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IMPLEMENTATION OF NEUROEDUCATION IN ISLAMIC RELIGIOUS EDUCATION AND ITS IMPLICATIONS FOR SPIRITUAL REFLECTION AND CHARACTER BUILDING

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ABSTRAK

Penelitian ini mengeksplorasi implementasi neuroedukasi dalam Pendidikan Agama Islam (PAI) serta pengaruhnya terhadap refleksi spiritual dan pembentukan karakter peserta didik. Studi ini menggunakan pendekatan kualitatif dengan desain studi kasus. Data dikumpulkan melalui observasi kelas, wawancara mendalam dengan guru PAI, pimpinan sekolah, dan peserta didik, serta analisis dokumen pembelajaran dan refleksi tertulis siswa. Analisis data dilakukan menggunakan analisis tematik. Hasil penelitian menunjukkan bahwa pembelajaran PAI berbasis neuroedukasi membentuk siklus pembelajaran holistik. Siklus ini mencakup aktivasi kognitif-emosional, keterlibatan bermakna, refleksi spiritual, dan tindakan karakter. Aktivasi emosional dan konteks pembelajaran meningkatkan fokus dan keterlibatan kognitif siswa. Proses ini mendorong refleksi nilai secara lebih dalam. Refleksi tersebut kemudian tercermin dalam perilaku dan tindakan karakter dalam interaksi sehari-hari di kelas. Temuan ini menunjukkan bahwa neuroedukasi mampu mengubah pembelajaran PAI menjadi proses yang lebih terintegrasi dan bermakna. Bagi pendidik Islam, pendekatan ini memberikan arah praktis untuk merancang pembelajaran yang tidak hanya berfokus pada pengetahuan, tetapi juga pada pengalaman nilai, kesadaran spiritual, dan pembentukan karakter secara nyata.

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Keywords:
neuroeducation, Islamic religious education, spiritual reflection, character building

ABSTRACT

This study explores the implementation of neuroeducation in Islamic Religious Education (IRE) and its impact on students' spiritual reflection and character development. The study employs a qualitative approach using a case study design. Data were collected through classroom observations, in-depth interviews with IRE teachers, school administrators, and students, as well as analysis of instructional documents and students' written reflections. Data analysis was conducted using thematic analysis. The results indicate that neuroeducation-based PAI instruction forms a holistic learning cycle. This cycle encompasses cognitive-emotional activation, meaningful engagement, spiritual reflection, and character-based actions. Emotional activation and the learning context enhance students' cognitive focus and engagement. This process encourages deeper reflection on values. Such reflection is then reflected in character-based behavior and actions during daily interactions in the classroom. These findings indicate that neuroeducation can transform PAI learning into a more integrated and meaningful process. For Islamic educators, this approach provides practical guidance for designing learning that focuses not only on knowledge but also on experiential values, spiritual awareness, and tangible character development.

A. INTRODUCTION

Islamic Religious Education (IRE) is an integral part of the education system that aims to shape students holistically through the development of cognitive, spiritual, and moral character aspects. From a modern educational perspective, religious education is expected to contribute to the formation of identity, the internalization of ethical values, and the strengthening of students' social responsibility within the context of a pluralistic and dynamic society (Jackson, 2019; Parker & Freathy, 2020).

Islamic Education (PAI) cannot be understood merely as a process of transmitting religious knowledge. It is a transformative values-based education focused on the development of a well-rounded personality (Bandura, 2018). Within the framework of contemporary Islamic pedagogy, the educational process must be able to integrate knowledge, faith, and action into a living unity within the students' learning experience.

However, various international studies indicate that religious education practices still face serious challenges. Religious instruction often remains trapped in a cognitive-reproductive approach that emphasizes memorization of texts and mastery of normative concepts. The dimensions of personal experience, reflection on meaning, and character formation have not yet been systematically integrated (Cooling, 2015; Sahin & Francis, 2019). As a result, religious education risks losing its transformative power and merely stopping at declarative knowledge without any impact on students' actual behavior (Palinkas, 2015).

This situation has become increasingly relevant in the context of 21st-century education. The world of education demands active, meaningful learning that involves an emotional connection to the material. In modern religious education studies, religious learning that does not involve emotion and personal reflection tends to be less effective in fostering long-term moral commitment (Halstead, 2017; Jackson, 2019).

