Relational Climate and Fine Motor Adaptation: A Qualitative Descriptive Study in an Integrated Islamic Kindergarten

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Abstract
Fine motor development during early childhood underpins later academic achievement and daily functioning, yet many children enter kindergarten with limited finger control and hand–eye coordination. Sensory-based activities such as finger painting are widely used to stimulate these skills. Still, existing studies often treat the activity as context-independent and rarely examine how a classroom's relational climate shapes children's responses to sensory materials. This qualitative descriptive study addressed that gap by examining how finger painting was implemented within the routines of an integrated Islamic kindergarten and how the kindergarten's value-based climate conditioned children's engagement. Twelve children aged four to five years participated across four sessions, alongside two classroom teachers and the school principal. Data were collected through classroom observation, semi-structured interviews, and documentation of children's artwork, and were analyzed using reflexive thematic analysis. Children initially hesitated because of the paint's unfamiliar texture, producing short, disconnected strokes and inconsistent pressure. Across sessions, their movements became more continuous and deliberate, pressure control became more consistent, and sustained attention lengthened. Teachers linked these changes to deliberate practices of patience, modeling, and predictable religious routine rather than to the paint alone. The study argues that the effectiveness of a sensory medium cannot be assessed in isolation from the value-based ecosystem in which it is embedded, and it offers a framework linking relational climate, self-regulation, and motor adaptation.

Keywords: *Early childhood education; Fine motor skills; Finger painting; Islamic kindergarten; Qualitative descriptive study; Sensory-based learning*

INTRODUCTION

Early childhood education plays a strategic role in building a comprehensive foundation for children's development, covering cognitive, language, social-emotional, moral, and physical-motor domains (Wahyuningsih et al., 2023; Yusrilla et al., 2024). Within this landscape, fine motor development is difficult to overstate. Fine motor skills involve coordinating small muscles—particularly those of the fingers, hands, and eyes—and underpin activities such as writing, drawing, cutting, self-feeding, and manipulating objects (Cameron et al., 2012). The developmental significance of these skills is now well documented beyond the motor domain itself. Longitudinal evidence from the 1970 British Cohort Study shows that early childhood fine motor skills positively predict visuospatial deductive reasoning in adolescence, and that this association mediates the previously observed link between early fine motor skills and later reading and mathematics ability (Cortes et al., 2022). Comparable longitudinal findings from the UK Millennium Cohort Study indicate that fine motor skills predict later English and science outcomes, while executive function operates as a mediating

pathway between motor competence and literacy achievement (Khoury-Metanis & Khateb, 2024; Zhou & Tolmie, 2024). Fine motor competence during the preschool years is therefore not a peripheral milestone but a developmental prerequisite with cascading consequences for academic readiness, self-confidence, and independence. Consistent with this, longitudinal evidence confirms that children's fine motor competence in kindergarten directly predicts early reading achievement upon entering Grade 1 (Piek et al., 2008; Suggate et al., 2019).

The age range of four to six years is widely recognized as a sensitive period for fine motor development (Wahyuningsih et al., 2023). During this stage, children need structured, continuous, developmentally appropriate stimulation, ideally through play-based activities that are exploratory, enjoyable, and aligned with their developmental characteristics (Barton & Wolery, 2010). This orientation is consistent with developmentally appropriate practice, which positions play-based learning as a core strategy in early childhood education (Copple & Bredekamp, 2009). In practice, however, many early childhood institutions still rely on limited, repetitive activities, often worksheet-based, that constrain children's opportunities for hands-on sensory experience and the motor coordination such experience cultivates. Fine motor delays remain common among early childhood learners (Hoiroh & Prasetya, 2023; Rohmah & Tasuah, 2023). Some children struggle to hold writing tools correctly, regulate finger pressure, coordinate hand and eye movements, and perform precision tasks. These difficulties extend beyond physical motor ability: children with underdeveloped fine motor skills often struggle to express ideas through writing or drawing, become easily frustrated, and withdraw from learning activities (Piek et al., 2008).

