

Neuroscientific Insights into Islamic Early Childhood Education Management: Enhancing Reasoning Development

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Received: November 12, 2025

Accepted: October 20, 2025

Revised: October 01, 2025

Available online: October 30, 2025

To cite this article: Suprayitno, K., Yekti, S., Ahmadi, A., & Samaalee, A. (2025). Neuroscientific Insights into Islamic Early Childhood Education Management: Enhancing Reasoning Development. *Bidayatuna Jurnal Pendidikan Guru Madrasah Ibtidaiyah*, 2(1), 129–152.

Abstract

This study aims to explore how management practices in Islamic Early Childhood Education (ECE) can enhance reasoning development among children through a neuroscience-informed approach. The research integrates the neuroscience of reasoning, Islamic pedagogical principles, and educational management theory to analyze how structured, faith-based environments influence cognitive and moral growth. Previous studies have emphasized curriculum design and teacher professionalism in Islamic ECE; however, few have examined the managerial dimensions that align pedagogical planning with brain-based learning. This study bridges that gap. This qualitative field research was conducted at BA 'Aisyiyah Pacitan, employing observation, documentation, and semi-structured interviews with teachers, parents, and administrators. Data were analyzed using Miles and Huberman's interactive model data reduction, display, and conclusion drawing. The findings illuminate how effective management rooted in Islamic ethics and informed by neuroscience supports the optimal development of reasoning abilities in young children. This study proposes a new model of Neuro-Islamic Education Management that harmonizes brain-based strategies with Islamic moral pedagogy in early childhood education.

Keywords: Islamic Education Management, Neuroscience, Reasoning Development, Children's Spirituality

1. Introduction

Integrating Islamic values into the management of early childhood education goes beyond incorporating morals into the curriculum. It helps create a nurturing educational environment where faith, thinking, and feeling come together on a daily basis (Faizin & Helandri, 2023; Farisia, 2020). Within the domain of Islamic education, empathy, resilience, and gratitude are cultural values interwoven into teaching and organizational policy and are the foundations of children's learning experiences during a critical period of development (Hendawi et al., 2024; Hidayah, 2024; Moslimany et al., 2024). These values do not directly affect the neurological system, but rather support development in ways that are consistent with neuroscience's understanding of the importance of emotional stability and social engagement for the development of reasoning abilities (Bakti

et al., 2025; Blair, 2002; Decety & Meyer, 2008; Hidayah, 2024). By this understanding, the *tarbiyah* system has a unified educational philosophy where emotion and reason are intertwined. Would you call this system mainly a moral education? No, because between the two, moral education will be the basis.

At institutions like BA 'Aisyiyah Pacitan, Islamically oriented early childhood institutions, curricula and management integrate spiritual growth vertical and cognitive development horizontal. Story narrating from the Qur'an, reflective play, and circular communication help children build the abilities to express curiosity, reason, and engage other people appropriately (Nicholls & Miller, 1984; Sandberg & Spritz, 2011; Schrier, 2017). Empirical literature proposes and argues that the specific practices mentioned promote the abilities of moral reasoning and the willingness to embrace otherness, especially when learning contexts center on reflection and dialogue, as opposed to direct learning (English, 2016; Han, 2013; Meyer, 2024; Rahman et al., 2022). From the perspective of neuroscience, the practices mentioned align with the significance of the triad in reasoning development: routine, emotional tie, and social context, although no direct links to specific brain mechanisms will be proposed.

Integrated child development is the process of the Islamic educational manager trying to coordinate the system of formal integration, the everyday routines of the education institution, and the values of the institution that aim to cater to the child's overall development. This description also pertains to what happens at BA 'Aisyiyah Pacitan, where the managing of the institution is trying to integrate the procedures of management in administrative planning, classroom settings, and teaching staff with practices of development appropriate moderation that is sensitive to children's emotions and learning patterns (Brown et al., 2018; Nuryahman & Majeed, 2024). Thus, learning is viewed as constrained, and its emotional and spiritual aspects are foundational since self-awareness, empathy, and social flexibility are considered vital, and are therefore, severely essential to, the basic functions of reasoning and self-control in early development (Andrei, 2023; Andres, 2025; Kujur, 2025). Thus, educational management does not work as a system for regulation as is done in management systems, but as a system that provides the basis for the development of reasoning.

The emotional dimension of early childhood education management data remains sparse, particularly in faith-based contexts. Children's cognition can only be fully developed in settings that are safe, predictable, and are built on positive relationships (Jia et al., 2024; Sroufe, 2000); educational neuroscience research suggests this. Compassion and positive morally infused relationships are central features of emotional security in early childhood education within Islam, and giving effect to them is done through daily ethical and spiritual routines. This suggests that in Islamic education, the relational and moral dimensions of reasoning are also important alongside the cognitive. Emotional regulation and cognition are the subjects of many secular literature, but not how these are put into practical management in Islamic education. This is the gap that research can address.

Although previous works mention the management of Islamic early childhood education institutions, there is a gap in verifying how institutional management practices align with programmable neuroscience, as well as the applicable practices of such institutions. Much of the available literature on Islamic education concentrates on the

ideals of empathy and moral education in an Islamic framework, with little attention given to the ways in which such integrated values might be scaffolded through the practices of educational management (Bakti et al., 2025; Ikhwan et al., 2025; Kamal, 2025). Managing early childhood education in the Islamic context has an apprehended bibliographic possum within which, there is an uncritical examination of the application of neuroscience within diverse cultures (Dougherty & Robey, 2018; Shah, 2015). There is, therefore, a lack of literature on how Islamic Early Childhood Education (IECE) management can purposefully integrate a safe emotional climate and predictable routines to facilitate children's reasoning and a child's Islamic pedagogy to foster the spirituality.

Integrating emotional, spiritual, and cognitive learning remains underexplored, and this study aims to address this. It focuses on BA 'Aisyiyah Pacitan as a qualitative case study, with the goal of understanding emotional security and structured routines as (managed) institutional practices that are perceived to enhance children's reasoning abilities. Contributing to the education fields of neuroscience, Islamic education, and educational management, the study proposes a conceptual framework on Neuro-Islamic Education Management. The study broadens the theory of Islamic education to include discussions on brain-informed learning and provides a foundation for educational leaders to integrate Islamic principles with developmental science in the management of early childhood education.