The one-way learning model is also becoming increasingly ill-suited to the needs of the digital generation, which requires contextual and reflective learning experiences

(King, 2020; Parker & Freathy, 2020). This calls for an updated approach to Islamic pedagogy that is more adaptive and integrative.

In this context, neuroeducation emerges as an approach that integrates neuroscience, cognitive psychology, and educational science. This approach explains how the brain learns, processes emotions, and constructs meaning simultaneously. Research in educational neuroscience shows that emotions play a crucial role in attention, memory, decision-making, and the internalization of values (Immordino-Yang et al., 2020; Immordino-Yang & Damasio, 2016). Meaningful learning that involves emotional experiences has been shown to enhance engagement and long-term memory (Jensen, 2018; Zull, 2020).

A number of studies have begun to link neuroeducation with religious education. (Fischer et al., 2020) confirms that emotional experiences and episodic memory have strong relevance in the learning of religious values. (Sahin & Francis, 2022) also emphasizes the importance of integrating affective and reflective dimensions into Islamic Education so that Islamic values are authentically internalized. However, the application of neuroscience in the design of Islamic Education (PAI) instruction has not yet been systematically developed in classroom practice. On the other hand, the brain-based learning approach in Western literature still focuses on improving academic achievement. Spiritual and character dimensions are often positioned as side effects, not the primary goals (Tokuhama-Espinosa, 2022).

However, in Islamic pedagogy, the intellect (‘aql), the heart (qalb), and action (‘amal) form an inseparable unity in the process of human education. Therefore, a learning model is needed that can fully integrate all three. Research in Indonesia also highlights the urgency of integrating cognitive, affective, and spiritual aspects into Islamic Education (PAI) (Hidayat & Syamsul, 2023; Ma’arif & Kartiko, 2021; Mutmainah et al., 2022; Sahlan & Prasetyo, 2020).

However, this integration remains partial and has not yet been developed into a systematic and operational pedagogical model. This gap highlights the urgent need for a more holistic learning model in contemporary Islamic education.

To date, no empirically tested neuroeducation-based PAI learning model is available in the context of secondary schools. Existing studies still separate the cognitive, spiritual, and character dimensions without a comprehensive integrative framework.

Furthermore, no learning cycle has yet been identified that links emotional activation, cognitive engagement, spiritual reflection, and character-based action into a single, continuous process. Based on this gap, this study developed the Holistic Neuro-PAI Model. This model reconstructs the principles of neuroeducation to align with the goals of Islamic education. This model integrates cognitive, emotional, spiritual, and character dimensions into a single structured and continuous learning cycle.

This study aims to analyze the implementation of neuroeducation principles in PAI learning in secondary schools. The focus of the study is directed at students’ cognitive engagement, spiritual reflection, and character development.

In addition, this study synthesizes empirical findings into the Holistic Neuro-PAI Model as an integrative pedagogical framework for contemporary Islamic education.

The contributions of this study encompass three aspects. First, the development of

the Holistic Neuro-PAI Model based on classroom empirical findings. Second, the expansion of neuroeducation studies into the realm of Islamic Religious Education. Third, the integration of spiritual reflection into learning design in a systematic and measurable manner within the framework of modern Islamic pedagogy.

B. METHOD

This study employs a qualitative approach using a case study design to gain an in-depth understanding of the implementation of neuroeducation-based Islamic Religious Education (IRE) in fostering students' cognitive engagement, spiritual reflection, and character development. This approach was chosen because it focuses on exploring the processes and meanings of learning in a natural context, rather than testing causal relationships (Creswell & Poth, 2018; Merriam & Tisdell, 2016).

A case study design was used to comprehensively examine learning practices within a specific institutional context and to capture the complexity of pedagogical interactions in the classroom (Stake, 2015; Yin, 2018).

The study was conducted at MTs Diniyah Pekanbaru. This location was chosen because it demonstrated a commitment to learning innovation, managerial support from the school, and reflective and contextual Islamic Education (PAI) practices (Patton, 2015). The school context is understood as a socio-pedagogical space that shapes the dynamics of neuroeducation implementation in learning.

Participants consisted of three PAI teachers, two school administrators, and 24 eighth-grade students aged 13-14 years. Participant selection was conducted purposively based on direct involvement in neuroeducation-based PAI learning and the ability to provide rich information (Palinkas, 2015). The number of participants was determined to achieve data saturation (Guest et al., 2014).