Sensory-based play activities have emerged as one of the more promising responses to this challenge. Learning experiences that involve direct tactile interaction, texture exploration, and coordinated movement have been shown to improve finger flexibility and hand control (Wahyuningsih et al., 2023; Sutari et al., 2025). A recent systematic review of sensory-based interventions for children and youth confirms that these interventions can improve functional outcomes and participation and—importantly for the present study—that targeting multiple sensory systems is more effective than targeting a single system (Piller et al., 2025). One particularly relevant sensory activity is finger painting, an art activity in which children paint directly with their fingers, without brushes or other tools. Finger painting engages touch, sight, and motor coordination and has been shown to enhance children's artistic abilities and active participation in learning within Islamic early childhood settings (Setyowati et al., 2022). Empirical evidence further highlights that structured finger painting activities systematically foster finger flexibility and fine motor coordination in young learners (Mayar et al., 2022). Finger painting functions not only as an artistic activity but as a medium for fine motor stimulation: children practice controlled finger movements, regulate pressure, and adapt hand motions to specific patterns or surfaces. This is consistent with evidence that well-developed fine motor skills support cognitive development, academic readiness, and self-regulation (Cameron et al., 2012; Grissmer et al., 2010; Piek et al., 2008), and with the broader finding that motor skill interventions can produce moderate effects on fine motor, visual-motor, and manual dexterity outcomes in children aged birth to six years (Strooband et al., 2020).

The mechanisms through which such activities operate are also becoming clearer. Contemporary accounts of sensory-motor development describe sensory-to-motor transformation not as a linear pipeline but as a dynamic, distributed process in which sensory feedback continuously shapes and refines motor output as an action is repeated. Neuroimaging evidence supports this picture: functional connectivity in sensorimotor networks predicts fine motor skill acquisition in preschool children (Wang et al., 2026), movement-related cortical activity continues to mature well into mid-childhood and varies markedly between individual children (Johnson et al., 2020), and fine motor skills in 4–5-year-olds are associated with spontaneous neural activity in prefrontal regions that also support mathematical ability (Wang et al., 2026). These findings help explain why finger-painting improvements tend to be progressive rather than immediate: repeated tactile engagement lets sensory feedback increasingly inform and adjust finger movement, gradually strengthening the neural coordination underlying fine motor control. They also help explain why a sensory-rich medium may outperform worksheet-based tasks, which offer comparatively limited sensory feedback (Grissmer et al., 2010). At the same time, the same literature cautions against overstating what a single classroom activity can accomplish. Home stimulation, socioeconomic context, and the quality of adult-child interaction also shape fine motor gains (Armstrong-Carter et al., 2021; Osorio et al., 2010), as do children's developmental trajectories, which differ substantially between individuals (Johnson et al., 2020). Any claim about a particular medium must therefore be located within the relational and environmental conditions in which it is delivered.

This is precisely where the integrated Islamic early childhood context becomes theoretically interesting rather than merely contextual. Integrated Islamic kindergartens organize learning around holistic development, integrating spiritual, cognitive, affective, and psychomotor domains within a single pedagogical framework (Fauzi et al., 2019; Asri et al., 2025). Religious routines—opening prayers, guided recitation, consistent moral framing—structure the classroom day and shape the emotional and relational climate in which learning activities take place (Sholehuddin et al., 2023; Muthohar et al., 2026). This matters for motor learning because the mechanisms linking sensory activity to motor precision are not purely neurological. Executive function mediates the relationship between fine motor skills and literacy achievement (Khoury-Metanis & Khateb, 2024), and self-regulation, sustained attention, and persistence develop in ways sensitive to the predictability and emotional safety of the learning environment. A classroom climate characterized by patience, encouragement, and predictable routine is therefore not a decorative backdrop to finger painting; it is a plausible moderator of how long children persist with a novel tactile material, how willing they are to tolerate the discomfort of an unfamiliar texture, and how readily they move from teacher-dependent to independent action. Recent work on guided mediation and multisensory engagement in Indonesian Islamic early childhood education supports this reading, showing that structured, emotionally mediated routines shape how young children respond to sensory learning experiences and how they internalize them (Muthohar et al., 2026). The relevant question is thus not simply whether finger painting "works," but how the value-based relational ecosystem of an integrated Islamic kindergarten conditions the sensory-to-motor feedback loop during the activity.