2. Methods

This study utilized the qualitative case study design to understand the extent to which management practices in Islamic Early Childhood Education (IECE) meet the objectives of fostering children's developing reasoning skills through emotional security and steady/consistent school routines. The case study examined TK ABA 'Aisyiyah Pacitan, a faith-based early childhood school that has been recognized for its integration of Islamic values, along with managed structures in its education and pedagogy. This study aimed to understand the impact of educational management in everyday practices and relationships and the qualitative approach designed for such setting to understand the contextual and interpretive facets of educational management (Creswell & Creswell, 2017; John W. Creswell, 2019). The study did not attempt to understand the neurological processes at work but rather, employed a neuroscience-informed framework to analyze conditions that development neuroscience recognize as conducive to early reasoning development and how the emotionally safe and predictable learning environment may work.

The data collection process involved three methods: document analysis, non-participant observation, and semi-structured interviews. This data collection process lasted 6 weeks. The focus of the observations included teachers' daily routines, emotional climate, and teacher and child interactions. Interviews focused on three teachers, the principal, and ten parents chosen by purposive sampling who were questioned about their children's emotional safety and reasoning skills, such as problem-solving and self-regulation, while the parents were asked about their management practices (Dr. Ismael Nurdin, Dra. Sri Hartati, 2019; Mamik, 2015; Miles et al., 2018). The study of the institution's lesson plans and activity schedules aimed to understand the alignment of practices with the managers' plans. The study used the three-step process of data

reduction, data display, and conclusion drawing as suggested by Miles and Huberman to create themes from the data and to apply the method of data source triangulation (Fadli et al., 2021). The data was collected over 6 weeks. The combination of methods of triangulation, peer debriefing, prolonged exposure to the data collection site, and memoing to self-regulate were used to provide validity to the analysis of the methodology. The study received ethical approval from the institution for the study, the researcher received informed consent for the adult participants, and children's data were anonymized throughout the research.

3. Results and Discussion

3.1 Results

3.1.1 Emotional Security as the Neuro-Cognitive Foundation

The establishment of a warm, empathetic classroom climate significantly enhances children's emotional regulation and engagement in learning. Teachers who consistently practice compassion and positive reinforcement create an environment where students feel emotionally safe, which is crucial for cognitive development. This emotional warmth not only reduces anxiety but also fosters active participation in reasoning-based discussions, as evidenced by the positive correlation between emotional support and preschool adjustment (C. S. Bailey et al., 2022).

1. Emotional Support and Classroom Climate

The findings indicate that a warm and empathetic classroom climate plays a central role in supporting children's emotional regulation and engagement in learning activities. At BA 'Aisyiyah Pacitan, teachers consistently demonstrated patience, positive reinforcement, and responsive communication, which contributed to a sense of emotional safety among children. This emotionally secure environment was perceived by teachers and parents as enabling children to participate more actively in classroom discussions, express ideas confidently, and engage in simple reasoning-related activities, such as explaining choices or responding to reflective questions. These findings are consistent with prior studies suggesting that emotional support in early childhood classrooms is closely associated with children's self-regulation and adaptive learning behaviors (C. S. Bailey et al., 2022; R. Bailey et al., 2023).

Within the Islamic educational context, emotional support was further reinforced through daily spiritual practices, including morning prayers, short *dhikr*, and Qur'anic storytelling. These practices were perceived as fostering calmness and emotional balance, which teachers described as helpful in preparing children for focused learning. Rather than being understood as direct neurological interventions, these routines functioned as emotionally stabilizing practices that align with neuroscience-informed perspectives emphasizing the importance of emotional security for early cognitive engagement. The integration of Islamic values such as *rahmah* (compassion) and *ukhuwwah* (brotherhood) into classroom management contributed to a respectful and supportive learning atmosphere, reducing behavioral conflicts and encouraging prosocial interaction.

2. Faith-Based Practices as Emotionally Regulating Routines

Faith-based activities emerged as an integral component of daily classroom routines and were perceived as contributing to children's emotional readiness for learning. Practices such as collective prayer, Qur'anic recitation, and storytelling were implemented in a rhythmic and predictable manner, helping children transition smoothly between activities. Teachers reported that these routines promoted attentional stability and reduced restlessness, particularly during the beginning of the school day. From a neuroscience-informed interpretation, such rhythmic and repetitive practices can be understood as aligning with research highlighting the role of predictable patterns in supporting emotional regulation and sustained attention (R. Bailey et al., 2023).

Qur'anic storytelling, in particular, was identified as a meaningful pedagogical strategy for supporting early moral reasoning. Teachers observed that children were able to recall story sequences, identify moral lessons, and relate narratives to everyday situations, such as sharing toys or showing patience (Sandberg & Spritz, 2011; Schrier, 2017). These observations suggest that narrative-based faith instruction supports reasoning development by combining emotional engagement with reflective thinking. Rather than framing these effects in terms of specific neural activation, the findings emphasize that emotionally meaningful and culturally grounded practices provide conditions that are conducive to the development of moral judgment and early reasoning abilities.

3. Managerial Emphasis on Empathy and Institutional Culture

At the managerial level, empathy was identified as a guiding institutional value shaping leadership practices, teacher supervision, and classroom norms. School leaders encouraged reflective supervision, collegial dialogue, and shared spiritual activities among teachers, fostering a supportive professional climate. Teachers reported that this empathetic leadership approach enhanced their emotional well-being and consistency in classroom practices, which, in turn, contributed to more responsive interactions with children. These findings align with studies indicating that empathy-oriented management supports positive teacher–student relationships and emotionally supportive learning environments (Rucinski et al., 2018).

The emphasis on empathy was not merely symbolic but operationalized through participatory planning, collaborative problem-solving, and shared responsibility (*ta'awun*) among staff. This managerial approach strengthened institutional coherence and reinforced the emotional climate experienced by children. From a neuroscience-informed perspective, emotionally regulated educators are better positioned to model calm, reflective behavior, which supports children's development of self-regulation and reasoning. Thus, empathy-driven management emerged as a mediating mechanism linking Islamic ethical leadership with emotionally supportive educational practices.

4. Consistent Routines as a Management Mechanism for Reasoning Development

The findings show that consistent daily routines functioned as a key management mechanism supporting children's emerging reasoning abilities. The structured daily schedule, comprising morning prayer, Qur'anic recitation, thematic learning, reflection time, and closing activities, provided predictability that helped children anticipate transitions and understand sequential order. Teachers noted that children increasingly

demonstrated awareness of temporal patterns (e.g., before-after, beginning–end) and were better able to follow instructions and complete activities independently. These observations are consistent with research suggesting that predictable routines support executive functioning and early temporal reasoning (Ponomareva et al., 2022; Wennberg et al., 2021).

