, "Hybridisation of Islamic Education and Neuroscience,"

judgment and executive decision-making, which are associated with the prefrontal cortex.

The Function of *Nāṣiyah* and the Deeds/Character of Abu Jahl in Sūrah al-‘Alaq: 15-16

Articles A8, A4, and A10 discuss the connection between *nāṣiyah* in Sūrah al-‘Alaq: 15-16 and its function in guiding human ~~morality and~~ actions.⁶¹ This is based on the notion that the pulling of the *nāṣiyah* (forelock) is related to Abu Jahl’s acts of lying and rebellion against the truth. In sūrah al-‘Alaq: 15-16, a threat is mentioned about pulling the *nāṣiyah* of those who are disobedient and persist in evil. Therefore, the authors of these articles conclude that *nāṣiyah* plays a role in directing human behaviour, both moral and amoral.

In Article A8, *nāṣiyah* in sūrah al-‘Alaq: 15-16 is associated with Abu Jahl’s act of lying. This article highlights *nāṣiyah*’s role in controlling human traits, such as good and bad characteristics, rebelliousness, and obedience.

The *Qur’ān* portrays Abu Jahl as a liar. This raises the question: why is only this body part (*nashiyah*) represented as lying and defiant, and not any other? This implies that the forehead and the crown located above the temples are the body parts responsible for various traits, good and bad, rebellious and submissive.⁶²

A8 also refers to Muhammad Abduh’s interpretation, stating that Abu Jahl’s *nāṣiyah* is to be pulled because of his persistent defiance and evil deeds:

According to Muhammad Abduh (in Abbas, 2014), *nashiyah* refers to the hair growing above the temples and symbolizes honour, egoism, and arrogance. This verse explicitly targets Abu Jahl, whose continuous defiant acts will lead to his forehead being pulled, symbolising loss of honour and guidance.⁶³

Article A4 similarly emphasises that *nāṣiyah* in sūrah al-‘Alaq: 15-16 refers to the “crown” through which Allah will seize those who lie and sin. The article cites Salman’s interpretation, linking the verse to Abu Jahl:

⁶¹ Asrini and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Jailani *et al.*, “Critical Analysis of ‘*Aql and Brain...*’”; Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

⁶² Asrini and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

⁶³ Ibid.

In sūrah Al-‘Alaq 15-16, the word *nashiyah*, which means ‘crown,’ is explained by Allah as the means by which He will uproot human life, for those who lie and sin, according to the interpretation of Salman and the commentary of the Mufasssir regarding Abu Jahl.⁶⁴

Article A10 also states that this verse specifically targets Abu Jahl, who was extremely disbelieving and persistently sinful. It is also seen as a warning to all disbelievers who lie and rebel.

In this verse, Allah states that He will seize the *nashiyah* (forelock) of a disbeliever who lies and disobeys. According to Muhammad Abduh (1998:258), *nashiyah* refers to the hair on the forehead, symbolising honour, pride, and arrogance. Thus, grabbing someone’s *nashiyah* indicates humiliation, like a helpless horse being pulled by its forelock. This verse is specifically aimed at Abu Jahl, whose persistent rebellion and evil deeds will cause his *nashiyah* to be seized, implying that one who loses this ‘crown’ can no longer be guided.⁶⁵

Functional Similarity Between *Nāṣiyah* and the Frontal/Prefrontal Cortex

These articles argue that the role of *nāṣiyah* as described in sūrah al-‘Alaq: 15-16 is similar to the role of the frontal/prefrontal lobe in neuroscience. They contend that both the Qur’ānic explanation of *nāṣiyah* and the neuroscientific understanding of the prefrontal cortex emphasise the role in guiding human behaviour. Article A4 explicitly links *nāṣiyah* to the brain based on functional similarity:

Nashiyah, whose function is the same as the brain...⁶⁶

Articles A7 and B1 highlight the prefrontal cortex’s role in initiating good and bad deeds, Articles A12 and B1 further add that the prefrontal cortex plays a vital role in the human thinking system.⁶⁷

Table 3.32 Examples of Analysis on Functional Similarity

Code	Quotation
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⁶⁴ Jailani *et al.*, “Critical Analysis of ‘*Aql and Brain...*,”

⁶⁵ Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

⁶⁶ Jailani *et al.*, “Critical Analysis of ‘*Aql and Brain...*,”

⁶⁷ Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘*Aql...*,”; Suyadi, “Hybridisation of Islamic Education and Neuroscience,”; Muji and Pangestuti, “Teori Belajar Berbasis Neurosains,”

A7	<i>“Secara neurobiology bagian otak yang berada dibalik ubun-ubun adalah kortek prefrontal yang tiada lain bertanggung jawab terhadap berpikir kritis, perencanaan, motivasi dan inisiasi berbuat baik dan buruk, termasuk menyatakan kejujuran dan kebenaran atau kebohongan. Dengan demikian diistilahkan nasyiyah dalam Alquran surat al-Alaq ayat 15-16 adalah otak manusia khususnya kortek prefrontal”</i> <i>(Neurobiologically, the part of the brain behind the forehead is the prefrontal cortex, which is responsible for critical thinking, planning, motivation, and initiating good and bad actions, including expressing truth or lies. Thus, the term nashiyah in sūrah al-‘Alaq: 15-16 refers to the human brain, specifically the prefrontal cortex.)</i>
A12	<i>“Di dalam surah Al-Alaq Dengan penyebutan kata nasyiyah yang diartikan sebagai ubun-ubun. Bagian ini memiliki peran penting dalam sistem berfikir manusia (frontal lobe) dan sebagai jaminan pertanggung jawaban atas perbuatan keji dan mungkar yang telah diperbuat manusia.”</i> <i>(In sūrah al-‘Alaq, the term nāṣiyah is interpreted as the forelock. This part (frontal lobe) plays an important role in the human thinking system and represents accountability for immoral and wicked actions committed by humans.)</i>
B1	<i>“Neurobiologically, the brain behind the crown is the prefrontal cortex. This part of the brain functions to think critically, plan, motivate, and initiate good and bad deeds, including expressing honesty or lies (Pasiak, 2012)... Thus, what is meant by nashiyah in Q.S. Al-‘Alaq [96]:15–16 is the human brain, especially the prefrontal cortex, which functions as ‘aql (thought).”</i>

3.3.7.1.2 Indication

In addition to relying on functional similarity, the connection to the brain is also explained through logic of indication. The concepts that use this logic include the concept of humans as *Khalīfah* (vicegerents) and humans as the most perfect beings. The relevance of these concepts to the brain lies in the belief that they imply the superiority of the human brain. These concepts do not explicitly mention the brain, but are interpreted as *alluding* to it. Article A10 argues that Allah appointed humans as *Khalīfah* on Earth due to the “extraordinary capacity of the human brain.” Article B.C3 cites sūrah al-A‘raf : 179 and concludes that “*humans who do not use their brains to think, are of a lower rank than animals.*” The article deduces that the human brain is the reason why humans are positioned above other creatures.

This approach uses implicit reasoning: although the Qur’ān does not directly mention the brain in these verses, the elevated status and moral responsibility of humans are interpreted as signs pointing to the unique role and capacity of the brain, especially in comparison to animals.

3.3.7.1.3 Referring to Tafsīr Literature

The literature rarely refers to classical *tafsīr*. However, Few studies not only consult classical interpretations but also critically examine and critique how these earlier *tafsīr* understood the verses. Article A5 critiques two classical exegetes: al-Bayḍāwī and Abū Ḥayyān al-Andalusī, stating that “both appear not to go further in developing and discussing a more substantive understanding of the word ‘*aql*.”⁶⁸

This indicates that the authors of these works are not merely adopting, but also re-evaluating the classical *tafsīr* tradition in light of contemporary intellectual and scientific needs.

The literature also makes extensive use of the works of Indonesian exegetes. *Tafsīr Al-Miṣbāḥ* by Quraish Shihab is among the most often cited texts.⁶⁹ Other local

⁶⁸ Muhammad Faiz Rofdli and Suyadi Suyadi, “Tafsir Ayat-Ayat Neurosains: ‘Aql dalam Al-Qur’an dan Relevansinya terhadap Pengembangan Berpikir Kritis dalam Pendidikan Islam,” *Jurnal At-Tibyan: Jurnal Ilmu Al-Qur’an dan Tafsir* 5, no.1 (June 30, 2020): 134–152, <https://doi.org/10.32505/tibyan.v5i1.1399>

⁶⁹ See: Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Asrini and Suyadi, “Tafsir Ayat-Ayat Neurosains Pendidikan Islam...”; Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

tafsīr and translations of the Qur'ān are also often referenced, including the official translation of the Qur'ān by the Ministry of Religious Affairs and the *Salman Scientific Tafsīr of Juz 'Amma*.⁷⁰

Few studies suggest that certain books of *tafsīr* deserve further study due to the important effect their interpretations may have on the theory and practise of Islamic education. *Salman Scientific Tafsīr of Juz 'Amma*, for instance, is used as a key reference in understanding the term *nāṣiyah*, as its interpretation is seen to have practical implications for educational theory in Islam, especially in relation to the concept of the brain as the centre of morality. The selection of these sources reflects a local and pragmatic orientation, favoring *tafsīr* considered more relevant and applicable to issues of education and modern science.⁷¹

However, in referring to books of *tafsīr*, some researches do not fully integrate the commentary into the broader argument of the verse's relation to neuroscience. These studies do not critically analyse the interpretations or explain how these interpretations support their claims.

For example, a study that discusses *nāṣiyah* as a trace of neuroscience in the Quran incorporates Muhammad Abduh's commentary to explain the verse. The study cited Abduh's view, which stated that the act of dragging someone by the forelock, or *nāṣiyah*, in the verse was a symbol of disgrace. According to the study, the act of seising by the forelock also suggests that the people who continuously commit sins and reject the truth will no longer receive guidance. However, the study does not present specific evidence from this commentary to support their claim that the word *nāṣiyah* in the Qur'ān refers to the brain.⁷²

The study seeks to demonstrate that in Muhammad Abduh's interpretation, there are indications that *nāṣiyah* is related to the function of moral behaviour in humans. This aligns with the understanding in neuroscience that the forelock is the part of the

⁷⁰ Jailani *et al.*, "Critical Analysis of 'Aql and Brain..."; Jailani, "Exploring the Development of Neuroscience..."; Suyadi and Jailani, "The Concept of 'Aql and Brain,"

⁷¹ Vivi Indri Asrini and Suyadi Suyadi, "Tafsir Ayat-Ayat Neurosains Pendidikan Islam: Telaah Tafsir Salman atas Konsep Nashiyah dalam Surat Al-Alaq," *Ideguru: Jurnal Karya Ilmiah Guru* 8, no. 3 (May 2, 2023): 363–70, <https://doi.org/10.51169/ideguru.v8i3.526>.

⁷² Ibid

brain associated with behavioural and moral functions. Because of this functional similarity, *nāṣiyah* in the Qur’ān is interpreted as referring to the brain.

However, there are several issues with this argument. First, the claim relies heavily on the assumption of functional similarity, that *nāṣiyah* can be equated with the brain because they serve the same function. Second, they do not provide supporting arguments to justify that this similarity in function is a valid basis for such an interpretation.