However, existing research has not addressed this question directly. Studies of finger painting have consistently reported positive effects on hand-eye coordination, finger dexterity, and manipulative skills, along with social-emotional benefits such as confidence, independence, and learning motivation (Sutari et al., 2025; Wahyuningsih et al., 2023). Studies in Islamic early childhood settings show that finger painting can enhance artistic ability and active participation (Setyowati et al., 2022). Yet most of this work treats finger painting as a general technique whose effects are assumed to be context-independent, and it is overwhelmingly quantitative, relying on pre-test–post-test designs without examining the relational conditions under which the activity is delivered. Conversely, the literature on Islamic early childhood education has documented holistic curriculum models and value-based pedagogical frameworks (Fauzi et al., 2019; Asri et al., 2025; Sholehuddin et al., 2023) but has rarely examined specific psychomotor activities in any empirical detail. A cross-cultural parallel is instructive: a qualitative study of Singaporean kindergarten teachers found that fine motor performance is closely tied to the quality of teacher–child interaction and the classroom's responsiveness to individual developmental needs, rather than to the activity in isolation (Shorouk et al., 2025). Suppose the relational context matters that much in a secular kindergarten; it is reasonable to expect that the explicitly value-based, religiously structured climate of an integrated Islamic kindergarten matters as well—and that this has yet to be described empirically. This study addresses a mechanism-based gap, not a location-based one: it concerns how religious routines, teacher–child interaction, and a compassion-oriented climate shape children's engagement, persistence, and self-regulation during a sensory-based fine motor activity.

Preliminary observations at TKIT Al-Kirom Jambangan reinforced the practical relevance of this question. Several children aged four to five years exhibited limitations in fine motor development, particularly in finger control during writing, coloring, and art-related activities. Teachers implemented various instructional strategies, but they still used limited sensory and exploratory learning media. These observations suggested a need for more varied, contextually appropriate stimulation, and that existing classroom routines—prayers, moral framing, patient guidance—might themselves support children's engagement with such media. It remained unclear how children responded to a sensory medium in this specific environment, what changes teachers observed over repeated sessions, and how the surrounding value-based climate shaped those responses.

This study is therefore designed as a qualitative descriptive investigation. It does not aim to establish causal effectiveness or measure fine motor precision with standardized instruments, but to describe how teachers implemented finger painting activities at an Integrated Islamic Kindergarten and interpret observed changes in children's fine motor behavior in relation to the setting's sensory and relational conditions. Three questions guide the inquiry: how finger painting activities were implemented within the routines of TKIT Al-Kirom Jambangan; what patterns of change teachers and researchers observed in children's finger movement, hand-eye coordination, pressure control, and task engagement across repeated sessions; and how the value-based, religiously structured climate of the kindergarten appeared to condition children's responses to the sensory demands of the activity. Framing the study this way keeps the claims proportionate to the evidence a qualitative design can generate, while still allowing the findings to speak to a genuine theoretical question about the

interaction between sensory learning and value-based pedagogy. The study is expected to contribute to the literature on sensory-based learning in early childhood by extending it into an underexplored institutional context and offering educators in integrated Islamic kindergartens a grounded account of how a low-cost, locally available medium can be embedded in existing routines rather than imported as an external intervention.