Importantly, routines at BA 'Aisyiyah Pacitan were implemented with flexibility, allowing teachers to adjust activities in response to children's emotional states and interests. This balance between structure and adaptability supported children's self-regulation and problem-solving behaviors. Islamic rituals, such as short prayers before and after activities, functioned as temporal and emotional anchors, reinforcing consistency while providing meaningful transitions. Rather than being viewed solely as religious observance, these rituals were perceived as supporting children's attentional focus and memory through repetition and meaning-making, aligning with culturally contextualized learning frameworks (Dougherty & Robey, 2018; Mahsun et al., 2022; Mahsun & Maulidina, 2019).

5. Integrative Islamic Pedagogy and Moral Reasoning

The integration of Islamic moral themes with inquiry-based learning emerged as a distinctive feature of classroom practice. Teachers intentionally linked exploration of natural and social phenomena with reflective questions grounded in Islamic values, encouraging children to ask “why” and “how” questions while considering ethical implications. This approach supported early reasoning by connecting cognitive inquiry with moral reflection. Teachers reported that children were able to articulate simple causal explanations and relate them to values such as gratitude, responsibility, and care for others.

Collaborative reflection and dialogical interaction further supported moral reasoning development. Through guided discussions and peer interaction, children practiced expressing opinions, listening to others, and resolving disagreements respectfully. These practices contributed to perspective-taking and ethical awareness, aligning with research on the role of dialogue in early reasoning and moral development (Bressan et al., 2023; Li et al., 2018)). Overall, the findings suggest that integrative Islamic pedagogy, when supported by coherent management practices, provides an educational environment in which cognitive, emotional, and moral dimensions of reasoning develop in an interconnected manner.

Emotional support within early childhood Islamic education serves as a pivotal foundation for developing children's cognitive and emotional intelligence. When teachers in institutions such as BA 'Aisyiyah Pacitan consistently demonstrate empathy, patience, and responsive communication, children experience a sense of emotional safety that strengthens their ability to explore, reason, and learn. According to Bailey et al., this kind of emotional scaffolding significantly enhances children's capacity for self-regulation—an essential skill for cognitive flexibility and moral discernment (R. Bailey et al., 2023). In the Islamic educational context, emotional support is further reinforced by spiritual practices such as morning prayers, daily dhikr, and Quranic storytelling, which instill calmness and a sense of divine attachment. These practices not only regulate the emotional rhythms of young learners but also build neural pathways that associate positive emotions with

learning and worship, creating a uniquely balanced developmental experience grounded in both affective neuroscience and Islamic pedagogy.

A positive classroom climate cultivated through consistent teacher-student interaction contributes to a culture of mutual respect and expressive freedom, enabling children to articulate feelings in socially appropriate ways. Fatahi et al. note that children who feel heard and valued demonstrate stronger prosocial behavior and improved problem-solving abilities (Fatahi et al., 2023). In the case of BA 'Aisyiyah Pacitan, educators consciously integrate Islamic ethics of *rahmah* (compassion) and *ukhuwwah* (brotherhood) into classroom management strategies, fostering a microcosm of moral society within the learning environment. This atmosphere mitigates behavioral conflicts and nurtures emotional resilience qualities essential for navigating future social and academic challenges. Such findings highlight that emotional security is not merely a byproduct of good teaching but a central neuroeducational mechanism through which Islamic values and cognitive growth intertwine to shape a holistic early childhood experience.

a. Faith-Based Practices

Faith-based activities in early childhood Islamic education play a crucial neuropsychological and pedagogical role in shaping emotional regulation and reasoning ability. Practices such as dzikr sessions, Qur'anic storytelling, and guided prayer not only introduce children to spiritual discipline but also create a calm and rhythmic environment that supports neural balance. Within the context of BA 'Aisyiyah Pacitan, these activities are carefully structured as part of daily routines often conducted in collective, rhythmic, and melodious patterns that synchronize breathing, emotion, and attention. Neuroscientific evidence shows that such rhythmic repetition activates the parasympathetic nervous system, reducing stress and fostering attentional stability (R. Bailey et al., 2023). In this sense, Islamic faith-based practices act as a natural form of socio-emotional therapy, reinforcing the prefrontal cortex's capacity for impulse control and reflective thought. The repetitive recitation of divine names or short verses (*dzikr jahr*) engages both linguistic and affective neural circuits, linking language processing with emotional calmness an outcome aligned with both Qur'anic pedagogy and neurodevelopmental theory.

Furthermore, Qur'anic storytelling serves as an experiential mode of spiritual cognition that enhances moral reasoning and empathy through narrative immersion. When children listen to stories of prophets or ethical parables, they engage mirror neurons that simulate moral emotions such as compassion, patience, and humility. This experiential engagement promotes not only emotional literacy but also activates regions of the brain responsible for abstract reasoning and moral judgment, including the medial prefrontal cortex and anterior cingulate cortex. Bailey et al. argue that emotional safety is the gateway to higher-order thinking; similarly, in Islamic education, tranquility (*sakinah*) is viewed as the prerequisite for *tafaqquh* deep understanding (R. Bailey et al., 2023). Thus, integrating faith-based practices into classroom routines bridges the sacred and the scientific, demonstrating how Islamic rituals can harmonize spiritual formation with cognitive development. By grounding education in both theology and neuroscience, this

approach reaffirms that faith and intellect are not opposing forces but interconnected dimensions of a child's holistic growth.

b. Managerial Emphasis on Empathy

The management of early childhood Islamic education that foregrounds empathy as an institutional value reflects a profound alignment between modern educational neuroscience and Islamic ethical philosophy. In BA 'Aisyiyah Pacitan, school leaders and teachers are encouraged to build emotionally safe and spiritually nurturing environments grounded in *rahmah* (compassion) and *ihsan* (benevolence). This managerial model transcends administrative efficiency it embodies moral leadership that shapes the emotional and spiritual architecture of the school. Research by Bailey et al. and Rucinski et al. demonstrates that when school management systems integrate empathy into decision-making, teacher-student relationships become more trust-based and emotionally intelligent, fostering self-awareness and intrinsic motivation among learners (Rucinski et al., 2018). In Islamic pedagogy, such management echoes the prophetic model of leadership (*uswah hasanah*), where authority is exercised through compassion, dialogue, and example rather than coercion. This empathetic management approach not only improves classroom harmony but also strengthens moral cognition, as children learn to associate empathy with justice, care, and mutual respect—core tenets of both Islamic and humanistic education.