A study uses Ibn Kathīr’s interpretation to support its claim that sūrah al-Tīn: 4 and sūrah al-Isrā: 70 contain references about neuroscience. According to the study, the concept of humans as perfect creatures in both verses is related to neuroscience because the reason for human perfection is their ability to reason. To support this argument, the study incorporates the interpretation of Ibn Kathīr on the verses, which discusses the idea of human perfection and elaborates its discussion by linking it to the idea of humans as khalīfah on earth. However, the study does not explain how Ibn Kathīr’s interpretation of the verses supports the argument about the relationship between the two verses and the brain or neuroscience. The relationship between the verses and the brain or neuroscience seems to be based more on the author's conclusions than on Ibn Kathīr interpretation.⁷³

Table 3.33 Quotations Showing References to *Tafsīr* Literature

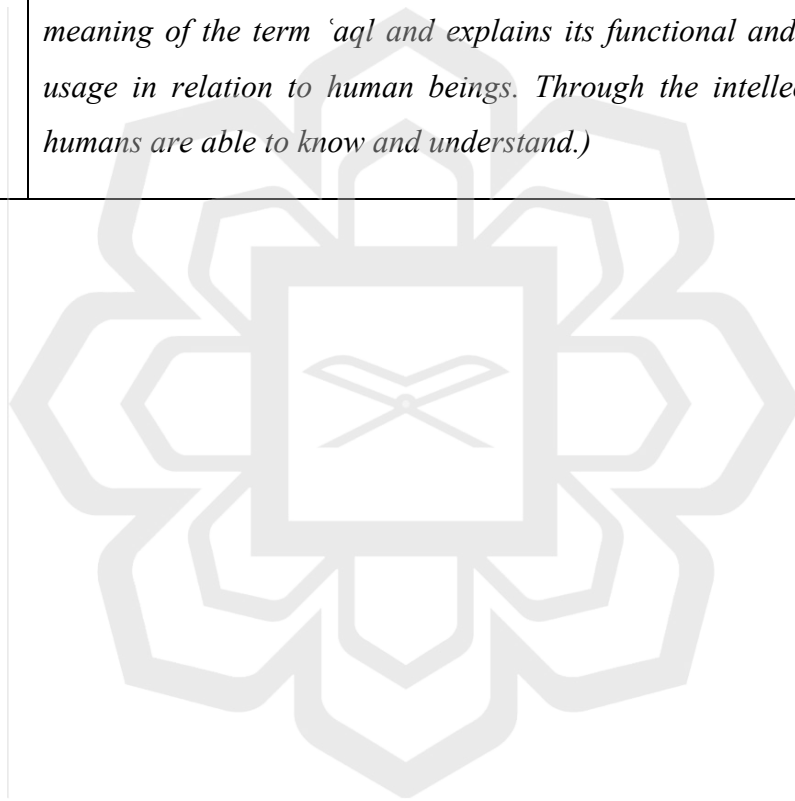
Code	Quotation
A8	“Menurut Muhammad Abduh dalam (Abbas, 2014), <i>Nasiyah mempunyai pengertian yaitu rambut yang tumbuh di atas pelipis dan merupakan citra terhormat, egoisme, kengkuhan. Pengulangan tersebut secara eksplisit ditunjuk kepada Abu Jahal, aktivitasnya yang membangkang dan tidak berhenti berbuat jahat, kepalanya akan ditarik, dan mengibaratkan</i>

⁷³ Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Munfarokhah, Ida Royani. *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD*. Master’s thesis, Institut PTIQ Jakarta, 2020.

	<i>seseorang yang tidak memiliki mahkota tidak bisa mendapatkan petunjuk lagi”</i> <i>(According to Muhammad ‘Abduh (as cited in Abbas, 2014), nāṣiyah refers to the hair that grows above the forehead and symbolizes honor, egoism, and arrogance. The repetition of the term explicitly refers to Abū Jahl; Due to his persistent defiance and continuous wrongdoing, his head would be seized. It also metaphorically suggests that a person who no longer possesses a “crown” is unable to receive guidance)</i>
A10	<i>“Penggunaan kata “aqalah” terdapat dalam QS. Al-Baqarah: 75...Quraish Shihab (2012) menjelaskan maksud ayat di atas adalah menyangkut sifat Bani Israil yang ditujukan untuk mengingatkan kaum muslimin agar tidak terperdaya dengan ulah tipu daya mereka.”</i> <i>(The term ‘aqalah occurs in Q.S. al-Baqarah (2):75. According to Quraish Shihab (2012), the verse addresses the traits of the Bani Israil and is intended as a reminder to Muslims not to be misled by their receptive conduct)</i>
A10	<i>“Allah menciptakan manusia sebagai makhluk yang unggul dari ciptaan lainnya., Hal ini tertuang dalam QS. al-Isra dan al-Tiin.... Dalam tafsir Ibnu Katsir telah dijelaskan bahwa kedua ayat ini merupakan penjelasan dari penciptaan manusia dengan segala keunggulannya...Allah SWT telah memberi manusia sifat yang sebaik-baiknya, anggota tubuh yang seimbang, sempurna, dan tidak kekurangan suatu apapun. Keunggulan manusia dalam penciptaannya juga berimplikasi dengan kesanggupannya dalam menerima amanah sebagai khalifah di bumi.”</i> <i>(Allah created human beings as superior to the rest of creation. This is stated in Q.S. al-Isrā’ and al-Tīn. In the tafsīr of Ibn Kathīr, these two verses are explained as affirming the creation of humankind with all its distinctive excellences. Allah has endowed human beings with the best form, balanced physical constitution, and completeness without deficiency. The superiority of human creation also implies their ability to bear the trust (amānah) as God’s vicegerent (khalīfah) on earth).</i>

A8	<i>“Quraish Shihab menekankan bahwa manusia diawasi oleh Allah SWT melalui mahkota.”</i> <i>(Quraish Shihab emphasizes that human beings are under Allah’s supervision through what is metaphorically described as the “crown)</i>
A3	<i>“Menurut ahli tafsir al-Qur’an, Quraish Shihab, untuk menunjuk ‘sesuatu’ yang mengikat atau menghalangi seseorang terjerumus ke dalam dosa dan kesalahan al-Qur’an menggunakan dengan kata akal).”</i> <i>(According to the Qur’anic exegete Quraish Shihab, the Qur’an employs the term ‘aql to refer to that which restrains or prevents a person from falling into sin and error.)</i>
B.C3	<i>“Manusia adalah makhluk ciptaan Tuhan yang paling sempurna diantara ciptaan-ciptaan yang lainnya. Hal ini secara tegas dinyatakan dalam Qs. At-Tin:4: ...Sesungguhnya kami telah menciptakan manusia dalam bentuk sebaik-baiknya....Dalam tafsir Ibnu Katsir makna ayat ini dijelaskan bahwa sungguh Allah telah menjadikan manusia dalam sebaik-baik keadaan, bahkan akal manusia dan pikirannya dapat menundukkan tabiat (alam):.... Kelebihan dan kesempurnaan manusia terletak pada kekuatan otak atau akalnya itulah yang menjadikan manusia berbeda dengan makhluk lainnya”</i> <i>(Human beings are the most perfect of God’s creations among all that He has created. This is explicitly stated in Q.S. al-Tīn (95):4: “Indeed, We have created man in the best of forms.” In the tafsīr of Ibn Kathīr, this verse is explained to mean that Allah has created human beings in the best condition; Moreover, the human intelligence and reasoning enable them to subdue and manage nature. Human excellence and perfection thus lie in the power of the brain or intellect, which distinguishes human beings from other creatures.)</i> <i>“Dalam tafsir Al- Misbah dijelaskan mengenai ayat ini,...Thahir ibn Asyur memahami kata al-hakim dalam arti...At-Thabathaba‘i menuturkan bahwa... Menurut Fakhruddin ar-Razi, ayat tersebut mengungkapkan...dalam tafsir at-Thabari disebutkan..”</i>

	<i>(In Tafsīr al-Miṣbāḥ, this verse is explained as follows...Ṭāhir ibn ‘Āshūr understands the term al-Ḥakīm to mean... Al-Ṭabāṭabā’ī states that... According to Fakhr al-Dīn al-Rāzī, the verse expresses... Meanwhile, in the tafsīr of al-Ṭabarī, it is mentioned that...)</i>
A5	<i>“Dalam menafsirkan QS. Al-Baqarah [2]: 44 ini, Al-Baydawi menegaskan arti kata ‘aql sekaligus menjelaskan penggunaannya secara metaforis fungsional pada manusia. Dengan akal, menurutnya, manusia bisa mengetahui dan memahami,”</i> <i>(In his interpretation of Q.S. al-Baqarah (2):44, al-Bayḍāwī clarifies the meaning of the term ‘aql and explains its functional and metaphorical usage in relation to human beings. Through the intellect, he argues, humans are able to know and understand.)</i>



CHAPTER FOUR

CRITICAL EVALUATION OF THE INTERPRETIVE METHODOLOGY

4.1 INTRODUCTION

Building upon the analysis presented in Chapter 3, which mapped out the interpretive methods and sources employed by proponents of the integration discourse, Chapter 4 provides a critical evaluation of those methods and sources. This chapter examines the coherence, validity, and limitations of the exegetical approaches used to derive arguments for integrating neuroscience into Islamic education.

The evaluation is structured around several key aspects: the phenomenon of "*ayatisasi*"¹, the tendency to attach Qur'ānic verses to concepts or issues without adequate exegetical justification; the framework of interpretation, how the structure and logic of interpretation align (or fail to align) with established interpretive standards and instances of *non sequitur* reasoning, where the conclusions drawn by proponents appear to overreach or lack clear linkage to the Qur'ānic content they reference. This chapter aims not only to identify methodological weaknesses but also to assess the broader implications of these interpretive practises for the discourse on integration neuroscience in Islamic education.

¹ *Ayatisasi* means linking, associating or assigning a Qur'ānic verse to a particular topic. It is derived from the word *āyat* which means 'verse' and the suffix *-isasi*, which in Indonesian language, function to form a noun that denotes a process, action or act of making something into a particular form. Although this term is not formally standardized in the Indonesian language, it is frequently used in various discussion and academic publications. See: Syaifullah Syaifullah, Romlah Widayati, and Ade Naelul Huda, "Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik)," *Hikami: Jurnal Studi Ilmu al-Qur'an dan Tafsir* 3, no. 2 (December 2022): 54–85, <https://doi.org/10.59622/jiat.v3i2>; Lukens-Bull, Ronald A., and Carolyn S. Lukens. *Islamic Higher Education in Indonesia: Continuity and Conflict*. New York: Palgrave Macmillan, 2013.; Media Zainul Bahri, "Expressing Political and Religious Identity: Religion-Science Relations in Indonesian Muslim Thinkers 1970–2014," *Al-Jāmi'ah: Journal of Islamic Studies* 56, no. 1 (2018): 155–86, <https://doi.org/10.14421/ajis.2018.561.155-186>

4.2 AYATISASI/PROOF-TEXTING APPROACH

4.2.1 Definition

Ayatisasi is derived from the word *āyat* (verse). *Ayatisasi* means assigning a Qur'ānic verse to a particular topic. It is often used to describe the phenomenon of matching or associating a verse with a topic, concept, or issue, without a strong basis in the science of *tafsīr*, frequently for specific or instrumental purposes. In this phenomenon, the understanding of Qur'ānic verses is not grounded in proper analytical methodology, but rather is based on forced or superficial correspondences. As such, no proper process of interpretation takes place.²

Several terms are used to describe this phenomenon: *ayatisasi*, *labelisasi*, or the *proof-texting approach*. It is sometimes also regarded as a form of *al-tafsīr al-'ilmiy* (scientific exegesis).

According to Ronald A. Lukens-Bull, the problem of *ayatisasi* is one of the most widespread phenomena in the practice of IOK in Indonesia, and even in the broader context of Islamisation globally.³ *Ayatisasi* is also found in some works of *al-tafsīr al-'ilmiy* and in various political campaigns.

4.2.2 Characteristics

4.2.2.1 Merely Matching

One of the main characteristics of the *ayatisasi* is that it involves merely quoting verses without analysing, exploring, studying, or presenting the deeper meanings or messages of the Qur'ān. Ronald A. Lukens-Bull and Jani-Fatah Yasin describe this practise as “simply quoting of relevant Qur'ānic verses”.⁴ Meanwhile, Bahri defines it as “merely

² See: Syaifullah Syaifullah, Romlah Widayati, and Ade Naelul Huda, “Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik),” *Hikami: Jurnal Studi Ilmu al-Qur'an dan Tafsir* 3, no. 2 (December 2022): 54–85, <https://doi.org/10.59622/jiat.v3i2>; Lukens-Bull, Ronald A., and Carolyn S. Lukens. *Islamic Higher Education in Indonesia: Continuity and Conflict*. New York: Palgrave Macmillan, 2013.; Media Zainul Bahri, “Expressing Political and Religious Identity: Religion-Science Relations in Indonesian Muslim Thinkers 1970–2014,” *Al-Jāmi'ah: Journal of Islamic Studies* 56, no. 1 (2018): 155–86, <https://doi.org/10.14421/ajis.2018.561.155-186>

³ Lukens-Bull, Ronald A., and Carolyn S. Lukens. *Islamic Higher Education in Indonesia: Continuity and Conflict*. New York: Palgrave Macmillan, 2013.