Table 1. Summary of Participants, Sessions, and Data Sources

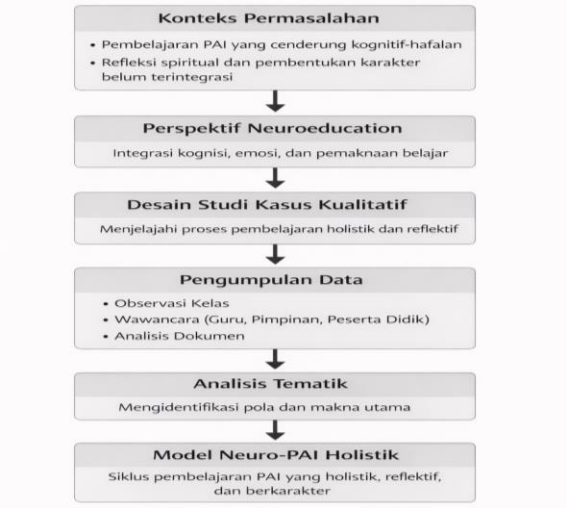
Component	Description	Number
PAI Teachers	Key informants on learning implementation	3
School leadership	Principal and curriculum vice principal	2
Students	8th-grade students aged 13-14	24
Learning sessions	Neuroeducation-based PAI classroom	12 sessions (90 minutes per observation session)
Research duration	Direct classroom observation	8 weeks

Data collection was conducted through classroom observations, semi-structured in-depth interviews, and document analysis (Creswell & Poth, 2018). Non-participant observations were conducted over eight weeks across twelve learning sessions, focusing on learning activation, cognitive-emotional engagement, spiritual reflection, and character behavior (Miles et al., 2020). Interviews were conducted with PAI teachers,

school administrators, and students to explore learning experiences and the interpretation of values. Document analysis included syllabi, lesson plans, teaching materials, and students' written reflections (Bowen, 2019).

Data analysis employed thematic analysis using an inductive approach through iterative stages of data familiarization, coding, theme development, and interpretation of meaning (Braun & Clarke, 2021).

Data validity was ensured through triangulation, member checking, detailed contextual descriptions, and an audit trail (Lincoln & Guba, 1985). This study also adhered to ethical principles, including participant consent, data confidentiality, and researcher reflexivity (Tracy, 2020).



Gambar 1. Kerangka berpikir penelitian yang menunjukkan alur konseptual dari implementasi pembelajaran PAI berbasis neuro-education hingga pengembangan Model Neuro-PAI Holistik.

C. RESULT AND DISCUSSION

1. Brain Activation (Brain Activation through Emotional and Contextual Stimuli)

Classroom observations indicate that the initial stages of neuroeducation-based Islamic Education (PAI) instruction consistently begin with emotional and contextual stimuli, such as the use of visual images, short videos, and stories that resonate with students' life experiences. Observations across 12 learning sessions revealed that this strategy enhances students' initial focus, as evidenced by more directed attention, prompt verbal responses, and readiness to engage in discussions. These findings suggest that emotional activation functions as a neurocognitive mechanism that facilitates the brain's readiness to process the meaning of learning.

Interviews with Islamic Education teachers corroborated these observational findings. One teacher stated, "When lessons begin with stories or images that are relevant to their lives, students grasp the meaning of the verses more quickly and are not as passive as they usually are" (Islamic Education Teacher 1). This data indicates that emotional activation serves not only as a trigger for attention but also as an initial foundation that facilitates the connection between students' cognitive processes and

personal experiences. Within the framework of the Holistic Neuro-PAI Model, the Brain Activation stage acts as the gateway to learning, conditioning students' cognitive and affective readiness.

2. Meaningful Engagement (Meaningful Cognitive Engagement)

The Brain Activation stage is followed by an increase in more meaningful cognitive engagement (Meaningful Engagement). Based on classroom observations, students appear to be more active in asking questions, arguing, and engaging in discussions when religious material is presented in a contextual and dialogic manner. Teacher–student interactions show a shift from one-way learning patterns toward dialogic learning, where students not only receive information but are also involved in a shared process of meaning-making.

These findings are supported by interviews with Islamic Education teachers who stated that this approach helps students understand the messages of verses and hadiths more deeply, rather than merely memorizing the text. Discussion and question-and-answer activities allow students to connect religious concepts with their social realities. In the Holistic Neuro-PAI Model, Meaningful Engagement asserts that effective cognitive engagement occurs when learning is designed in alignment with how the brain works integrating emotion, attention, and meaning.