Compassion-driven leadership also carries significant implications for the social-emotional and cognitive development of young learners. Fatahi et al. (2022) argue that when educational institutions embed empathy into organizational culture, it enhances social connectedness and reduces behavioral conflicts, allowing emotional energy to be redirected toward learning and cooperation (Fatahi et al., 2023). Within the BA 'Aisyiyah Pacitan context, this philosophy is operationalized through reflective supervision, participatory planning, and shared spiritual practices among teachers, creating a collegial culture of *ta'awun* (mutual support). The resulting climate of trust and collaboration supports teachers' emotional resilience, which in turn translates into consistent care and responsiveness toward students. From a neuroscientific perspective, empathy-driven management enhances teachers' emotional regulation and stress management, enabling them to model calm, reflective behavior key conditions for activating children's prefrontal cortex functions related to reasoning, empathy, and self-control. Thus, the managerial emphasis on empathy in Islamic early education represents not merely an ethical choice but a neuroeducational strategy that intertwines moral leadership with brain-based learning, producing a generation of emotionally balanced and spiritually aware individuals.

3.1.2 Consistent Routines as a Management Mechanism for Reasoning

Structured daily framework: The school implemented a consistent schedule—morning prayer, Qur'an recitation, thematic exploration, reflection time, and closing prayer. This structure offered predictability that enhanced children's ability to plan, anticipate, and reason through sequential events. Teachers noted that children began to understand temporal and causal relationships. The implementation of a structured daily framework in schools, featuring consistent activities such as morning prayer and Qur'an recitation, significantly enhances children's understanding of time and causality. This

predictability allows children to develop temporal reasoning skills, as they begin to recognize sequences and relationships between events.

1. Predictability and Routine

A consistent and predictable schedule in early childhood education is not merely an administrative feature it is a neurodevelopmental necessity. In environments such as BA 'Aisyiyah Pacitan, structured daily routines such as morning assemblies, prayer times, storytelling, and play-based learning foster a profound sense of security that allows children to anticipate and mentally prepare for upcoming activities. Wennberg et al. emphasize that predictability activates the brain's regulatory systems, particularly within the prefrontal cortex, enhancing executive functions such as planning, memory, and attentional control (Wennberg et al., 2021). When children can foresee the rhythm of their day, their cognitive load is reduced, freeing up mental energy for exploration, creativity, and moral learning. This sense of stability aligns closely with the Islamic pedagogical principle of *tartib* (orderliness), which reflects divine balance in both spiritual and worldly affairs. The habitual performance of *shalat dhuha*, *tadarus*, and reflective play periods exemplifies how routine, when infused with faith, nurtures not only time management but also *adab* (discipline) and mindfulness critical attributes for lifelong learning and character formation.

Beyond its neurocognitive benefits, routine plays a transformative role in shaping autonomy and self-regulation among young learners. That well-structured routines empower children to take initiative, make decisions, and manage their transitions with confidence—behaviors closely tied to the development of independence and intrinsic motivation (Maag Merki et al., 2023). Within an Islamic educational framework, this translates to cultivating *amanah* (responsibility) and *istiqamah* (steadfastness), values that encourage children to engage consciously with their environment and duties. In the BA 'Aisyiyah setting, routines such as tidying up after play, preparing for prayer, or reciting daily supplications provide children with small but meaningful opportunities to exercise self-control and reflective judgment. Neuroscientifically, these repeated structured acts strengthen neural circuits associated with self-regulation and emotional resilience, while spiritually, they instill a sense of rhythm and purpose reflective of divine order. Thus, consistent scheduling is more than classroom management—it is a holistic educational design where neuroscience and Islamic principles converge to cultivate balanced, thoughtful, and morally grounded individuals.

2. Development of Temporal Understanding

Recent advances in developmental psychology and cognitive neuroscience reveal that children gradually construct what is known as a “mental timeline”—an internal cognitive framework that enables them to understand sequences, causality, and the progression of events. This developmental process begins in early childhood, where experiences are first encoded episodically and later organized chronologically, forming the basis for reasoning about time (Tillman et al., 2018). Within the learning environment of BA 'Aisyiyah Pacitan, this cognitive construction is intentionally nurtured through well-structured schedules and reflective discussions that help children connect daily activities to broader moral and spiritual narratives. For instance, teachers encourage children to recall and retell sequences of Qur'anic stories or daily routines, guiding them to recognize

temporal order (before-after, yesterday-today-tomorrow) while linking these patterns to lessons on patience, responsibility, and divine timing. Neuroscientifically, this process stimulates the hippocampus and prefrontal cortex—regions associated with temporal reasoning and planning thereby strengthening children’s capacity to foresee outcomes and reflect upon past actions. Such pedagogical design aligns with the Islamic notion of *tadabbur al-zaman* (contemplation of time), which regards time as a divine trust that must be understood, valued, and managed responsibly.

Structured thematic activities and guided reflection further enhance children’s ability to articulate causal relationships, deepening their understanding of time not merely as a sequence of events but as a moral and cognitive continuum. That when children engage in reflective thematic exploration such as examining how a seed grows over time or discussing moral consequences in narrative stories they develop metacognitive awareness that supports abstract reasoning and executive control (Birkeland, 2019). In the Islamic educational context, such activities are infused with spiritual reflection, where children learn to interpret the unfolding of time through gratitude (*syukr*) and awareness of divine order (*qadar*). In BA ‘Aisyiyah Pacitan, teachers integrate these reflections into storytelling and experiential learning, allowing children to connect temporal concepts with ethical values and spiritual meaning. This synthesis between cognitive structure and faith-based interpretation transforms time learning into a deeply humanizing process where children do not merely learn about time, but learn through time, cultivating both cognitive maturity and moral consciousness.

3. Cultural and Educational Implications

The regulation of time within educational environments is not a neutral practice—it embodies the cultural, moral, and spiritual ideals that shape how children experience and internalize learning. That temporal organization in schools reflects a society’s understanding of order, discipline, and human development (Birkeland, 2019). In Islamic early childhood education, such as at BA ‘Aisyiyah Pacitan, the rhythm of time is inseparable from spiritual consciousness. Daily routines are structured around acts of worship (*ibadah*) and moral reflection, embedding a sacred rhythm within the child’s cognitive and emotional world. This synchronization between spiritual and temporal order instills a deep awareness of purpose, patience, and accountability. When children learn that each moment carries moral significance reinforced through prayer times, storytelling, and reflection they develop not only a sense of time management but also *ta’dib* (ethical discipline). This approach aligns with both neuroscientific and educational perspectives, as the predictability of temporal frameworks enhances executive functioning while the cultural infusion of meaning transforms time into a moral and spiritual learning space. Thus, the regulation of time becomes a pedagogical act that connects the rhythm of the classroom to the rhythm of faith, fostering both cognitive structure and spiritual depth.