⁴ Mohd Shah Jani and Raudlotul Firdaus Fatah Yasin, *Divine Revelation as Source of Knowledge* (Kuala Lumpur: IIUM Press, 2019).

presenting Qur'ānic verses" related to a particular subject.⁵ In an article titled "*Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik)*", *ayatisasi* is defined as: "the attempt to link something with Qur'ānic verses."⁶

In this phenomenon, the claim of correlation, harmony, or compatibility between the Qur'ān and the object of comparison, whether it is a topic, concept, issue, or scientific finding, is a dominant and foundational feature. Ronald A. Lukens-Bull notes that the approach used in this phenomenon generally aims to find relevant Qur'ānic verses or Qur'ānic verses and hadith that support the findings and theory or science. In other words, the topic or discovery is portrayed as being in accordance with the Qur'ān, as if there is a direct alignment between revelation and science.

4.2.2.2 The Basis of Compatibility is Literal and Textual / Found Literally in the Qur'ān

Several definitions that describe this phenomenon as *ayatisasi* emphasise that the literal text of the verse serves as the primary foundation for asserting compatibility between the Qur'ān and a given object, such as scientific theories, modern concepts, or contemporary issues.

This aligns with the explanation offered by Kartanegara, who critiques a narrow understanding of the Islamisation of knowledge. He criticises the view that sees Islamisation strictly as the effort to find literal references for every scientific concept or discovery in the Qur'ān and Hadith:

(Islamisation) is understood rigidly as a teaching that must be referenced literally in the Qur'ān and Hadith.⁷

In this approach, textual evidence, rather than interpretive depth or contextual understanding, becomes the primary tool for validating scientific or conceptual claims through the Qur'ān.

⁵ Media Zainul Bahri, "Expressing Political and Religious Identity: Religion-Science Relations in Indonesian Muslim Thinkers 1970–2014," *Al-Jāmi'ah: Journal of Islamic Studies* 56, no. 1 (2018): 155–86, <https://doi.org/10.14421/ajis.2018.561.155-186>

⁶ Syaifullah Syaifullah, Romlah Widayati, and Ade Naelul Huda, "Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik)," *Hikami: Jurnal Studi Ilmu al-Qur'an dan Tafsir* 3, no. 2 (December 2022): 54–85, <https://doi.org/10.59622/jiat.v3i2>

⁷ Mulyadhi Kartanegara et al., *Pengantar Studi Islam* (Jakarta: Ushul Press, 2011)

4.2.2.3 Driven by Specific Motives/Objectives/Interests

Ronald A. Lukens-Bull and Carolyn S. Lukens states that *ayatisasi* is carried out “to justify modern science,” as well as “to prove that Islam is true”.⁸ Mohd Shah Jani and Raudlotul Firdaus Fatah Yasin observe that this phenomenon is not only used to justify a particular theory or body of knowledge; they note that this approach is used “to support or to reject certain theoretical propositions and conclusions”.⁹ La Adu defines *ayatisasi* as an effort to label a theory or form of knowledge as Islamic in order to make it appear consistent with Islamic values. In this practise, the Qur’ān is interpreted to suit modern science.¹⁰

4.2.2.4 Forced Arguments / Lacking Strong Foundations

In the *ayatisasi*, the connection between Qur’ānic verses and the scientific concept or issue being addressed is not based on strong reasoning. The understanding of the verses does not stem from in-depth analysis or from following proper principles of Qur’ānic exegesis. As a result, the alignment between Qur’ānic verses and the proposed topic tends to be speculative. The article “*Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik)*” highlights the lack of a valid methodological basis from the science of *tafsīr* in *ayatisasi* practises. It defines *ayatisasi* as:

An attempt to link something with Qur’ānic verses without a valid foundation in the science of *tafsīr*.¹¹

⁸ Ronald A. Lukens-Bull and Carolyn S. Lukens, *Islamic Higher Education in Indonesia: Continuity and Conflict* (New York: Palgrave Macmillan, 2013)

⁹ Mohd Shah Jani and Raudlotul Firdaus Fatah Yasin, *Divine Revelation as Source of Knowledge* (Kuala Lumpur: IIUM Press, 2019).

¹⁰ La Adu, Bahaking Rama, and Muhammad Yahdi, “Islamisasi Ilmu Pengetahuan,” *CBJIS: Cross-Border Journal of Islamic Studies* 5, no. 1 (June 28, 2023): 21–33, <https://doi.org/10.37567/cbjis.v5i1.2108>.

¹¹ Syaifullah Syaifullah, Romlah Widayati, and Ade Naelul Huda, “Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik),” *Hikami: Jurnal Studi Ilmu al-Qur’an dan Tafsir* 3, no. 2 (December 2022): 54–85, <https://doi.org/10.59622/jiat.v3i2>;

4.2.3 *Ayatisasi* in the Literature on the Integration of Neuroscience in Islamic Education

4.2.3.1 *Merely Matching & Claiming Relevance*

In the literature on the integration of neuroscience in Islamic education, verses from the Qur'ān are claimed to be in line with neuroscience. What is typically presented are merely the terms, concepts, or Qur'ānic verses deemed compatible with neuroscience, referred to in this context as the traces of neuroscience in the Qur'ān.

Because the focus is on searching for traces or evidence by identifying verses believed to be related to the brain, no interpretive process occurs in the sense of uncovering the deeper meanings or messages of the Qur'ān within those verses. The process generally ends at the stage of determining which terms, concepts, or verses are considered as traces of neuroscience in the Qur'ān.

In these studies, discussions on the Qur'ān and neuroscience largely revolve around listing or highlighting Qur'ānic elements that are thought to match neuroscience. However, without a meaningful exegetical process, these studies stop short of engaging with the verses beyond surface-level compatibility, making them a clear example of the *ayatisasi* phenomenon.

4.2.3.2 *Literal Mention in the Qur'ān*

Most articles on the integration of neuroscience in Islamic education argue that neuroscience is discussed in the Qur'ān. They believe that this discussion is signaled by Qur'ānic terms or concepts that indicate or allude to the brain as an organ. When addressing the relationship between neuroscience and the Qur'ān, these articles typically focus on identifying equivalent terms, rather than exploring the conceptual meanings or messages embedded in the verses.

In analysing "neuroscience in the Qur'ān," these works focus on the presence of neuroscience-related words, not on broader concepts such as human cognitive structure or function within the Qur'ānic worldview. The interpretive effort is thus centred on linguistic parallels, rather than conceptual or thematic reflection.

Therefore, it can be concluded that the attempt to find literal references is based on a reasoning pattern and method that emphasises presence, described as "tracing the

signs". These "signs" are interpreted merely as equivalent or related terms, rather than as part of a conceptual construction. The analysis often includes frequency counts of specific words.

4.2.3.3 Carried Out for Specific Motives/Objectives and Interests

In the articles that propose the idea of integrating neuroscience into Islamic education, the motive behind discussing terms, concepts, or verses believed to be related to neuroscience is to prove that neuroscience has a "trace in the Qur'ān."

As discussed in article A6, proving that neuroscience has a trace in the Qur'ān is aimed at countering the view that neuroscience is a secular or non-Islamic discipline.¹² The belief that neuroscience is secular or non-Islamic because it lacks a "trace in the Qur'ān" is seen as the reason why neuroscience has received little attention in Islamic education.

Table 4.1 Quotations on Specific Motives and Objectives behind the Discourse

Code	Quotation
A4	<i>"The main problem in this research is that neuroscience has so far been considered a secular science because there is no explicit trace of it in the Qur'ān. Therefore, this science is less developed in Islamic education because it does not have formal legitimacy in sources of Islamic law related to scientific studies, namely the Qur'ān and Sunnah."</i>
A6	<i>Penelitian bertujuan untuk menyelidiki hubungan antara neurosains dan prinsip- prinsip Islam, dengan mengatasi pandangan bahwa neurosains belum dianggap sebagai disiplinilmu Islam karena muncul setelah turunnya Al-Qur'an dan As-Sunnah pada abad ke-7."</i> <i>"This research aims to investigate the relationship between neuroscience and Islamic principles, by addressing the view that</i>

¹² Jailani, "Exploring the Development of Neuroscience..."

	<i>neuroscience has not yet been regarded as an Islamic discipline because it emerged after the revelation of the Qur'ān and the Sunnah in the 7th century."</i>
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Within this framework, the Qur'ān plays a role in providing justification for the idea of integrating neuroscience into Islamic education. The verses discussed in these articles are understood as normative grounds legitimising the integration of neuroscience into Islamic education.

Table 4.2 Quotations on Normative Grounds for Integrating Neuroscience into Islamic Education

Code	Quotation
A1	<i>"Neuroscience memiliki jejak dalam islam. Pendidikan islam memiliki jejak di alam ilmu syaraf. Oleh karena itu pendididkan islam dapat diintegrasi-interkoneksi dengan neurosains"</i> <i>"Neuroscience has a trace in Islam. Islamic education has a trace in the realm of neuroscience. Therefore, Islamic education can be integrated and interconnected with neuroscience."</i>
B2	<i>"Neurosain mempunyai jejak di dalam Islam. Pendidikan islam mempunyai jejak di alam neurosain. Oleh karena itu, pendidikan Islam dapat diintegrasi-interkoneksi dengan neurosain."</i> <i>"Neuroscience has a trace in Islam. Islamic education has a trace in the realm of neuroscience. Therefore, Islamic education can be integrated and interconnected with neuroscience."</i>

4.2.3.4 Forced Argument / Lacking Strong Foundation

In the literature on the integration of neuroscience in Islamic education, the phenomenon of *ayatisasi* is evident in conclusions that are not derived from a complete and proper interpretive process, as meanings are concluded without deepening or considering the context of the verses. Arguments about compatibility of meaning stem from the logic they propose. Arguments involving the functional similarity between *nāṣiyah* and *'aql* with the brain, as well as the “signal” logic regarding humans being the most perfect beings and vicegerents on earth due to brain superiority, are not supported by references that clearly substantiate those logics or interpretations.

Analysis of the interpretive process also shows that in interpreting verses, some articles do not actually conduct a thematic synthesis of the compiled verses, but merely arrange a narrative elaboration that appears as synthesis, yet in reality, does not originate from direct analysis of the meaning of the verses in their context. The resulting synthesis does not grow from a deep interaction with the text, but rather emerges from an external narrative that is attached to the collection of verses.

4.2.3.5 Claim of Correspondence Between the Qur’ān and Modern Science

The data in the table below illustrates the recurring claim in the literature that the Qur’ān and modern neuroscience are not only compatible but also mutually reinforcing. Some studies explicitly argue that there is no contradiction between the two, framing neuroscientific findings as confirmation or extension of Qur’ānic concepts. For example, several articles highlight the Qur’ānic terms *nāṣiyah* (often translated as "crown" or prefrontal cortex) and *'aql* (intellect) as directly correlating with modern understandings of the brain and cognition. This connection is further expanded upon in references to *ulūl albāb*, which demonstrate that the Qur’ānic depiction of intellectual and moral excellence aligns with neuroscientific findings about brain qualities and human potential. Other contributions extend this compatibility argument to broader fields such as neurotheology, neurophilosophy, and neuroeducation. Overall, the quotations in this section reflect a fundamental belief that neuroscience does not stand apart from Islamic revelation but rather validates and deepens insights already embedded in the Qur’ān.

Table 4.3 Quotations Highlighting Claims of Correspondence Between the Qur'ān and Modern Science

Code	Quotation
A12	<i>"Between the Qur'ān and modern science, there is no contradiction; instead, the two proceed in harmony, side by side."</i>
B4	<i>"there is compatibility with the study of Qur'ānic verses contained in neuroscience"</i>
B1	<i>"The Islamic neuroscience of education corresponds to the concept of Ulul Albab in QS. The results of the study showed that the concepts of nasiyah (crown) and „aql (mind) in the Qur'ān have a correlation with the brain and mind in neuroscience"</i>
B2	<i>"The concept of mind-brain is also relevant to research finding which states that one's excellence is determined by the brain's quality. This finding is in line with research on Ulul Albab"</i>
A12	<i>"Neuroscience discoveries already have indications in the Qur'ān."</i>
A12	<i>"Based on the findings of the study, it can be stated that there is an integration between the Qur'ān and modern science, in which the two do not contradict each other but instead move forward in harmony."</i>
B4	<i>"as contained in Suyadi 's research seeing that there is compatibility with the study of Qur'ānic verses contained in neuroscience."</i>
B3	<i>"Based on a systematic review of the hierarchical thinking concept both of Qur'ān and neuroscience, the result shows that this concept</i>

	is relevant to neurotheology, neuro-philosophy, and neuroeducation”
A11, B1	“The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning (nāṣiyah) in the Qur’ān which some commentators define as “the crown”
B1	“Thus, it can be concluded that the neuroscience that emerged in the 19th century was basically a development of the critical study of the concept of nashiyah in the Qur’ān which emerged in the 7th century. This can be proven that behind nashiyah or fontanel is where the brain lies which functions to think as the nashiyah function is also to think. The results of the study showed that the concepts of nashiyah (crown) and „aql (mind) in the Qur’ān have a correlation with the brain and mind in neuroscience”
A4	“The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning (nashiyah) in the Qur’ān which some commentators define as “the crown” (prefrontal cortex).”