3. Spiritual Reflection (Facilitated Spiritual Reflection)

Interviews with students and an analysis of reflective journals indicate that neuroeducation- based Islamic Education (PAI) fosters deeper spiritual reflection. Activities such as writing reflective journals, moments of silence following discussions, and reflective questions help students connect religious values with their life experiences. One student remarked, "Usually, religion class is just about listening and taking notes, but now we're asked to reflect. I've come to understand better why those values are important for my life" (Student 2).

An analysis of students' reflection journals revealed an increase in self-awareness, marked by the ability to connect the values of honesty, responsibility, and faith with concrete daily experiences. These findings indicate that spiritual reflection does not arise spontaneously but is systematically facilitated through instructional design. Within the framework of the Holistic Neuro-PAI Model, Spiritual Reflection serves as a bridge between cognitive engagement and the internalization of values.

4. Character Action (Character Action in Social Interaction)

The final stage of the Holistic Neuro-PAI Model is reflected in Character Action, which is the manifestation of values in students' actual behavior. Classroom observations reveal changes in students' behavior regarding discipline, cooperation, empathy, and responsibility, particularly when they engage in collaborative tasks and group discussions explicitly linked to moral values. One PAI teacher stated, "When they work in groups and their tasks are linked to religious values, the children's attitudes of mutual respect and responsibility are more evident" (PAI Teacher 2).

These findings indicate that character development does not occur solely through normative explanations, but through learning experiences that involve emotions, reflection, and social interaction. In the Holistic Neuro-PAI Model, Character Action emphasizes that the internalization of religious values reaches an applied stage when

students are given the opportunity to practice those values within the social context of learning.

5. Challenges in Implementing the Model

Although it demonstrated positive impacts, this study also identified challenges in implementing the Holistic Neuro-PAI Model. Interviews with school administrators revealed that teachers' understanding of neuroeducation still varies. One principal stated, "Some teachers still view neuroeducation merely as a variation in teaching methods, not yet grasping the full concept of how the brain works." Limitations in training and professional support have resulted in the model not being fully and consistently applied across all classrooms.

Based on observational data, interviews, and document analysis, the research findings indicate that the implementation of neuroeducation-based Islamic Religious Education (PAI) takes place through four main sequential stages that form a holistic learning cycle, as shown in Table 1 (Holistic Neuro-PAI Model).

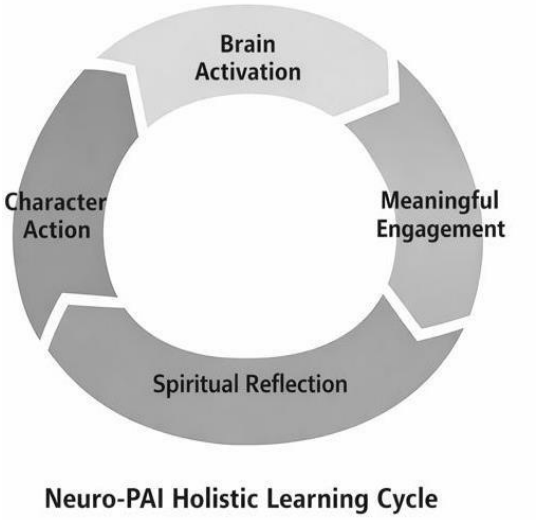
Table 2. Research Findings on the Implementation of the Holistic Neuro-PAI Model

Main Themes	Focus of Findings	Empirical Evidence (Observations, Interviews, Documents)	Significance of Findings
Brain Activation (Brain Activation through Emotional and Contextual Stimuli)	Learning begins with emotional and contextual stimuli	Observation of 12 sessions revealed improved initial focus, directed attention, and rapid verbal responses; teachers reported that students were more prepared and less passive when lessons began with contextual stories or images	Emotional activation serves as an initial mechanism for the brain's readiness to process the meaning of learning
Meaningful Engagement (Meaningful Cognitive Engagement)	Increased active and dialogic student participation	Observations show students actively asking questions, arguing, and discussing; teacher interviews reveal that students have a deeper understanding and are not merely memorizing	Cognitive engagement increases when learning aligns with the brain's natural way of integrating emotion and meaning
Spiritual Reflection	The Emergence of Spiritual Reflection and Self-Awareness	Student interviews and reflection journals indicate that students are able to connect the values of faith, honesty, and responsibility with life experiences	Spiritual reflection is formed through systematic facilitation, not spontaneously