Yet, while structure provides security, flexibility within that structure is equally vital for fostering creativity and adaptive intelligence. That educational environments that balance consistency with adaptability yield higher learning outcomes and emotional resilience among children (Maag Merki et al., 2023). In the context of BA ‘Aisyiyah Pacitan, flexible routines allow teachers to adjust activities based on students’ emotional states, attention spans, and spontaneous learning opportunities. For example, a

scheduled storytelling session might evolve into an outdoor exploration or reflective discussion if children express curiosity or emotional need. This pedagogical elasticity mirrors the Islamic principle of *taysir* (ease and adaptability), which emphasizes the importance of balance and compassion in all human endeavors. Neuroscientifically, such flexibility strengthens children's prefrontal cortex by encouraging cognitive shifting and emotional regulation skills critical for problem-solving and lifelong learning. Therefore, the dynamic management of time within Islamic early education demonstrates a sophisticated interplay between structure and sensitivity, tradition and adaptation, showing that true discipline arises not from rigidity but from the wise integration of order and empathy.

Disruptions to structured learning routines such as unexpected outdoor activities or sudden schedule changes can significantly impair children's concentration and reasoning coherence. These disruptions disrupt the cognitive rhythms young learners rely on to process information, regulate emotions, and maintain attention. Research consistently shows that stable routines create neurological efficiency by reducing cognitive load and allowing children to predict and prepare for upcoming tasks (Savina, 2021). When this stability is disrupted, children must divert mental resources to reorient themselves, jeopardizing the smoothness of their learning. In Islamic early childhood settings like BA 'Aisyiyah Pacitan Kindergarten, where structured cycles of prayer, storytelling, and thematic learning form the backbone of daily learning, disruptions to routines not only impact academic focus but also disrupt spiritual and emotional foundations. Therefore, understanding how routines support cognitive regulation is crucial for designing learning environments that protect children's mental coherence, especially during periods of transition or unexpected activities.

The cognitive processes most affected by the stability of routines - response inhibition, voluntary attention, and working memory - collectively form the core of self-regulation, a skill fundamental to early learning. Response inhibition allows children to pause, reflect, and override impulsive behavior; voluntary attention allows them to filter out distractions and focus on meaningful stimuli; and working memory maintains the mental representations necessary to complete tasks and follow sequential instructions (Savina, 2021). When routines are consistent, these processes operate smoothly, supporting neural connectivity and strengthening the development of executive functions (Fregni et al., 2025). However, when routines are disrupted, these systems must work harder to adapt, often resulting in decreased concentration and learning outcomes (Maag Merki et al., 2023). This highlights an important implication for educators and school managers: maintaining predictable routines is not just a classroom management issue, but also a neurodevelopmental imperative. Structured yet flexible planning is crucial for maintaining the cognitive and emotional stability necessary for optimal learning in early childhood..

Islamic rituals as temporal anchors: Rituals like *du'a* before learning and *surah* recitation after activities served as both spiritual and cognitive anchors. These repetitive yet meaningful practices reinforced cause-effect understanding and strengthened memory consolidation, consistent with Dougherty and Robey's assertion that culturally contextualized routines deepen neural learning pathways (Dougherty & Robey, 2018).

3.1.3 Integrative Islamic Pedagogy as a Bridge Between Faith and Cognition

The integration of Islamic moral themes with inquiry-based learning in curriculum management fosters a holistic educational experience. This approach not only enhances students' understanding of natural phenomena but also deepens their spiritual connection to the world around them. By linking lessons on Allah's creations to questions like "Why does the sun rise?", educators can cultivate both intellectual curiosity and spiritual awe (*ta'abbud*) among students.

1. Islamic Teachings in Education

At BA Aisyiyah Pacitan, the integration of Islamic principles into early childhood education is not merely doctrinal but forms the pedagogical core that guides curriculum design and classroom practices. The Quran consistently emphasizes learning aligned with divine guidance, framing knowledge as both an intellectual pursuit and a path to spiritual purification. This dual orientation shapes the school's educational ethos, where daily activities such as Quranic storytelling, recitation of the Beautiful Names of Allah (Asmaul Husana), and reflective conversations are seamlessly woven into play-based learning. The Islamic curriculum must cultivate *'ilm* (knowledge) and *ruhiyyah* (spiritual depth) in balance. At BA 'Aisyiyah Pacitan, this manifests as a supportive environment where children are encouraged to engage with moral values—such as patience, empathy, and gratitude not as isolated lessons, but as lived practices embedded in their cognitive and emotional development. Such an approach ensures that education serves not only as a means of academic preparation but also as a foundation for internalizing faith-centered character (Pallathadka et al., 2023).

In line with the Quranic ideals of individuality and human potential, educators at BA Baleharjo intentionally design learning experiences that reflect each child's unique developmental profile. Effective Islamic pedagogy must address the characteristics, interests, and abilities of each learner—an approach clearly evident in the school's adaptive teaching model. Teachers routinely observe children's emotional cues, reasoning abilities, and social interactions, using these insights to tailor activities such as thematic explorations, sensory play, and moral dialogues. This personalized approach not only strengthens cognitive skills but also supports holistic maturation, enabling children to grow in independence, self-awareness, and spiritual sensitivity. In practice, this means a child curious about nature can be guided to connect their explorations to Quranic verses about creation, while a child who demonstrates strong verbal skills can be encouraged to express moral reflections through stories. By valuing individual differences while grounding learning in Islamic values, BA 'Aisyiyah Pacitan educates students with intellectual curiosity, emotional balance, and spiritual awareness embodying the vision of holistic education called for in the Quran.

2. Inquiry-Based Learning

The pedagogical approach implemented at BA Aisyiyah Kindergarten in Pacitan intentionally fosters an environment that encourages children to observe, question, and interpret the world around them through cognitive curiosity and spiritual awareness. Agbaria (2024) emphasizes that inquiry-based learning in Islamic education is not merely intellectual it is a philosophical invitation for students to understand their place in the

cosmos as servants and stewards. When teachers guide children to explore phenomena such as shadows, plant growth, or the movement of clouds, they not only develop scientific reasoning but also cultivate early critical thinking skills grounded in reflective awareness. Through simple yet profound questions - “Why does the sun move?”, “How do seeds grow?”, “Who created the wind?” - children begin to connect empirical exploration with metaphysical understanding. This dual inquiry enables them to interpret their environment as a meaningful and purposeful creation, fostering a worldview in which learning is intertwined with gratitude, responsibility, and ethical awareness (Agbaria, 2024).