4.2.4 Discussion of the Issue: Expert Perspectives

Many scholars have criticised this understanding of the integration of knowledge as merely labelling secular knowledge with Qur’ānic verses or Islamic terms. Mulyadi Kartanegara advocates understanding the Qur’ānic spirit, ensuring that the integration of knowledge should be align with it, rather than interpreting it as merely finding the literal reference in the Qur’ān.¹³ Ronald A. Lukens-Bull views this approach as a superficial attempt at integration of knowledge and criticises it epistemological

¹³ Mulyadhi Kartanegara et al., *Pengantar Studi Islam* (Jakarta: Ushul Press, 2011)

soundness and validity.¹⁴ According to Mohd Shah Jani and Raudlotul Firdaus Fatah Yasin, this approach does not lead to critical Islamic response to the issue.¹⁵

Quraish Shihab argues that Qur'ānic verses should not be positioned merely as an instrument to either support or reject scientific theories¹⁶. This view is also set forth by Syaifullah et al. in their article "*Fenomena Ayatisasi di Indonesia.*" which highlights a major problem in this approach, namely that in such framework, the Qur'ān does not function as a guidance. They argue that:

It has an extraordinary impact on the sanctity of the Qur'ān, as the Qur'ān is reduced to a mere instrument used solely to justify personal interests, no longer regarded as a guidance of life, a true guide for the path of life.¹⁷

In approaching the Qur'ān in this context, Quraish Shihab calls for a sound and rigorous method that combine deep analysis and systematic approach attentive to the semantic, linguistic, and contextual dimensions of the Qur'ānic verses.¹⁸ Additionally, Al-Attas, emphasises the purification of knowledge, arguing that the Islamisation of knowledge must operate at the epistemological level, based on the premise that knowledge is never entirely value-free.¹⁹

4.2.5 Analysis of the Causes of *Ayatisasi* in the Discourse on Neuroscience Integration in Islamic Education

In the discourse on integrating neuroscience and Islamic education, *ayatisasi* emerges as a result of various fundamental obstacles in implementing scientific integration. One of the main causes is the lack of adequate technical, methodological, and regulatory guidelines to bridge neuroscience concepts with the principles of Islamic education in

¹⁴ Ronald A. Lukens-Bull and Carolyn S. Lukens, *Islamic Higher Education in Indonesia: Continuity and Conflict* (New York: Palgrave Macmillan, 2013)

¹⁵ Mohd Shah Jani and Raudlotul Firdaus Fatah Yasin, *Divine Revelation as Source of Knowledge* (Kuala Lumpur: IIUM Press, 2019).

¹⁶ M. Quraish Shihab, *Membumikan Al-Qur'an: Fungsi dan Peran Wahyu dalam Kehidupan Masyarakat* (Bandung: Mizan, 2003), 49.

¹⁷ Syaifullah Syaifullah, Romlah Widayati, and Ade Naelul Huda, "Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik)," *Hikami: Jurnal Studi Ilmu al-Qur'an dan Tafsir* 3, no. 2 (December 2022): 54–85, <https://doi.org/10.59622/jiat.v3i2>

¹⁸ M. Quraish Shihab, *Rules of Qur'ānic Interpretation (Kaidah Tafsir)*, 2nd ed., November (Jakarta: Lentera Hati Publishing, 2013), 389.

¹⁹ La Adu, Bahaking Rama, and Muhammad Yahdi, "Islamisasi Ilmu Pengetahuan [Islamisation of Knowledge]," *CBJIS: Cross-Border Journal of Islamic Studies* 5, no. 1 (June 2023): 21–33, <https://doi.org/10.37567/cbjis.v5i1.2108>.

a scientific and systematic manner. As a result, Qur'ānic verses are often cited merely as complements without deep analysis, causing the integration process to become symbolic and superficial. In addition, the difficulty in identifying relevant Islamic issues that can be meaningfully connected with neuroscience materials presents its own challenge.²⁰

According to Syaifullah et al., among the factors behind the emergence of *ayatisasi* are: the practise of relying solely on a word-for-word translation of the Qur'ān, and interpreting verses without adequate understanding or methodological grounding in *tafsīr*.²¹

According to Mohd Shah Jani and Raudlotul Firdaus Fatah Yasin, one of the reasons for the failure of integration in Islamic education is the inability to critically read the social, cultural, economic, and political realities from the perspective of knowledge integration²². This is closely related to their lack of understanding of the theoretical assumptions of modern sciences from the tawhidic worldview concerning God, humanity, and the universe. With this background, *ayatisasi* in the discourse on neuroscience and Islamic education can be understood as a symptom of weak methodological, epistemological, and practical readiness in realising a holistic integration of knowledge.

Several studies on efforts or practises of IOK have found that one of the main inhibiting factors in realising the IOK is the lack of regulatory references or technical implementation guidelines, as well as the absence of training or operational manuals on the integration of religious and scientific knowledge²³

²⁰ See: M. Iqbal Lubis, Naskah, Fatimah Depy Susanti, and Indah Wati, "Integrasi Ilmu Sains dan Islam: Studi Penulisan Skripsi Jurusan Pendidikan Ekonomi FTK UIN Sultan Syarif Kasim Riau Pekanbaru," *Eklektik: Jurnal Pendidikan Ekonomi dan Kewirausahaan* 5, no.1 (June 2022): 42–67, <https://doi.org/10.24014/ekl.v5i1.17737>

²¹ Syaifullah, Romlah Widayati, and Ade Naelul Huda, "Fenomena Ayatisasi di Indonesia (Studi Analisis Ayat-Ayat Politik)," *Hikami: Jurnal Studi Ilmu al-Qur'an dan Tafsir* 3, no. 2 (Desember 2022): 54–85, <https://doi.org/10.59622/jiat.v3i2.68>.

²² Mohd Shah Jani and Raudlotul Firdaus Fatah Yasin, *Divine Revelation as Source of Knowledge* (Kuala Lumpur: IIUM Press, 2019).

²³ See: M. Iqbal Lubis, Naskah, Fatimah Depy Susanti, and Indah Wati, "Integrasi Ilmu Sains dan Islam: Studi Penulisan Skripsi Jurusan Pendidikan Ekonomi FTK UIN Sultan Syarif Kasim Riau Pekanbaru," *Eklektik: Jurnal Pendidikan Ekonomi dan Kewirausahaan* 5, no.1 (June 2022): 42–67, <https://doi.org/10.24014/ekl.v5i1.17737>; Susilawati, "Menuju Integrasi Ilmu-Ilmu Keislaman dengan Ilmu-Ilmu Umum (Integratif Antara Kajian yang Bersumber Ayat-ayat Qauliyah dan Ayat-ayat Kauniyah)," *Cross-Border* 5, no. 1 (September 19, 2022): 939–954, <https://journal.iaisambas.ac.id/index.php/Cross-Border/article/view/1360>

A study on the implementation of the idea of knowledge integration in a mathematics study programme revealed that one of the problems faced is the difficulty in finding Islamic issues that can be meaningfully integrated with the learning material.²⁴

A study on the development of the integration of religious and scientific knowledge at UIN Suska Riau concluded that, so far, the idea of knowledge integration has only taken place at the level of philosophy and content. However, it has not yet reached the level of methodology and implementation strategies.²⁵

4.3 UNSOUND THEMATIC INTERPRETATION

In the discussion of *'aql* as a trace of neuroscience, the interpretive method used can conceptually be categorised as the *al-Tafsīr al-Mawḍū'ī* method. According to al-Farmawī, *al-Tafsīr al-Mawḍū'ī* is: “a method of interpreting Qur’ānic verses according to related themes or subject matters, which connects the purpose of the verse and its thorough comprehension, as well as compiling verses of the Qur’ān which have related themes or common direction to gain a general conclusion”²⁶. Meanwhile, in *Mabahith fi al-Tafsīr al-Mawḍū'ī* by Musthafa Muslim, this method is defined as: “approaching a specific subject or topic related to intellectual and social life or natural phenomena from a Qur’ānic perspective”²⁷.

As the name suggests, *al-Tafsīr al-Mawḍū'ī* places the theme as the main focus of interpretation. The argument that the concept of *'aql* in the Qur’ān represents a trace of neuroscience can be categorised as *al-Tafsīr al-Mawḍū'ī* because the analysis focuses on a particular theme, namely *'aql*, by examining its mention across various verses, rather than limiting it to a single verse. The resulting conclusion is also general in nature:

²⁴ Memen Permata Azmi and Azwir Salam, “Konstruksi Integrasi Islam dan Ilmu Matematika dalam Implementasi Kurikulum Pendidikan Matematika UIN Suska Riau,” *Juring: Journal for Research in Mathematics Learning* 5, no. 2 (June 2022): 119–128, <https://doi.org/10.24014/juring.v5i2.14892>.

²⁵ M. Iqbal Lubis, Naskah, Fatimah Depy Susanti, and Indah Wati, “Integrasi Ilmu Sains dan Islam: Studi Penulisan Skripsi Jurusan Pendidikan Ekonomi FTK UIN Sultan Syarif Kasim Riau Pekanbaru,” *Eklektik: Jurnal Pendidikan Ekonomi dan Kewirausahaan* 5, no. 1 (June 2022): 42–67, <https://doi.org/10.24014/ekl.v5i1.17737>

²⁶ Jauhar Azizy, Mohammad Anwar Syarifuddin, and Hani Hilyati Ubaidah, “Thematic Presentations in Indonesian Qur’anic Commentaries,” *Religions* 13, no. 2 (February 3, 2022): Article 140, <https://doi.org/10.3390/rel13020140>.

²⁷ Mohamed El-Tahir El-Mesawi, “The Methodology of al-Tafsīr al-Mawḍū'ī: A Comparative Analysis,” *Intellectual Discourse* 13, no. 1 (June 2005): 1–30, <https://doi.org/10.31436/id.v13i1.118>.

that the trace of neuroscience is the concept of *'aql* itself, not its specific meaning in just one particular verse.

In the Qur'ān, it is explained that the word *'aql* (intellect) is mentioned 49 times in the past verb form, which includes *'aqala* (1 time), *ya 'qilun* (22 times), *na 'qilu* (1 time), *ya 'qiluha* (1 time), *ta 'qilun* (24 times), and 48 times in the present verb form.²⁸

Based on 49 verses that mention *'aql*, it contains meanings such as understanding, thinking, and comprehending. (QS 17:44, QS 16:97–98, QS 9:12).²⁹

One of the articles that uses the concept of *'aql* in the Qur'ān as its starting point is the article titled: “A3: *Aql and the Brain in Neuroscience Studies and Its Implications for the Scientific Approach in Islamic Education*.” This article clearly states that its aim is to analyse the concept of *'aql* in the Qur'ān. The neuroscience perspective is used as an analytical lens. The interpretation is connected to neuroscience theories/findings. The starting point is not to search for traces of neuroscience in the Qur'ān. The word *'aql* is not positioned as a keyword but as the main focus and starting point of analysis.

In addition, another article that takes *'aql* as its starting point is the one titled: *'Aql in the Qur'ān and Neuroscience*.

This article aims to examine the concept of *'aql* from the perspective of neuroscience and the Qur'ān.

Article A3 connects *'aql* with other related terms/keywords. For example:

Based on 49 verses that mention *'aql*, it contains meanings such as understanding, thinking, and comprehending (QS 17:44, QS 16:97–98, QS 9:12).³⁰

Article A2 focuses on the key term and merely lists how many times the term appears in the Qur'ān and in what forms, without mentioning its locations or including complete verses with their translations. For example:

In the Qur'ān, it is explained that the word *'aql* (intellect) appears 49 times in the form of past verbs, including *'aqala* (once), *ya 'qilun* (22 times), *na 'qilu* (once), *ya 'qiluha* (once), *ta 'qilun* (24 times), and 48 times in the form of present-tense verbs.³¹

²⁸ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

²⁹ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

³⁰ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

³¹ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

However, there are several shortcomings in the application of *al-Tafsīr al-Mawḍūʿī* in interpreting the concept of *ʿaql* within this literature:

4.3.1 Lack of In-Depth Synthesis

Meanwhile, the word *ʿaql* appears in the Qurʾān in 49 places... this implicitly shows that the Qurʾān pays great attention to the intellect.³²

The distribution of verses that speak of the intellect in various contexts shows how important the position of intellect is in Islamic teachings³³.