As shown in the figure below, the research findings indicate that the implementation of neuroeducation-based Islamic Education (PAI) creates an integrated, holistic learning cycle. The learning process begins with *Brain Activation* through emotional and contextual stimuli that serve to prepare students' brains for learning, then

continues with *Meaningful Engagement*, characterized by active cognitive engagement, dialogic interaction, and a deep understanding of religious material. This engagement facilitates *Spiritual Reflection*, where students reflect on the values of faith and moral conduct in relation to their personal experiences. The final stage is reflected in *Character Action*, namely the emergence of character traits in the form of responsibility, empathy, cooperation, and discipline in social learning interactions. These findings confirm that PAI learning does not occur linearly but rather as a continuous cycle that holistically connects brain activation, cognitive interpretation, spiritual reflection, and character-based actions.

Figure 1. Neuro-PAI Holistic Learning Cycle



Overall, the results of this study confirm that neuroeducation-based Islamic Religious Education not only enhances students' cognitive understanding but also fosters a holistic and continuous learning process. Empirical findings indicate that the integration of *Brain Activation*, *Meaningful Engagement*, *Spiritual Reflection*, and *Character Action* forms an interconnected and inseparable learning cycle. Initial activation through emotional and contextual stimuli serves as the foundation for learning readiness, which in turn fosters meaningful cognitive engagement and a deeper understanding of religious values. This process is then facilitated through spiritual reflection, which allows students to connect religious teachings with their personal experiences and social realities, so that values of faith and morality do not remain merely at the conceptual level but begin to be consciously internalized.

Furthermore, the results of observations and interviews indicate that the internalization of these values leads to the emergence of character-based behaviors in social learning interactions, such as increased responsibility, empathy, cooperation, and discipline. These findings demonstrate that character development in Islamic Education (PAI) learning occurs through experiential learning which involves emotions, reflection, and social practice, rather than through normative explanations alone. Nevertheless, this study also reveals implementation challenges, particularly regarding variations in teachers' understanding of the concept of neuroeducation and limitations in professional

training, which impact the consistency of the model's application in the classroom. Overall, the results of this study provide empirical evidence that the Holistic Neuro-PAI Model has strong potential as a framework for Islamic Religious Education that can bridge religious knowledge, spiritual meaning, and the character development of students in a holistic and contextual manner.

Analysis/Discussion

This discussion is organized around the four main themes of the research (Theme 1-Theme 4) to ensure consistency between empirical findings and theoretical interpretations. With this approach, the discussion does not deviate from the data obtained but rather deepens the meaning of the findings through critical dialogue with studies in neuroeducation, Western brain-based learning, and non-Islamic spiritual pedagogy, thereby allowing the research's theoretical contributions to be articulated more explicitly.

Theme 1: Cognitive Engagement in PAI Learning

Students' cognitive engagement in neuroeducation-based Islamic Education (PAI) learning demonstrates increased attention, participation, and more meaningful understanding. These findings can be explained through the perspective of brain-based learning, which positions attention and emotion as the primary foundations of the learning process (Immordino-Yang & Damasio, 2016; Jensen, 2018).

However, in the context of Islamic Education (PAI), cognitive engagement does not stop at mastering the subject matter. This process moves toward the formation of values that are directly relevant to students' lives. This means that learning not only activates thinking skills but also guides students to understand the relevance of religious values in real-world actions.

From a pedagogical perspective, this requires teachers not only to present material in an informative manner but also to create a learning context that is closely tied to students' experiences. Contextual stimuli, reflective questions, and linking the material to social realities are strategies that need to be strengthened in Islamic Education instruction.

Theme 2: Spiritual Reflection in the Learning Process

Spiritual reflection emerges as a crucial component of the learning process when learners are given the space to consciously process their learning experiences. These findings reinforce the view that spirituality develops through the integration of self-awareness, emotions, and the interpretation of experiences (Hyde, 2019; King, 2020).

In contrast to spiritual approaches in some Western literature that emphasize individual experiences, the results of this study indicate that spiritual reflection can be systematically fostered through instructional design. This means that spirituality does not merely emerge spontaneously but can be facilitated through structured learning activities.

In practice, Islamic Education teachers can integrate spiritual reflection through learning journals, discussions on the meaning of values, and assignments that encourage students to connect the material with personal growth. In this way, learning not only yields knowledge but also fosters an awareness of values.