Interacting with natural phenomena also evokes a sense of wonder and reverence, which are essential for fostering spiritual growth in early childhood. Rodriguez (2025) asserts that awe is a fundamental emotional experience that shapes children's capacity for humility, gratitude, and contemplation. At BA ‘Aisyiyah Pacitan, activities such as observing rain, listening to birdsong, tending to classroom plants, or feeling the morning breeze during outdoor dhikr sessions are purposefully designed to evoke this sense of divine awe. These experiences activate emotional pathways linked to empathy and spiritual sensitivity, enabling children to form a deep, affective bond with creation. As children marvel at the colors of flowers or the rhythm of ocean waves, they begin to understand nature not only as an object of study but also as a sign (verse) that demonstrates God's greatness. This integration of awe and curiosity creates a powerful pedagogical synergy: strengthening cognitive development while enriching children's spiritual imagination, cultivating learners who are not only inquisitive thinkers but also emotionally attuned and spiritually grounded individuals (Rodriguez, 2025).

3. Spiritual Pedagogy

Spiritual pedagogy, when carefully integrated into early childhood Islamic education, such as at BA Aisyiyah Pacitan, has the potential to transform learning into a deeply relational and empowering experience. Rodriguez (2025) argues that spirituality in education is not limited to doctrinal teaching; rather, it emerges through meaningful relationships—between children and themselves, between children and others, and between children and nature. In practice, this means creating learning encounters where children are encouraged to express emotions, ask thoughtful questions, and engage empathetically with their peers. Activities such as guided reflection, nature walks, collaborative storytelling, and values-centered dialogue enable students to discover their personal strengths and foster a sense of belonging and purpose. This relational focus empowers children by validating their lived experiences and nurturing their agency, allowing them to experience religious learning not as a series of commandments, but as a path to self-discovery, compassion, and harmony with creation (Rodriguez, 2025).

This spiritual pedagogy aligns closely with Wortham et al. (2021), which emphasizes the importance of wholeness in education an approach that integrates emotional, ethical, and spiritual dimensions into the learning process. At BA Aisyiyah Pacitan, this philosophy is realized through a seamless blend of cognitive tasks with moral narratives, emotional development, and faith-based practices. Children are not only taught to recite verses of the Quran but are also guided to understand their ethical implications in everyday interactions. Emotional literacy is fostered alongside academic skills, ensuring that

learning is both intellectually stimulating and character-building. This holistic orientation enables education to be an integrated experience where thinking, feeling, and believing are interconnected rather than siloed. By fostering this sense of wholeness, the school positions children to grow as balanced individuals capable of critical reasoning, ethical action, and experiencing the world with spiritual depth (Wortham et al., 2021).

4. Collaborative Reflection and Moral Reasoning

At BA 'Aisyiyah Pacitan, teachers serve not only as transmitters of knowledge but also as facilitators of moral-spiritual reflection, guiding children to connect their everyday experiences with broader Islamic ethical principles. Through deliberate dialogical practices -such as reflective questioning, values-based storytelling, and guided conversations - educators help young learners recognize patterns between what they observe, feel, or encounter and the core moral teachings of Islam. This approach transforms abstract values such as honesty, compassion, trustworthiness, and social responsibility into concrete experiences that are developmentally understandable. By placing learning in the context of children's real lives, teachers foster a reflective disposition from an early age, ensuring that moral reasoning emerges from internal awareness, rather than external impulses. This pedagogical model positions the classroom as a relational space where meaning is co-constructed and where children learn to interpret their world through rational and spiritual lenses.

Furthermore, these reflective interactions substantially enhance children's cognitive, social, and affective development. Studies show that collaborative argumentation sharpens social perspective-taking and ethical reasoning, as children learn to understand alternative viewpoints, build logical connections, and negotiate meaning through dialogue (Kim et al., 2021). At BA 'Aisyiyah Pacitan, such dialogic engagement whether during thematic discussions, inquiry-based nature explorations, or peer exchanges during circle time trains students to articulate their thoughts clearly, respond respectfully to differing ideas, and regulate their emotions when navigating disagreements. This dual development is crucial: while cognitive growth emerges through reasoning and structured discourse, spiritual-moral maturity is formed when children recognize that communication itself is an ethical practice grounded in *adab* (civility) and mutual respect. Thus, reflective dialogue becomes a transformative pedagogical engine, integrating intellectual, emotional, and spiritual formation in alignment with the holistic vision of Islamic early childhood education.

5. Managerial Innovation and Teacher Development

The integration of neuroscience with Islamic pedagogy in teacher training provides a robust framework for understanding how emotional stability forms the foundation of effective cognitive functioning. Research in educational neuroscience highlights that executive functions such as planning, inhibitory control, and cognitive flexibility depend on well-regulated emotional states (Wan Abdullah et al., 2020). Within the context of Islamic educational philosophy, emotional regulation is increasingly supported by spiritual practices that cultivate inner calm, mindfulness, and ethical self-awareness. When these principles of neuroscience and Islamic pedagogy converge, teacher preparation programs are better able to equip educators with strategies that nurture both neurological readiness and spiritual grounding in their students. This alignment ultimately strengthens

the classroom environment, enabling children to engage in deeper learning processes while developing the self-discipline and reflective awareness that are central to Islamic moral education.

Professional development initiatives - such as structured workshops, peer learning circles, and collaborative problem-solving sessions - play a crucial role in enhancing teachers' capacity to innovate and apply higher-order thinking strategies to classroom practice. These ongoing learning opportunities allow educators to reflect on their pedagogical decisions, integrate new research-based methods, and refine their approaches to inquiry-based learning and critical thinking (Alotaibi et al., 2019). In Islamic early childhood education settings, such as BA 'Aisyiyah Pacitan, collaborative professional development fosters a culture of collective growth, where teachers jointly explore ways to combine cognitive challenges with a supportive, values-based learning environment. By engaging in ongoing dialogue and collaborative experimentation, educators become more adept at designing learning experiences that stimulate analytical reasoning, curiosity, and ethical reflection ensuring that pedagogical innovations remain aligned with developmental needs and Islamic educational values.