From the above quotations, it can be seen that after compiling verses containing the term *ʿaql*, the authors immediately conclude that the Qurʾān places great emphasis on the importance of intellect, or that all forms of *ʿaql* indicate a command to think. However, these conclusions are not the result of a deep analysis of the meanings of *ʿaql* as they appear in the 49 verses. In reaching these conclusions, the articles do not demonstrate any analytical process involving the variations or thematic groupings of meanings based on the contextual use of the word *ʿaql* in each verse. They do not explain how the concept of *ʿaql* is understood within the verse's context. In other words, the synthesis presented does not grow out of direct and thorough engagement with the verses themselves. In some cases, such as in article A3, the synthesis is based merely on quotations or the opinions of other authors, rather than a direct analysis of the compiled verses.³⁴

From these examples, it is evident that the articles compile statistical data, not conceptual meaning. They state that the word *ʿaql* appears 49 times in the Qurʾān, then conclude that the Qurʾān emphasises the importance of intellect, then go further to interpret *ʿaql* as referring to the brain, thus arguing that *ʿaql* represents a trace of neuroscience in the Qurʾān.

³² Mohammad Jailani, "Exploring the Development of Neuroscience in the Light of Islamic Perspectives: A Qualitative Literature Review," *Jurnal Studi Islam* 12, no. 1 (July 2023): 99–118, <https://doi.org/10.33477/jsi.v12i1.3489>

³³ Himayatul Izzati, "Potensi Pembelajaran Manusia: Perspektif Neurosains dan Islam," *Alifbata: Jurnal Pendidikan Dasar* 1, no. 1 (2021): 64–77, <https://doi.org/10.51700/alifbata.v1i1.89>

³⁴ Kasno, "Aql dan Otak dalam Kajian Neurosains..."

4.3.2 Failure to Address the Essence of Thematic Interpretation (*al-Tafsīr al-Mawḍūʿī*)

The core of *al-Tafsīr al-Mawḍūʿī* method lies in examining a specific topic as expounded by the Qurʾān in order to construct what can be considered the Qurʾānic view of that topic. In this method, the purpose of collecting all relevant verses comprehensively is to formulate a Qurʾānic framework regarding the theme in question. *Al-Tafsīr al-Mawḍūʿī* emphasises the unity of meaning derived from an analysis of the full set of relevant verses, rather than relying on isolated verse contexts or focusing exclusively on individual verses.

In the context of the current discussion, namely *ʿaql* as a trace of neuroscience, these articles tend to focus on the mere presence of such verses as evidence of neuroscience in the Qurʾān. The existence of verses that mention *ʿaql* is taken as the core argument for claiming the trace of neuroscience in the Qurʾān. As a result, their analysis and discussion primarily revolve around identifying the relevant verses, while offering little attention to what those verses actually say. The task of constructing a Qurʾānic framework of thought regarding the concept of *ʿaql*, which should be the very essence and main objective of applying *al-Tafsīr al-Mawḍūʿī* method in this literature, is, in fact, largely neglected.

4.4 EVALUATION OF LINGUISTIC ANALYSIS

4.4.1 Lack of Depth in Linguistic Interpretation

Several articles that associate terms such as *ʿaql*, *tafakkur*, and *nāṣiyah* as traces of neuroscience in the Qurʾān generally lack in-depth linguistic analysis. The explanations of these terms as *ʿaql*, *nāṣiyah*, or *tadabbur* are often presented in a brief manner without comprehensive philological inquiry, and they frequently rely on less authoritative sources rather than primary lexical references such as classical *muʿjam* works. Some articles merely cite secondary references, including other journal articles, without offering a substantive examination of the Arabic roots or relevant linguistic aspects.

For instance, Article A1 defines *ʿaql* concisely as “to restrain and to withhold,” and adds that in relation to humans it means “the ability to restrain one’s desires.”

However, this explanation is not supported by any thorough linguistic analysis and is instead cited from another journal article.³⁵

Similar to A1, Article A5 also relies on a secondary journal article in discussing the definitions of these terms.³⁶ It translates *tafakkur* as “thinking,” *tadabbur* as “reflecting,” and *‘aql* as “intellect.” The article further states that *‘aql*, in Arabic, is related to “the potential and function of knowing, as well as the ability to classify and categorise, which impacts self-control and direction.”

Meanwhile, Article A9 does not specify the references used when defining *tadabbur* as “reflecting,” *tafakkur* as “thinking,” *ta‘aqqul* as “reasoning,” and *tabassur* as “understanding.”³⁷

Article A10 attempts to provide a basic morphological analysis in defining *‘aql*, mentioning the root word of the term. It translates *‘aql* as “to understand, comprehend, or reflect,” and concludes that *‘aql* signifies the ability to grasp and think about something. However, this definition is also based on a secondary journal article.³⁸

Similarly, Article B.C3 offers minimal morphological analysis, stating that *‘aql* is a *masdar* (verbal noun). It defines *‘aql* as *fahima wa tadabbara*, translated as “to know, understand, reflect, and deliberate”, and supplements this by referring to the definition of “akal” in the Indonesian dictionary (*Kamus Besar Bahasa Indonesia*).³⁹

4.4.2 Predominance of Terminological Rather Than Contextual Analysis

In Analysing terms such as *‘aql*, *nāṣiyah*, and *tafakkur* from a linguistic perspective, most articles tend to focus on their terminological meanings rather than examining their contextual usage within the Qur’ānic verses. That is, the analysis primarily concerns the independent meaning of the word, its lexical root and etymology, rather than its function and position within the syntactic and rhetorical structure of the verse. Little to no attention is given to *Nahwu*, *Balaghah*, or *Siyaq al-ayah*, which are essential for

³⁵ Nurjanah et al., “Konsep ‘Aql dalam Al-Qur’an dan Neurosains,”

³⁶ Rofdlī and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

³⁷ Izzati, “Potensi Pembelajaran Manusia...,”

³⁸ Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...,”

³⁹ Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master’s thesis, Institut PTIQ Jakarta, 2020),

uncovering the deeper semantic relationship between the term and its surrounding elements within the verse. This tendency can be observed, for instance, in Article A3, which concludes:

“Even though the Qur’ān contains many references to the activity of the intellect, the word ‘*aqala*’ has a definite meaning, namely: to think, to understand, and to comprehend. Therefore, the meaning of IQ is the potential (rationality), the ability to understand and comprehend, to grasp phenomena, and to solve problems logically and make judgments.”⁴⁰

4.5 EVALUATION OF REFERENCE USAGE

4.5.1 Does Not Use Primary Sources

One example of an argument relying solely on secondary sources can be found in article A3, particularly in its claim that the meaning of ‘*aql*’ in the Qur’ān is “brain.” The article cites the opinion of Taufiq Pasiak, who states that the terms ‘*aql*, *qalb*, *nafs*, or *ruh*’ “become completely meaningless when not connected to the human brain.” Taufiq Pasiak is a neuroscience expert, and the referenced book is a popular neuroscience publication, not a scholarly work that thoroughly studies these terms. In supporting this argument, the article does not include any strong primary references that clearly substantiate this claim.

On this matter, Taufiq Pasiak (2012: 8–9) explicitly states that: ‘Whatever term is used (whether ‘*aql*, *qalb*, *nafs*, or *ruh*), all become entirely meaningless when not connected to the human brain, as the meaning of these terms has a neurobiological basis found in the human brain.’⁴¹

In this body of literature, only a few articles truly engage in direct analysis of Qur’ānic verses, while several merely cite each other. This can be seen in article A9 which bases its argument about the concept of ‘*aql*’ in the Qur’ān on research by Suyadi, a central figure in this discourse.

In-depth research conducted by Faiz and Suryadi on verses that signal the activity of the intellect...⁴²

⁴⁰ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

⁴¹ Kasno, “Aql dan Otak dalam Kajian Neurosains...,”

⁴² Izzati, “Potensi Pembelajaran Manusia...,”

A similar case is found in article A1, titled “*The Concept of ‘Aql in the Qur’ān and Neuroscience*,” which discusses the concept of ‘*aql* in the Qur’ān. In this discussion, the authors do not refer at all to authoritative *tafsīr* works such as those by al-Ṭabarī, Ibn Kathīr, al-Qurṭubī, Fakhr al-Rāzī, or even contemporary exegetes like Quraish Shihab. The article also does not involve authoritative exegesis in building its synthesis. Its interpretation of the verses appears more like a general discussion of ‘*aql*, rather than an in-depth study of Qur’ānic verses. As can be seen in the excerpt below, much of the verse discussion relies on secondary sources.

The Qur’ān asks humans to think, and the Qur’ān also venerates the greatness of the intellect and its status in humans. The statements in the Qur’ānic verses indicate that Allah instructs us to use the intellect as a tool for thinking in order to reflect upon reality and produce knowledge. In fact, it is obligatory for humans to use the intellect and to accord it a high position. However, when humans use reason, it has its limitations and weaknesses.” (Lukman Hakim Fuadi, "Peran Akal Menurut Pandangan Al-Ghazali," *Jurnal Substantia*, 15, No. 1 (2013): 86.⁴³

4.5.2 References Do Not Support the Argument

Some research that incorporates commentary from books of *tafsīr* to explain the verses does not fully integrate the commentary into the broader argument of the verse’s relation to the brain or neuroscience. These studies do not critically analyse the interpretations or explain how these interpretations support their claims.

In the argument that the concept of the human being as the most perfect creation implies the existence of the brain, article A10 supports its position by referring to Ibn Kathīr’s *tafsīr* of sūrah al-Tīn: 4 and sūrah al-Isrā’: 70. The article highlights Ibn Kathīr’s interpretation that these verses describe humans as superior beings, created in the best form. According to Ibn Kathīr, this superiority is demonstrated through the creation of the human body in a balanced, perfect manner, without defect.

This interpretation of Ibn Kathīr regarding physical perfection is then connected by the article’s authors to the brain, arguing that human superiority lies in their cognitive abilities. From this, it is clear that the argument linking these verses to the brain is not directly sourced from Ibn Kathīr’s interpretation, but rather represents an interpretation

⁴³ Nurjanah et al., “Konsep ‘Aql dalam Al-Qur’an dan Neurosains,”

of his interpretation. The relationship between the verses and the brain or neuroscience appears to be based more on the authors' conclusions than on Ibn Kathīr's actual *tafsīr*.

Allah created humans as superior beings among His creations, even surpassing angels in their creation. This is expressed in QS. *Al-Isrā'* and *At-Tīn*... According to the *tafsīr* of Ibn Kathīr, these two verses explain the creation of humans with all their excellences. Allah SWT granted humans the best characteristics, balanced limbs, perfection, and no deficiency. All of these are signs of Allah's power in creation and resurrection on the Day of Judgment. The superiority of human creation also has implications for their capacity to bear the trust (*amānah*) as caliphs on earth... According to the *tafsīr* of Ibn Kathīr on QS. *Al-Aḥzāb*: 72, Al-'Awfī narrated from Ibn 'Abbās: 'The meaning of *al-amānah* is obedience, which was offered...'⁴⁴

Article A10 also refers to Quraish Shihab's interpretation in explaining the concept of '*aql*' in al-Baqarah: 75. From this reference, they conclude that there are two characteristics of reason ('*aql*): "not being deceived" and "deceit." However, no explanation is provided as to how Quraish Shihab's interpretation relates to the argument that '*aql*' is connected to the brain and neuroscience.