METHOD

Research Design

This study employed a qualitative descriptive design situated within an interpretivist paradigm (Creswell & Creswell, 2023). The design choice was deliberate and responds directly to a central limitation in prior finger painting research: the tendency to treat a context-dependent classroom activity as if its effects were uniform and measurable in isolation. A qualitative descriptive design does not seek to establish causal effectiveness or to quantify motor precision against standardized instruments. Instead, it aims to produce a thick, context-sensitive account of how a sensory-based activity unfolds within a specific pedagogical environment and how teachers and researchers interpret changes in children's behavior over time (Creswell & Creswell, 2023). This orientation is appropriate because the study's guiding question concerns how the value-based relational climate of an integrated Islamic kindergarten conditions children's engagement with the sensory demands of finger painting—a question fundamentally about meaning, process, and situated practice rather than effect size.

The design is further justified by the current state of the literature. Recent reviews of sensory-based interventions note substantial heterogeneity in how researchers implement and evaluate such activities, and call for closer attention to the conditions under which sensory input translates into functional participation (Piller et al., 2025). Similarly, neurodevelopmental research on fine motor development emphasizes marked individual differences in developmental trajectories, even among children of the same age (Johnson et al., 2020; Wang et al., 2026). A design that captures variation across children and sessions, rather than averaging it away, is therefore better suited to the phenomenon than a small-sample pre-test–post-test comparison.

Participants and Setting

The study was conducted at *TKIT Al-Kirom Jambangan*, an integrated Islamic kindergarten in East Java, Indonesia. The study focused on 12 children aged 4-5 years. This age range was selected because it corresponds to the sensitive period for fine motor development identified in the literature (Wahyuningsih et al., 2023) and because the children were at a stage where they could be introduced to finger painting as a novel sensory experience without prior formal instruction in the medium. All children were enrolled in the same class group and participated in the activity as part of their regular classroom routine, not as a pull-out intervention.

Supporting data sources included two classroom teachers and the school principal. Teachers were selected because they possessed sustained, day-to-day knowledge of each child's fine motor behavior across multiple activity contexts, and because they were positioned to notice changes that a researcher present only during finger painting sessions

might miss. The principal contributed an institutional perspective on how the activity was situated within the kindergarten's broader curriculum and religious routines.

Sampling was purposive and criterion-based. Inclusion criteria for children were: (a) enrolment in the four-to-five-year age group at *TKIT Al-Kirom Jambangan*; (b) no diagnosed motor or developmental condition that would require adapted materials; and (c) participation in at least three finger painting sessions during the observation period. No child was excluded based on prior fine motor performance, including children teachers had identified as showing delays, because the study sought to describe variation rather than select a homogeneous high-ability group.

Instruments and Observation Framework

Observation was guided by a structured but non-quantified framework adapted from the Indonesian Standard of Early Childhood Developmental Achievement (*Standar Tingkat Pencapaian Perkembangan Anak*, STPPA) as stipulated in Permendikbudristek No. 5 of 2022. Four observational foci were derived from this standard: finger flexibility (range and smoothness of finger movement during painting), hand–eye coordination (accuracy of color placement relative to the intended pattern or surface), grasping and pressure control (consistency of finger pressure applied to the painting surface), and task engagement (duration of sustained attention and degree of independence from teacher assistance).

Crucially, these foci were used as descriptive lenses, not as measurement scales. We recorded the four-level developmental categories commonly used in Indonesian early childhood assessment (*Belum Berkembang*, *Mulai Berkembang*, *Berkembang Sesuai Harapan*, *Berkembang Sangat Baik*) as teacher-generated contextual descriptions during interviews and as field notes during observation. Still, they were not treated as interval data, summed into scores, or subjected to statistical analysis. This distinction is stated explicitly here because it addresses a predictable methodological objection: the study does not claim to measure precision, and it does not use the STPPA rubric as a psychometric instrument. The rubric provided a shared vocabulary for teachers and researchers to describe what they observed, while the analysis remained qualitative.