While the integration of collaborative reflection and neuroscience-based strategies into Islamic education offers substantial promise, significant challenges remain hindering its full implementation. One of the most pressing issues is the need for sustained, high-quality professional development that equips teachers with the skills to translate neuroscientific insights into everyday pedagogical practice. Without consistent training, educators may revert to traditional, teacher-centered methods that limit cognitive engagement and hinder the development of higher-order thinking skills (Alotaibi et al., 2019). Furthermore, institutional resistance to change—often rooted in long-standing cultural and instructional norms—can undermine the impact of reflective collaboration, preventing teachers from experimenting with innovative, student-centered approaches. These barriers highlight the urgency of building a supportive learning culture, committed leadership, and structured mentoring systems to ensure that the transformative potential of neuroscience and reflective pedagogy is fully realized in Islamic educational settings.

3.2 Discussion

The findings of this study reveal a multilayered interplay between Islamic pedagogical principles, emotional development, and managerial practices within BA 'Aisyiyah Pacitan, illustrating how early childhood education can be simultaneously spiritually rooted and scientifically grounded. Central to this dynamic is the alignment between Islamic values - such as *rahmah* (compassion), *adab* (ethical conduct), and *tawāzun* (balance) - and contemporary neuroscientific insights on children's socio-emotional and cognitive development. The observed practices, including structured routines, faith-based activities, and emotionally responsive teaching, collectively demonstrate that Islamic schools can cultivate holistic development when pedagogical strategies are intentionally designed to enhance neurological stability, emotional regulation, and higher-order thinking. This convergence reflects a paradigm in which spirituality is not positioned against modern science but is integrated into an educational ecology that supports children's readiness to learn, self-awareness, and moral reasoning.

A significant contribution of this study lies in showing how emotional stability functions as the neurological foundation for learning, echoing evidence that positive emotions stimulate prefrontal cortex activation, strengthening executive functions such as inhibition control, planning, and attention (Wan Abdullah et al., 2020). BA 'Aisyiyah Pacitan's emphasis on warm teacher–child interactions and predictable classroom routines reinforces these neural mechanisms. The findings deepen current literature by demonstrating that emotional support within an Islamic preschool context is not merely moral guidance but a neurological intervention that conditions children for sustained engagement, resilience, and cognitive flexibility. This resonates with research indicating that emotionally safe environments enhance voluntary attention and working memory capacities crucial for literacy, numeracy, and Qur'anic learning. Thus, emotional climate emerges not only as an affective dimension but as a cognitive infrastructure essential for learning outcomes.

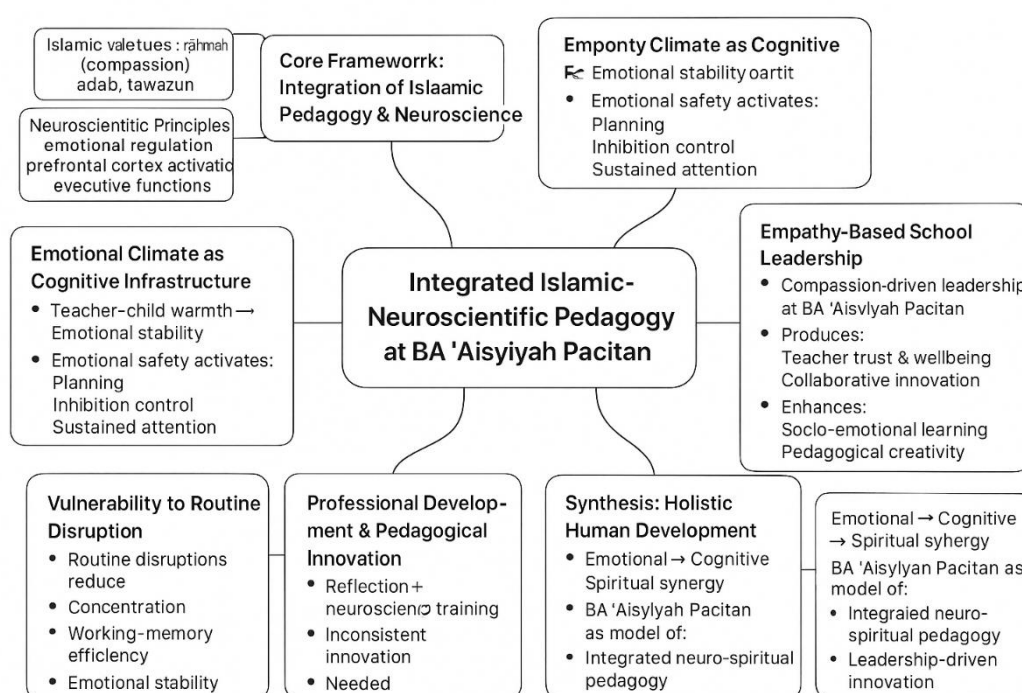


Figure 1. Concept Map: Integrated Islamic-Neuroscientific Pedagogy at BA 'Aisyiyah Pacitan

This study further reveals that faith-based practices - particularly the use of dhikr, Quranic stories, and reflective dialogue - serve as regulatory tools that enhance emotional clarity and behavioral coherence. Neuroscience supports the idea that rhythmic recitation and meditation practices stabilize arousal systems and promote cognitive calm, enabling children to transition smoothly into focused learning states (C. S. Bailey et al., 2022). At BA 'Aisyiyah Pacitan, these practices provide more than just ritual observance; they shape children's sense of meaning, belonging, and moral orientation. By embedding these activities into daily routines, teachers foster spiritual mindfulness that supports self-regulation, empathy, and social awareness. This discussion extends recent scholarship by demonstrating how Islamic spiritual rituals can be pedagogically reinterpreted as

emotional scaffolding that refines executive function and shapes moral cognition from an early age.

Another important dimension is the managerial role of empathy-driven leadership, which frames the school ecosystem. Leadership at BA 'Aisyiyah Pacitan prioritizes compassion, reflective communication, and situational awareness, which aligns with the Islamic prophetic leadership model. Such leadership fosters trust, reduces teacher burnout, and enhances collaborative problem-solving—conditions known to improve teaching quality and student socio-emotional development (Rucinski et al., 2018; Fatahi et al., 2023). This study provides new insights by demonstrating how Islamic managerial philosophy, when combined with evidence-based emotional leadership strategies, creates a coherent institutional culture capable of sustaining pedagogical innovation. In this case, leadership is not administrative but transformative, enabling teachers to creatively integrate neuroscience, spirituality, and child-centered learning.