The use of the word '*aqalah*' is found in QS. Al-Baqarah: 75... Quraish Shihab (2012) explains that the verse concerns the nature of the Children of Israel, aimed at reminding Muslims not to be deceived by their deceitful behaviour, nor to place too much hope in them. From this explanation, two characteristics of the intellect ('*aql*') are derived: not being deceived and deceit.⁴⁵

As found in article A10, article B.C3 also uses Ibn Kathīr's *tafsīr* to support the claim that sūrah al-Tīn: 4 and sūrah al-Isrā': 70 imply the existence of the brain. The article argues that Ibn Kathīr's interpretation of these verses describes the perfection or superiority of human beings. The article then elaborates at length on the concept of the perfection of human creation, explaining that human excellence can be seen in the ability to subdue animals and plants, and in possessing intellect and thought that enables humans to dominate nature for their needs. It also discusses the differences between humans and animals in terms of eating behaviour and body posture. After this, the article directly concludes that the source of human superiority and perfection lies in the brain. However, the article does not specifically explain which part of Ibn Kathīr's *tafsīr*

⁴⁴ Juliani, Sabili, and Suyadi, "Tafsir Ayat-Ayat Neurosains...",

⁴⁵ Juliani, Sabili, and Suyadi, "Tafsir Ayat-Ayat Neurosains...",

explicitly links human perfection with the brain. The article appears to offer an additional interpretation that is not clearly stated in Ibn Kathīr's commentary.

Humans are the most perfect creation of God compared to other creatures. This is explicitly stated in QS. At-Tīn: 4: 'Indeed, We created man in the best of forms...' According to the *tafsīr* of Ibn Kathīr, the meaning of this verse is that Allah created man in the best condition and granted him the ability to subdue animals and plants under his control. Even the intellect and thinking of man can dominate nature for various purposes and needs. Humans eat with their hands, unlike other animals that take food with their mouths. And Allah made humans upright in stature. However, humans are unaware of their own distinction and assume that they are the same as other creatures. As a result, they do what reason does not approve of and what their innate disposition dislikes. This is what is being sworn by, that man was created by Allah in the best of forms. The superiority and perfection of man lies in the power of the brain or intellect, which is what makes humans different from other creatures."⁴⁶

Article B.C3 refers to the views of several Qur'ānic commentators in its discussion of implied references to the brain, which it claims can be found in the verses discussing the concept of man as *khalīfah* (vicegerent), namely sūrah al-Baqarah: 30-33.

Thus, Allah SWT created humans equipped with extraordinary brain capacity, so they were given the responsibility to be *khalīfah* on this earth, as found in QS. Al-Baqarah 30–31 and 33.⁴⁷

One of the commentators cited is Quraish Shihab. From his interpretation of these verses, the article highlights the phrase: "He granted him the potential for knowledge of the names." The article understands this as the verse describing Allah's gift to humans as the potential to know. Although not stated explicitly, this emphasis on the "potential to know" is seemingly interpreted as an allusion to the brain. In articles A3 and A5, *'aql* in the Qur'ān is also interpreted as the "potential to know."

In Tafsir al-Misbah, Quraish Shihab explains this verse: God taught Adam the names of all things, meaning He granted him the potential to know the names or words used to refer to objects, or taught him the functions of these objects. This verse informs that humans are endowed by God with the potential to know the names or functions and characteristics of things, for example, the function of fire, the function of wind, and so on, and also with the potential for language. The process of teaching language to humans (especially children) does not begin with

⁴⁶ Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master's thesis, Institut PTIQ Jakarta, 2020)

⁴⁷ Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master's thesis, Institut PTIQ Jakarta, 2020),

verbs, but rather with names: “this is Papa,” “this is Mama,” and so forth. This is part of the meaning understood by scholars from the verse: *He taught Adam the names, all of them.*

Article B.C3 also refers to the *tafsīr* of al-Biqā‘ī and Ṭāhir ibn ‘Āshūr in its discussion of sūrah al-Baqarah: 30-33. The article highlights their interpretations of the word *al-Ḥakīm* found in verse 32. However, the article does not explain how the meaning of *al-Ḥakīm* according to these commentators is related to the argument about the concept of man as *Khalīfah* in connection with the brain and neuroscience.

According to the *tafsīr* scholar, al-Biqā‘ī, *al-Ḥakīm* means one who fully believes in the knowledge and decisions he takes, so that he appears with confidence, does not speak with hesitation, or act based merely on assumptions, nor does he do anything experimentally. Ṭāhir ibn ‘Āshūr interprets *al-Ḥakīm* as someone who knows the intricacies of a matter so thoroughly that he is able to preserve it from corruption or imbalance.

This article also refers to the view of al-Ṭabāṭabā‘ī, who explains that this verse emphasises the “function of humans” or “human mission and responsibility,” where the mission mentioned in the verse is to be the *khalīfah* on earth.

Al-Ṭabāṭabā‘ī states that the verse carries a specific meaning when compared to other verses in the Qur’ān that speak about humans. These can be grouped into two categories: “structural” and “functional.” The first category includes verses discussing the origin of human creation, the elements that make up a human being, the phases of human development, and so on. The second category refers to verses discussing the mission and responsibilities that humans are entrusted with as they are commanded to live on earth. The verse in question belongs to this second category, where it states that humans are made to be *Khalīfah* on earth.

The interpretation of Fakhr al-Dīn al-Rāzī, which holds that the verse highlights the honour bestowed upon Adam and the great gift given to humanity, is also cited in this discussion. According to Fakhr al-Dīn al-Rāzī, this verse reveals how Allah honoured Adam, which simultaneously became a significant blessing for all of humankind. At least two tendencies can be observed in the interpretation of the word *khalīfah* in this verse: one views *khalīfah* as a replacement for previous creatures on earth, and the other sees *khalīfah* as a vicegerent who carries the divine mandate. In *Tafsīr al-Ṭabarī*, *khalīfah* is explained as the one who inhabits and populates the earth as a replacement for those who came before.

The views of these exegetes elaborate on the concept of *khalīfah fī al-ard*, which is believed to signify a trace of neuroscience in the Qur’ān. However, these interpretations do not actually support the argument that the concept of *khalīfah fī al-ard* is a trace of neuroscience in the Qur’ān. In fact, that should be the main argument supported by the opinions of the exegetes. It is not explained how the reference from *Tafsīr al-Miṣbāḥ*, about Allah teaching Adam the names of objects, and the views of al-Biqā’ī and Ṭāhir ibn ‘Āshūr regarding the meaning of *al-Ḥakīm* clearly support the claim that the concept of man as *khalīfah* is a reference to the brain or neuroscience in the Qur’ān.

A similar case is also found in article A8. This article argues that, according to Muḥammad ‘Abduh’s interpretation, there is an indication that *nāsiyah* is related to moral behaviour functions in humans, just as, in neuroscience, the forelock is associated with behavioural and moral functions. Due to this functional similarity, it is interpreted that the *nāsiyah* mentioned in the Qur’ān refers to the brain. From this, it can be seen that ‘Abduh’s interpretation does not directly support the claim that *nāsiyah* is related to the brain or neuroscience.

4.6 LOGICAL FALLACY

4.6.1 A Qur’ānic Hint About the Brain Is Treated as a Qur’ānic Hint About Neuroscience

The first logical fallacy appears in the argument is that “a Qur’ānic indication about the brain is equal to, or can be interpreted as, a Qur’ānic indication about neuroscience.” As previously explained, the term “brain” is used as an entry point to reading neuroscience into the Qur’ān. Verses of the Qur’ān that are believed to allude to the brain are interpreted as traces of neuroscience in the Qur’ān.

Articles A1, A3, and B.C3 conclude that the verses they analyse contain a command to use ‘*aql*’.⁴⁸ Article A10 concludes that the verses discussed in the article contain a command to use the brain.⁴⁹

⁴⁸ Nurjanah et al., “Konsep ‘Aql dalam Al-Qur’an dan Neurosains,”; Kasno, “Aql dan Otak dalam Kajian Neurosains...,”; Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master’s thesis, Institut PTIQ Jakarta, 2020), [page number].

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Table 4.4 Quotations Showing the Qur'ānic Command to Use 'Aql as a Hint of Neuroscience

Code	Quotation
A1	<i>ayat alquran di tersebut menunjukkan bahwa Allah menyuruh kita menggunakan akal</i> <i>“These verses of the Qur’ān show that Allah commands us to use reason” ... “Neuroscience has traces in Islam.”</i>
A3	<i>Untuk menggambarkan kecedasan digunakanlah kata akal, namun istilah otak tidak dikenal al-Qur’an ... apa yang ditemukan dari penelitian neurosains pada saat ini sesungguhnya telah mempunyai sinyalemen yang cukup tegas didalam al-Qur’an.</i> <i>“To describe intelligence, the word ‘aql is used, although the word brain is not known in the Qur’ān... The explanations of the Qur’ānic verses above show that Allah commands humans to use their intellect... What has been discovered through neuroscience research today actually already had quite clear signs in the Qur’ān.”</i>
A10	<i>“The term neuroscience also exists in the Qur’ān, namely brain activity... this is a hidden wisdom to motivate humans to pay attention to themselves, to use their brains, to study (tafaakur and tadabbur) the brain organ.”</i>

Meanwhile, articles A3, B.C3, and A7 directly equate 'aql with the brain, interpreting 'aql as the brain.⁵⁰

⁵⁰ Kasno, “Aql dan Otak dalam Kajian Neurosains...”; Ida Royani Munfarokhah, *Neurosains dalam Mengembangkan Kecerdasan Intelektual Peserta Didik SD Islam Al-Azhar BSD* (master’s thesis, Institut PTIQ Jakarta, 2020); Jailani, Suyadi, and Djubaedi, “Menelusuri Jejak Otak dan ‘Aql...,”

Table 4.5 Quotations Equating ‘Aql with the Brain

Code	Quotation
A3	<i>“To describe intelligence, the word ‘aql is used, although the word brain is not known in the Qur’ān... The explanations of the Qur’ānic verses above show that Allah commands humans to use their intellect... What has been discovered through neuroscience research today actually already had quite clear signs in the Qur’ān.”</i>
B.C3	<i>“The brain in the Qur’ān is described by the word ‘aql (reason)...”</i>
A7	<i>“The neurobiological basis of the brain in the Qur’ān can be traced based on the concept of ‘aql as its key term... Neuroscience in Islamic education has neurobiological traces that can be tracked in the Qur’ān, particularly in Surah al-‘Alaq verses 15–16.”</i>

Articles A4, A11, and B1 claim that the meaning of *nāṣiyah* is the brain⁵¹:

Table 4.6 Quotations Equating Nāṣiyah with the Brain

Code	Quotation
A4	<i>“What is meant by the crown is the brain, especially the prefrontal cortex... Neuroscience in the 19th century was very broad and was already present in Islamic civilisation along with the revelation of the Qur’ān.” (see also A6)</i>
A11	<i>“In Salman’s interpretation, what is meant by the crown is the brain... The development of neuroscience and Islamic education in</i>

⁵¹ Jailani *et al.*, “Critical Analysis of ‘Aql and Brain...”; Suyadi and Jailani, “The Concept of ‘Aql and Brain,”; Suyadi, “Hybridisation of Islamic Education and Neuroscience,”

	<i>this modern era is in line with the emergence of new findings, namely research about the meaning of nāṣiyah in the Qur’ān, which some commentators define as ‘the crown.’”</i>
B1	<i>“Thus, what is meant by nāṣiyah in Q.S. al-‘Alaq [96]:15–16 above is the human brain... It can therefore be concluded that neuroscience, which emerged in the 19th century, was essentially a development of the critical study of the concept of nāṣiyah in the Qur’ān.”</i>

Articles A5, A10, and B2 argue that terms in the Qur’ān related to brain activity are traces of neuroscience in the Qur’ān.⁵²

Table 4.7 Quotations Claiming Qur’ānic Terms for Brain Activity Indicate Neuroscience

Code	Quotation
A5	<i>“Qur’ānic verses about neuroscience can be traced through key terms that refer to brain activity.”</i>
A10	<i>“The term neuroscience also exists in the Qur’ān, namely brain activity... this is hidden wisdom to motivate humans to pay attention to themselves, to use their brains, to reflect (tafaakur and tadabbur) on the brain organ.”</i>
B2	<i>“Traces of neuroscience in the Qur’ān can be found in the terms used by the Qur’ān to refer to brain activity... Neuroscience has traces in Islam.”</i>

From the excerpts above, it can be seen that these articles present or discuss Qur’ānic verses or terms that are believed to be related to the brain. These are then

⁵² Rofdli and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Juliani, Sabili, and Suyadi, “Tafsir Ayat-Ayat Neurosains...”; Suyadi, “Integrasi Pendidikan Islam dan Neurosains,”

interpreted as traces or indications of neuroscience in the Qur'ān. Here we can observe that the logic used is: 'a Qur'ānic indication or discussion about the brain constitutes an indication or trace of neuroscience in the Qur'ān'. In this reasoning, the brain is equated with neuroscience.