Theme 3: Character Development through Learning Experiences

Character formation in neuroeducation-based PAI learning occurs through direct experience and social interaction. This aligns with social learning theory, which asserts that character is formed through the practice and repetition of behavior in real-world contexts (Bandura, 2018).

These findings indicate that character cannot be developed solely through lectures or the verbal transmission of values. In integrated learning, character emerges as a result of a learning process that simultaneously involves cognition, emotion, and action.

Consequently, teachers need to design learning experiences that provide space for the practice of values. Project-based learning, group work, and social activities serve as essential tools for internalizing religious values into students' daily behaviors.

Theme 4: Challenges in Implementing Neuroeducation

The implementation of neuroeducation in Islamic Education (PAI) faces major challenges regarding teacher readiness and institutional support. These findings indicate that changing teaching approaches requires more than just technical training; it demands a deeper conceptual understanding.

Theoretically, this confirms that neuroscience-based innovations cannot be adopted instantly. Teachers need to understand the basic principles of how the brain works in learning in order to design strategies that align with students' characteristics.

To address these challenges, it is necessary to strengthen teachers' capacity through ongoing training, the development of learning communities, and the integration of a reflective approach into learning assessments.

Summary of the Discussion

Overall, neuroeducation-based PAI learning demonstrates a strong integration of cognitive, emotional, and spiritual aspects. This approach not only enhances understanding of the material but also strengthens the internalization of values and character development.

This finding bridges two approaches that have traditionally been separate. First, brain-based learning, which focuses on cognitive aspects. Second, spiritual pedagogy, which places greater emphasis on subjective experience. In this context, neuroeducation serves as a bridge connecting the two within a more holistic learning framework.

The implication is that PAI is no longer positioned as a subject that merely transfers religious knowledge, but as an educational process that shapes ways of thinking, feeling, and acting in harmony with Islamic values. This approach positions learning as a process of transformation, not merely the transfer of information.

CONCLUSION

This study demonstrates that neuroeducation-based Islamic Religious Education (IRE) plays a crucial role in fostering a more holistic, meaningful learning process that aligns with how students' brains function. Based on the findings structured into Themes 1 through 4, this approach has been proven to enhance cognitive engagement, strengthen spiritual reflection, and support character development through active, contextual, and reflective learning experiences.

Learning no longer focuses on rote memorization and the transfer of knowledge

but moves toward a deeper process of internalizing values.

Theoretically, this study expands the field of neuroeducation into the context of Islamic Religious Education, which remains underrepresented in the scientific literature. The Holistic Neuro-PAI Model developed in this study integrates four main stages: brain activation, meaningful engagement, spiritual reflection, and character action. This model emphasizes that Islamic Religious Education (PAI) learning can be designed as a complete cycle that integrates cognitive, emotional, spiritual, and behavioral aspects. Thus, religious education is not merely understood as the transmission of values but as a process of shaping awareness and actions grounded in learning experiences.

In practice, the success of implementing this model depends heavily on teachers' readiness and institutional support. Islamic Education teachers need to have a strong conceptual understanding of how the brain functions in learning, not just technical teaching skills. Therefore, structured and ongoing teacher training programs are needed ones that focus not only on methods but also on a shift in the learning paradigm. This training should be directed toward the ability to design learning experiences that engage emotions, encourage reflection, and create meaningful learning experiences.

In addition, institutional support is a key factor in sustaining the implementation of the Holistic Neuro-PAI model. Schools and educational institutions need to provide spaces for teacher collaboration, academic supervision that supports learning innovation, and policies that allow for the implementation of neuroeducation-based learning. Without systemic support, this innovation risks remaining at the level of individual teacher practice and failing to develop sustainably.

This study also has limitations because it was conducted within a single educational institution, so the results cannot yet be widely generalized. Therefore, further research is recommended to test the Holistic Neuro-PAI Model in various educational contexts across different levels, cultures, and religious traditions. A mixed-methods approach is also recommended to strengthen the validity of the findings through a combination of qualitative and quantitative data.

Moving forward, the development of this model can be directed toward a more inclusive and adaptable educational context that accommodates diversity. With enhanced teacher training and consistent institutional support, neuroeducation has the potential to become a strategic approach for improving the quality of Islamic Education (PAI) to make it more relevant, transformative, and sustainable.

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