The findings of this study underscore the crucial role of structured routines in shaping the cognitive and moral development of early childhood within an Islamic educational environment. At BA 'Aisyiyah Pacitan, a consistent daily schedule provides a predictable learning environment for children that supports the formation of a “mental timeline,” enabling them to anticipate events, understand sequences, and develop early causal reasoning skills. This aligns with research showing that regular routines strengthen cognitive functions such as working memory, voluntary attention, and temporal reasoning (Dýrfjörð et al., 2023; Selman et al., 2025). More importantly, this practice aligns closely with the Quranic values of order (*niẓām*), balance (*tawāzun*), and constancy, which position predictability not only as a pedagogical tool but also as an ethical principle embedded in Islamic moral formation. Empirical studies increasingly validate that children exposed to stable routines demonstrate better socioemotional adjustment, enhanced self-regulation, and stronger academic engagement (Koshy et al., 2024). Thus, structured routines serve as cognitive scaffolding and moral architecture, reinforcing the integrated developmental approach that is central to early childhood Islamic education.

However, these findings also suggest that disruptions to these structured rhythms - such as sudden schedule changes or irregular outdoor events - can disrupt children's concentration, impair working memory performance, and trigger emotional fluctuations. These disruptions impair neurological efficiency, as the brain must expend additional cognitive resources to adjust to uncertainty, often resulting in reduced learning readiness and behavioral coherence (Selman et al., 2025). While structure is the backbone of cognitive stability, rigid adherence without adaptive flexibility can be counterproductive. Therefore, schools like BA 'Aisyiyah Pacitan must find a delicate balance: maintaining routines as a foundation for cognitive security while remaining responsive to real-world demands and the dynamic nature of children's learning. This requires a structured yet robust approach to routine management one that protects learners' cognitive and spiritual well-being while fostering adaptability as a critical 21st-century competency (Koshy et al., 2024).

Finally, this study highlights the importance of reflective professional development grounded in neuroscience and Islamic pedagogy. Teachers at BA 'Aisyiyah Pacitan benefit from collaborative learning sessions, but data indicate that there are still inconsistencies in translating reflective insights into sustainable classroom innovations.

Traditional teaching practices—teacher-centered narratives, limited dialogic inquiry, and minimal metacognitive scaffolding—remain obstacles to fully realizing 21st-century Islamic education (Alotaibi et al., 2019). This discussion advances the field by arguing that Islamic education requires a sustainable professionalization model that integrates spiritual formation, scientific literacy, and pedagogical experimentation. Only through such integrative training can Islamic preschools produce educators capable of guiding children through complex emotional, cognitive, and spiritual landscapes.

The findings of this study reveal that Islamic early childhood education achieves its maximum developmental impact when emotional responsiveness, structured routines, faith-based practices, and neuroscience-based pedagogy operate as an integrated system. At BA 'Aisyiyah Pacitan, emotion-focused teaching practices create a classroom climate where children feel heard, understood, and valued conditions that research shows significantly increase emotional expression, regulation, and engagement in learning tasks (Fatahi et al., 2023). Educators function not only as instructors but also as emotional socializers, guiding young learners in interpreting feelings, navigating interpersonal interactions, and developing emotional competencies, which form the foundation for healthy socioemotional and moral development. This emotional foundation is strengthened by consistent routines that offer predictability and stability, conditions essential for building cognitive clarity, temporal reasoning, and self-regulation during early childhood (Alkouatli, 2023). Within an Islamic framework, such predictability is not merely procedural, but reflects the ethical value of order (*nizām*) as a spiritual orientation toward balance, gratitude, and a disciplined life.

Complementing these structural and emotional elements are faith-based practices that intentionally cultivate children's spiritual awareness and sense of connectedness. Practices such as Qur'anic storytelling, gentle rhythmic recitation, and reflective conversations foster spiritual well-being by inviting children to experience awe, compassion, and purpose dimensions proven to support holistic development at an early age (Rouse & Hyde, 2024). Neuroscience further explains why these practices are effective: emotional security and spiritual calm activate neural pathways associated with emotional regulation, planning, and attention, enabling children to manage their emotions more effectively and engage in higher-level cognitive processing (Russell & Herringa, 2021). When Islamic values, emotional pedagogy, structured routines, and neuroscientific principles converge, they create a coherent developmental ecology one that nurtures emotional resilience, intellectual curiosity, and a deep spiritual foundation. Through this integrated approach, Islamic early childhood education emerges not only as a moral and religious endeavor but also as a scientifically grounded model of holistic human development.

4. Conclusions

This study demonstrates that Islamic early childhood education achieves its strongest developmental impact when emotional responsiveness, structured routines, faith-based practices, and neuroscience-based pedagogy are integrated into an integrated learning framework. At BA 'Aisyiyah Pacitan, these components work together to create a learning ecology where emotional safety, cognitive organization, and spiritual grounding are mutually reinforcing. Teachers' emotional attunement fosters self-regulation

and socio-emotional competence, while predictable routines reinforce children's developing sense of temporal order and causal reasoning. When embedded in the Islamic values of *niẓām* (order), *rahmah* (compassion), and *tawāzun* (balance), these practices shape not only academic readiness but also a moral-spiritual orientation that guides children toward resilience, empathy, and disciplined living.

Furthermore, the integration of Quranic stories, meditative recitation, and reflective dialogue strengthens children's spiritual well-being, providing them with a sense of meaning and connectedness that supports emotional stability and cognitive clarity. Neuroscientific insights confirm these effects, demonstrating that emotionally and spiritually safe environments activate neural pathways critical for executive function, attention, and long-term learning. This synthesis reveals that Islamic early childhood education, when aligned with contemporary scientific understanding, offers a holistic pedagogical model capable of nurturing the full spectrum of human development emotional, cognitive, moral, and spiritual. Thus, these findings call for continued innovation in teacher training, greater institutional support for integrated practices, and a sustained commitment to bridging Islamic pedagogy with emerging scientific knowledge to prepare young learners for the complexities of the modern world.

5. CRediT Authorship Contribution Statement

Kabul Suprayitno and Sanjaka Yekti: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, and Writing – review & editing. **Ahmadi Ahmadi and Abdunorma Samaalee:** Conceptualization, Supervision, Validation, and Writing – review & editing.

6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

7. Acknowledgments

Acknowledgments is where you acknowledge individuals who do not qualify for co-authorship but have contributed to your article intellectually, financially, or in some other manner. Acknowledging someone in your academic texts enhances your integrity as a writer by demonstrating that you are not claiming the ideas of other academics as your own intellectual property.

8. Data Availability

Data will be made available on request.

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