A Qur'ānic indication about the brain, however, cannot automatically be interpreted as a Qur'ānic indication about neuroscience. To speak of neuroscience is indeed to speak about the brain. But to speak about the brain does not necessarily mean one is speaking about neuroscience, because neuroscience is merely one way of studying the brain. Neuroscience is a scientific discipline. It concerns how something is studied, how one views the empirical reality referred to as the "brain." It involves a set of methodologies and theories that are not absolute. It is composed of frameworks of theories constructed by humans. Neuroscience is a modern scientific lens through which the reality of the brain is examined. It is a discipline grounded in experimentation and observation.

As has been emphasised by several thinkers such as Syed Muhammad Naquib al-Attas, Seyyed Hossein Nasr, and Osman Bakar, modern science is not in essence value-free. Therefore, viewing neuroscience as a purely neutral attempt to study the brain is a mistaken assumption. Auda, for instance, states that *"It is also not accurate to consider natural sciences to be mere neutral or value-free 'tools'. All sciences are based on frameworks of concepts, objectives, values, which may not necessarily align with the revelation."*⁵³

If we claim that the Qur'ān discusses neuroscience and thereby provides legitimacy for the discipline, then we are indirectly legitimising a modern scientific discipline that is, at its core, theoretical and non-absolute. The implication of such a claim is that the Qur'ān becomes a theological foundation for the entire structure of neuroscience, an epistemologically and theologically problematic position.

⁵³ Jasser Auda, *Re-Envisioning Islamic Scholarship: Maqasid Methodology as a New Approach* (Swansea: Claritas Books, 2021)

4.6.2 The Qur'ānic Allusion to the Brain/Neuroscience Legitimises the Integration of Neuroscience into Islamic Education

Table 4.8 Quotation on Qur'ānic Justification for Integration of Neuroscience in Islamic education

Code	Quotation
A1	<i>Neuroscience memiliki jejak dalam islam.....Oleh karena itu pendididkan islam dapat diintegrasi-interkoneksi dengan neurosains” “Neuroscience has a trace in Islam... Therefore, Islamic education can be integrated-interconnected with neuroscience.”</i>
A3	<i>adanya perubahan paradigma dalam memandang hubungan akal, hati, dan otak.... Perubahan itu ditunjukkan dengan mengakomodir perkembangan-perkembangan baru neurosains, terutama yang ada hubungannya dengan pendidikan</i> <i>“There has been a paradigm shift in viewing the relationship between reason, heart, and brain. This shift is demonstrated by accommodating new developments in neuroscience, especially those related to education.”</i>
A4	<i>research result) “has broad implications for the development of Islamic education today.” ... “The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely research about the meaning (nasyiyah) in the Qur’ān.”</i>
A10	<i>Implikasinya terhadap pendidikan Islam adalah pengembangan potensi akal sebagai bentuk sebaik-baik penciptaan manusia</i> <i>“Its implication for Islamic education is the development of intellectual potential as a form of the best human creation.”</i>
A11	<i>“The development of neuroscience and Islamic education in this modern era is in line with the emergence of new findings, namely</i>

	<i>research about the meaning (nāṣiyah) in the Qur'ān... Therefore, Islamic Education and Neuroscience can be hybridized."</i>
B1	<i>"The results of the study showed that the concepts of nasiyah (crown) and 'aql (mind) in the Qur'ān have a correlation with the brain and mind in neuroscience. Both can be hybridized so as to find new varieties of science called the Islamic Education Neuroscience."</i>
B2	<i>Neurosain mempunyai jejak di dalam Islam. Pendidikan islam mempunyai jejak di alam neurosain. Oleh karena itu, pendidikan Islam dapat diintegrasikan-interkoneksi dengan neurosain.</i> <i>"Neuroscience has a trace in Islam. Islamic education has a trace in the realm of neuroscience. Therefore, Islamic education can be integrated-interconnected with neuroscience."</i>

Starting from the argument that traces of neuroscience exist in the Qur'ān, several articles, as shown in the excerpts above, then conclude that the integration of neuroscience into Islamic education is in line with the Qur'ān or is valid because it has legitimacy in the Qur'ān. There are several issues with this argument:

First, as previously explained, the argument that neuroscience has traces in the Qur'ān is a weak argument. Qur'ānic terms or verses that imply the brain cannot automatically be interpreted as signs/traces of neuroscience in the Qur'ān. Therefore, the argument that the Qur'ān legitimises neuroscience is based on a weak foundation.

The second issue is that the argument "The Qur'ān's indications of the brain/neuroscience legitimise the integration of neuroscience with Islamic education" is one that greatly reduces the complexity of the issue. The integration of neuroscience into Islamic education is a complex, multidisciplinary problem.

As discussed in Chapter 2, at least three forms of neuroscience integration into Islamic education have been proposed by proponents. First, interpreting this idea as a change in the orientation/direction of Islamic education development, where this change in orientation should be reflected in the Islamic education curriculum in the broad sense,

including everything related to the administration of education. Second, neuroscience is internalised into the curriculum by developing it with reference to neuroscience theories or findings. Third, the formation of a new discipline called Islamic educational neuroscience.

These three proposals offer systemic integration. They encompass the entirety of neuroscience, including findings, theories, perspectives, and the entire paradigm of Islamic education. As explained by Donoghue and Horvath, education itself is a multifaceted field with neurological, psychological, and sociocultural dimensions.⁵⁴ Therefore, concluding that “the systemic integration of neuroscience into Islamic education is legitimised” without a deep and comprehensive consideration of all these aspects from a Qur’ānic worldview constitutes a severe oversimplification of the issue.

Looking at the discipline of educational neuroscience, which has been pioneered earlier, even the “legitimacy” or effectiveness of that discipline is still debated among experts. Furthermore, in the process of establishing a bridge between these two disciplines, there are major challenges in translating the two fields, which have very different epistemological natures. Thus, in the idea of integrating neuroscience into Islamic education, there is an even greater challenge where neuroscience, which is based on experiment, must dialogue with the philosophy of Islamic education, which is also based on metaphysical concepts. Therefore, in determining the Qur’ān’s view on this issue, there are many aspects/dimensions that must be studied and taken into consideration.

The third issue arises because in the argument concerning the “legitimacy of neuroscience,” the Qur’ānic topic discussed is very limited while the conclusions drawn are disproportionately large. They reduce a complex, multidisciplinary problem to a single simple question: “Does the Qur’ān talk about the brain?”

The discussions found in this literature do not deeply and comprehensively examine the topic of neuroscience in the Qur’ān. In this literature, discussions on neuroscience in the Qur’ān stop at identifying terms or verses believed to relate to, discuss, or imply the brain. Moreover, this literature does not explore in depth how the

⁵⁴ Gregory M. Donoghue and Jared Cooney Horvath, “Neuroeducation: A Brief History of an Emerging Science,” in *Reference Module in Neuroscience and Biobehavioral Psychology*, ed. [Editor Name(s)] (Amsterdam: Elsevier, January 2020), sec. 632, <https://doi.org/10.1016/B978-0-12-819641-0.00077-3>

Qur'ān views *'aql* or the brain/neuroscience and merely concludes that the Qur'ān discusses the brain. Because the discussion found in this literature has not even been conducted properly and thoroughly, concluding that the Qur'ān legitimises neuroscience is an extremely far-reaching leap.

Since the study of the integration of neuroscience into Islamic education is a complex one, its approach must also be multidimensional. To understand the Qur'ān's perspective on the integration of neuroscience in education, a study from various aspects is required. There are many concepts in the Qur'ān related to this issue, all of which must be studied in depth and referred back to a holistic Qur'ānic framework.

4.6.3 Analysis of the Cause of Logical Fallacy: The Belief That Neuroscience Has Not Developed Because There Are No Traces of It in the Qur'ān

Table 4.9 Quotations Regarding the lack of Qur'ānic Basis for Neuroscience

Code	Quotation
A4	<i>“The main problem in this research is that neuroscience has so far been considered a secular science because there is no explicit trace of it in the Qur'ān. Therefore, this science is less developed in Islamic education because it does not have formal legitimacy in sources of Islamic law related to scientific studies, namely the Qur'ān and Sunnah.”</i>
A5	<i>Pengembangan akal pikiran atau berpikir kreatif inovatif dalam Pendidikan Islam selama ini dipandang tidak memiliki landasan normatif dan teologis dalam Alquran.</i> <i>The development of intellect or creative and innovative thinking in Islamic education has so far been viewed as lacking normative and theological foundations in the Qur'ān.</i>
A6	<i>Penelitian bertujuan untuk menyelidiki hubungan antara neurosains dan prinsip-prinsip Islam, dengan mengatasi pandangan bahwa</i>

	<i>neurosains belum dianggap sebagai disiplin ilmu Islam karena muncul setelah turunnya Al-Qur'an dan As-Sunnah pada abad ke7.</i> <i>This research aims to investigate the relationship between neuroscience and Islamic principles, by addressing the view that neuroscience has not yet been recognised as an Islamic discipline because it emerged after the revelation of the Qur'ān and Sunnah in the 7th century.</i>
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From the excerpts above, we can see that the authors of these articles did not initially aim to analyse the Qur'ān's view ~~on neuroscience or its view on the integration of neuroscience into Islamic education.~~ From the start, their aim was to prove that neuroscience is discussed in the Qur'ān, in the hope that neuroscience would then receive greater attention in the field of Islamic education.

The authors of these articles made an early assumption that neuroscience has received little attention in Islamic education because Muslims have long considered neuroscience to be a secular science, due to the absence of a literal mention of it in the Qur'ān. However, this argument is not supported by any references or substantial evidence.

This kind of view has already been cautioned against by Mulyadhi Kartanegara, one of the prominent figures of IOK. He argued that the integration of knowledge, including the Islamisation of knowledge, should not be understood as a quest to find literal references in the Qur'ān.

Mulyadhi Kartanegara agrees with the Islamisation of knowledge, with several notes. First, the Islamic element in the term 'Islamisation' should not be strictly understood as teachings that must have literal references in the Qur'ān and hadith, but rather should be viewed from a spirit that must not contradict the fundamental teachings of Islam.⁵⁵

⁵⁵ Mulyadhi Kartanegara et al., Introduction to Islamic Studies (Jakarta: Ushul Press, 2011)

In this literature, they interpret the integration of knowledge, and the integration of neuroscience into Islamic education, as something that must be proven through literal references in the Qur'ān, that is, by showing that neuroscience has traces in the Qur'ān.



CHAPTER FIVE

CONCLUSION

5.1 ON THE IDEA OF INTEGRATING NEUROSCIENCE INTO ISLAMIC EDUCATION

The idea of integrating neuroscience into Islamic education is an effort to respond to the advancements of modern science for the improvement of educational processes. The educators who support this idea are those who are hopeful about studies on the human brain, with the hope of optimising teaching and learning methods. They are people who strive to help future teachers choose more effective teaching methods, to help teachers not only understand what they are teaching but also how to teach it effectively, and to help students learn effectively, including how to develop appropriate responses to children with learning difficulties.

This deserves appreciation as an effort that reflects a spirit of innovation, continuous evaluation, improvement, and ongoing enhancement within Islamic education. It inspires educators to continue making progress and optimising various aspects for a better and ever-improving Islamic education.

This issue prompts us to reflect once again on how we perceive human beings within educational processes at various levels. How do we view the dynamics or the relationship of human beings, who possess both physical and metaphysical realities, within education in its broadest sense?

When discussing this issue, we are talking about education in a broad sense, ranging from philosophical matters such as the goals and essence of Islamic education, to more practical concerns, such as how to address the problems faced by teachers in the classroom.

5.2 A MAJOR PROBLEM WITH ROLE OF THE QUR'ĀN IN THIS DISCOURSE

However, an in-depth examination of this discourse reveals a very fundamental problem. In this discourse, they use verses of the Qur'ān to strengthen their arguments

about why their proposal is necessary. They use Qur'ānic verses to support their proposals. This problem relates to the role of the Qur'ān in this discourse, how the Qur'ān is *functioned*. They function the Qur'ān as a tool to legitimise their proposals.

They see that a field of knowledge can be called Islamic if traces of it can be found in the Qur'ān. They feel the need to prove that neuroscience aligns with the Qur'ān, that neuroscience has a theological basis, that the Qur'ān legitimises this modern science, so that this discipline gains more attention in Islamic education.

From this, we can see that before analysing these “neuroscience verses,” they already hold the belief that neuroscience as a whole aligns with the Qur'ān. That there is no reason not to integrate neuroscience into Islamic education, because it is, after all, discussed in the Qur'ān and contains nothing that contradicts it.

It is this problem, that the Qur'ān plays a role in providing justification for the idea of integrating neuroscience into Islamic education, as well as the preconceived notion that neuroscience, in its entirety, aligns with the Qur'ān, that then gives rise to further issues in their approach to interpreting the Qur'ān.

What they end up doing is not interpreting the Qur'ān in order to understand the Qur'ān's perspective on the issue, but rather imposing their view onto the Qur'ānic verses. They don't let the Qur'ān guide the meaning. They merely try to prove that the Qur'ān talks about the issue, without exploring what the Qur'ān actually says about that issue. In many of the articles in this literature, there are many discussions that appear to be acts of interpretation, efforts to uncover the meanings and guidance of the Qur'ān, but those efforts are not carried out in any real or substantive way.

They offer a new interpretation of certain verses and terms in the Qur'ān. However, this new interpretation is not grounded in a rigorous analysis of the verses. The synthesis is not built from an in-depth study of the verses. It is unclear how the references they cite and the linguistic analysis they conduct actually support their arguments regarding the new meanings they propose. After collecting the related verses, they do not analyse their unified meaning or construct a thematic interpretation based on the comprehensive analysis of all those verses. They appear as if they are gathering verses, consulting classical exegesis, and analysing linguistic aspects, but all of that is merely an illusion. They are not truly doing it. These efforts are not carried out in any real or substantive way. They have already pre-concluded the meanings of the verses,

and the arguments used to support these conclusions are often based on leaps in logic and lack strong explanation or reasoning as to why the verses should be understood in that way.

5.2.1 Challenge

The influence of the spirit of integration of knowledge that has developed in Indonesia (which also underlies this idea) can be seen in their approach to interpretation, specifically, their attempt to contextualise the meaning of the verses, to go beyond literal meaning, and to not be bound by the tradition of narration. This is also evident in their tendency toward inclusive interpretation, where various disciplines are invited to participate in the effort to understand the Qur'ān in order to respond to contemporary challenges.

However, this study also reveals that in the effort to derive answers from the Qur'ān in response to contemporary issues and realities, several challenges arise. One of the key challenges is: How do we formulate the problem? What is the real issue at hand? And then, what exactly are we seeking from the Qur'ān, what question are we trying to answer through the Qur'ān?

This discourse shows us that the process is neither easy nor straightforward, it needs deep examination. And we can see in this discourse that they stumble over this problem. They oversimplify a complex, interdisciplinary issue. The issue of integrating neuroscience into Islamic education is reduced to a single topic: “the brain.” Then, from this narrowed issue, the question they seek to answer from the Qur'ān becomes as simple as: “Does the Qur'ān talk about the brain?”

This study affirms the need for a more thorough inquiry into the methodology of contemporary *tafsīr*, particularly regarding the following key questions: How do we formulate the problem? What is the real issue we are facing? And then, how do we determine what to look for in the Qur'ān, what questions are we hoping to find answers to?

In the future, there will be many new discoveries and innovations we have never encountered before, sometimes, we may not even fully understand what they actually are. Yet, these discoveries will have a profound impact on our lives. People will seek

guidance from the Qur'ān regarding such matters. For example, artificial intelligence and various technologies that are currently booming and significantly shaping our lives. Naturally, these contemporary realities must be read carefully, not merely assessed by determining whether they are mentioned in the Qur'ān to judge whether they are halal or haram.

We are witnessing challenges within one of the principles of contextual-progressive *tafsīr*, as supported by Amin Abdullah, namely, the idea that interpretation is interactive, where readers from various disciplines can contribute to the production of meaning. In this case, we see education experts participating in meaning-making¹. However, what ends up happening is a form of pragmatic interpretation, used to serve certain interests, and failing to capture the essence of the Qur'ān. The interpretive process becomes oversimplified, and the resulting interpretations of verses are shallow.

From this, we learn that interactivity in Qur'ānic interpretation must be accompanied by scholarly responsibility and a commitment to ensuring that the meanings derived from the Qur'ān genuinely emerge from the text, through a valid methodology, without being influenced by ideological pressures, scientific agendas, or simplified logic.

In that process, understanding cannot be separated from existing methods of interpretation. It must still be grounded in a sufficient grasp of the principles of Qur'ānic exegesis.

From this, we also learn that the principle of openness in Qur'ānic interpretation to various scientific disciplines, as emphasised by Amin Abdullah's contextual-progressive approach, indeed offers great potential for making the Qur'ān remain relevant in responding to contemporary challenges, including in the fields of education, science, and technology.² However, this principle of interpretive interactivity also entails serious challenges: when the involvement of experts from outside the discipline of *tafsīr* is not accompanied by methodological competence in Qur'ānic studies, the interpretive process tends to become pragmatic, superficial, and purely functional.

¹ M. Amin Abdullah, *Multidisiplin, Interdisiplin, dan Transdisiplin: Metode Studi Agama dan Studi Islam di Era Kontemporer* (Yogyakarta: IB Pustaka, 2020).

² Ibid

In the context of integrating neuroscience and Islamic education, we see how interpreters from educational or scientific backgrounds enter the realm of Qur'ānic interpretation, but with an approach that oversimplifies the issue, whether in formulating *tafsīr* questions, collecting verses, or constructing meaning from the revealed text. As a result, the interpretations produced fail to explore the essence of Qur'ānic values and merely cite verses as justification to support certain scientific ideas or agendas.

Thus, the openness of *tafsīr* to reality and interdisciplinarity must still be balanced with epistemological and methodological caution, so that *tafsīr* does not fall into mere “alignment” or “affirmation” of external agendas. *Tafsīr* must remain a scholarly and spiritual process that extracts meaning from the text with depth and precision, not just a pragmatic tool to support scientific narratives or educational policies. This is the key lesson from this phenomenon: interactivity in *tafsīr* must be accompanied by scholarly responsibility and integrity of meaning.

From this phenomenon, we can see that efforts to integrate neuroscience and the Qur'ān, particularly in the context of Islamic education, represent an early form of interdisciplinary encounter. It opens space for modern academic disciplines such as education, psychology, or neuroscience to engage with the Islamic intellectual tradition, especially the Qur'ān. However, such encounters are often one-sided and not based on a truly dialogical process. Education scholars interpret verses, but without seriously involving experts in *tafsīr*. As a result, the interpretive process tends to be pragmatic and methodologically weak.

This situation reflects a lack of meaningful interdisciplinary collaboration. Ideally, as emphasised in Amin Abdullah's integrative-interconnective approach, there should be mutual questioning, critical engagement, and complementarity between academic disciplines. Educational experts should engage in dialogue with Qur'ānic scholars to ask: is the interpretive approach being used methodologically sound? Is there a more appropriate way to explore the Qur'ān's perspective on this contemporary issue?

Therefore, this phenomenon highlights the urgent need for more intense and comprehensive interdisciplinary dialogue. The encounter between modern reality and revelation should not be monopolised by one discipline, but should be approached collaboratively. This is not just a shortcoming, it is also an opportunity: that the

discourse of knowledge integration must be continuously promoted through interdisciplinary *tafsīr* forums, so that the Qur'ān can truly serve as a source of meaning and guidance in facing the challenges of our time, without losing its methodological integrity or transcendental message.

The main finding of this research indicates that the effort to interpret Qur'ānic verses in relation to neuroscience and Islamic education has not yet been conducted properly or rigorously. Although the existing literature claims to employ thematic and interdisciplinary approaches to interpretation, methodologically, the *tafsīr* processes carried out do not meet the standards of sound Qur'ānic scholarship. From problem formulation, to the method of compiling verses, synthesising meaning, and the justification process, all still display patterns of oversimplification, a tendency toward pragmatism, and a lack of deep epistemological dialogue.

This study does not aim to normatively answer whether neuroscience should or must be integrated into Islamic education. On the contrary, this study seeks to show that such a question is itself misguided.

The Qur'ān's perspective on the idea of integrating neuroscience into Islamic education is far too complex to be answered merely by asking whether the word "brain" appears in the Qur'ān. Behind that question lie philosophical, epistemological, and methodological dimensions that have yet to be seriously examined.

Thus, answering such questions requires genuine, multidisciplinary academic collaboration, between *mufasssīr*, Muslim philosophers, education scholars, neuroscientists, and psychologists. It takes a rigorous and collaborative effort to explore how the Qur'ān, as a source of ethical and spiritual guidance, might engage with modern scientific disciplines. What is needed is not merely a search for terminology, but a willingness to ask the Qur'ān deeper questions: what is its view of the human being, of intellect, of learning, of the body, and of the responsibility of knowledge? Only through such an approach can the integration of knowledge be meaningfully pursued and firmly grounded in strong methodology.

5.2.2 Recommendation

A study titled The Hard Problem of ‘Educational Neuroscience’ by Palghat et al. investigates how philosophical assumptions about the mind, specifically the hard problem of consciousness and mind-body problem, may influence researchers in educational neuroscience³. This research reinforces the argument about the existence of epistemological and philosophical challenges in merging modern neuroscience and Islamic educational thought. In which the existing studies on the integration of neuroscience into Islamic education in Indonesia have not been sufficiently critical of this issue. As Palghan et al explain,

Philosophical assumptions that differ between fields and individuals impact how research is conducted and contribute to conflicting approaches.⁴

The mind-body problem questions the relationship between mental phenomena such as consciousness, perception, and intention and physical phenomena such as brain activity. Educational neuroscience is built on the belief that the mental phenomena such as thinking and learning can be fully explained by studying the brain. However, this assumption stands in contrast to philosophical perspectives that maintain a clear distinction between the mental and the physical. In this context, the presence of the mind-body problem presents a significant philosophical challenge to the field of educational neuroscience, which often assumes that mental processes involved in education are directly linked to, or even reducible to, physical processes in the brain. And this disagreement is often not discussed or questioned deeply within the field of educational neuroscience. As Palghan et al caution,

The prospects for the field of Science of Learning are constrained by one’s philosophical stance on the accessibility of knowledge in this area. If we take the view that the hard problem of consciousness is a real problem, we see how it constrains the possible influence of neuroscience on teaching practice.⁵

The integration of neuroscience into Islamic education is not merely technical or pedagogical; it is deeply philosophical. Islamic education carries metaphysical

³ Kelsey Palghat, Jared C. Horvath, and Jason M. Lodge, “The Hard Problem of ‘Educational Neuroscience,’” *Trends in Neuroscience and Education* 6 (2017): 204–210, <https://doi.org/10.1016/j.tine.2017.02.001>.

⁴ Ibid.

⁵ Ibid

concepts and beliefs, while neuroscience often operates from a materialist or empiricist standpoint. The research conducted by Palghat et al., particularly the discussion on eliminative materialism in Dr. Steepleton's view, reinforces this point. This tension is reflected in Dr. Steepleton's materialist point of view:

Dr Steepleton is a neurobiologist studying memory formation in neural networks using fMRI. Dr Steepleton is an eliminative materialist. She believes that the body/brain is the only source of information about our personal state, and that emotional words or descriptions of our internal life are meaningless relics of rhetoric devices for things we don't yet fully understand. She also believes that the hard problem of consciousness is, as she puts it, 'hornswoggle'; it is a meaningless problem and stems from our ignorance.⁶

In Dr Steepleton's view all meaningful knowledge must be biologically measurable. If scholars like her dominate the field, educational neuroscience risks becoming blind to subjective, ethical, or spiritual dimensions of education which are central in Islamic education.

In the discourse of Integration of Islamic education in Indonesia, Islamic views of the human being such as the soul, *qalb*, *aql*, intersect or conflict with modern neuroscience's materialist framework. Words like "learning" or "intelligence" in neuroscience may not fully capture the Islamic concepts of *tafaqquh*, *tazkiyah*, or *hikmah*. neuroscience may be inherently limited in addressing aspects of Islamic education that involve transcendent knowledge, divine guidance, or spiritual transformation. Careless translation or borrowing of terms across fields may result in semantic confusion and philosophical dilution. Thus, any attempt at integration must begin with linguistic and conceptual clarification.

This research recommends a philosophical dialogue involving interdisciplinary teams rather than uncritical translation or integration. Instead of assuming that integration is always possible or beneficial, we should carefully examine whether the epistemological frameworks of modern neuroscience and Islamic education are truly compatible, so that any integration can be meaningful.

⁶ Ibid

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