Semi-structured interview protocols were developed for teachers and the principal. Teacher interviews focused on three domains: (a) children's baseline fine motor behavior as observed across daily classroom activities, not only during art sessions; (b) the instructional strategies teachers used to introduce and scaffold finger painting, including how they managed children's initial reactions to the paint's texture; and (c) teachers' perceptions of change in individual children over the course of the sessions, with prompts asking for specific behavioral examples rather than general impressions. The principal interview addressed the activity's institutional framing—how the kindergarten positioned finger painting within its curriculum, how it related to religious routines, and what constraints shaped its implementation.

Trustworthiness was addressed through three strategies consistent with qualitative descriptive inquiry (Lincoln & Guba, 1985; Creswell & Creswell, 2023). First, triangulation was applied across data sources: observational field notes, teacher interviews, and documentation of children's artwork were compared for convergence and divergence. Second, peer debriefing was conducted with a colleague not involved in data collection, who

reviewed emerging interpretations against the raw field notes. Third, an audit trail was maintained, consisting of dated observation records, interview transcripts, and analytic memos documenting decisions about coding and theme development. Member checking was conducted informally with teachers at the end of the observation period, during which preliminary interpretations were shared, and teachers were invited to confirm, qualify, or contest them.

Data Collection Procedures

Data collection proceeded in three overlapping phases over one implementation cycle. In the first phase, the researcher conducted non-participant classroom observations over two weeks before introducing finger painting, focusing on children's fine motor behavior during routine activities such as drawing, coloring, and manipulative play. This phase established a contextual baseline for interpreting later observations without serving as a formal pre-test.

In the second phase, finger painting activities were implemented across four sessions over approximately three weeks. Each session followed the kindergarten's existing routine: an opening prayer, a brief teacher demonstration, individual painting time, hand-washing, and a closing reflection. The researcher observed each session from a position that allowed close viewing of children's hand movements without interrupting the activity, and recorded field notes in real time using a structured observation sheet with space for descriptive and reflective notes. With parental consent, researchers photographed children's artwork at the end of each session to document changes in stroke patterns, color application, and spatial distribution over time.

In the third phase, semi-structured interviews were conducted with the two classroom teachers and the principal. Each teacher interview lasted approximately 45–60 minutes and was audio-recorded with consent. Interviews were conducted in Indonesian, the language in which teachers were most comfortable articulating nuanced observations of children's behavior, and were later transcribed and translated into English for analysis, with key excerpts back-translated to verify accuracy.

Administrative permission was obtained from the school principal before data collection. Parental consent was obtained in writing for children's participation and for the use of anonymized photographs of artwork. Children's assent was sought verbally at the start of each session, and any child who was reluctant to touch the paint could observe rather than participate, without consequence. This approach to assent and dissent is consistent with contemporary guidance on research with young children, which recognizes that children communicate willingness and reluctance through multiple verbal and non-verbal cues, and that these cues must be honored throughout the research process rather than treated as a single consent event (Ólafsdóttir et al., 2025; Fielding et al., 2025).

Data Analysis

Data were analyzed using reflexive thematic analysis following the six-phase procedure articulated by Braun and Clarke (2022). The analysis was inductive and data-driven rather than deductive, meaning codes were generated from the content of field notes and interview transcripts rather than imposed by the STPPA framework. The four observational foci served as an orienting structure for observation, but they did not determine the coding categories.

In the first phase, the researcher read and reread all field notes, interview transcripts, and artwork documentation to become familiar with the data. In the second phase, initial codes were generated line by line, using a combination of descriptive codes (e.g., "child avoids touching paint," "teacher physically guides hand") and process codes (e.g., "child initiates stroke without prompting," "child monitors own hand movement"). In the third phase, codes were clustered into candidate themes. Two candidate themes were subsequently collapsed because they described the same phenomenon from different data sources; one candidate theme was discarded because it was supported only by a single teacher's remark and was not corroborated by observation. In the fourth phase, we reviewed themes against the full dataset to ensure they accounted for both confirming and disconfirming instances. In the fifth phase, we defined and named the themes. The final themes were organized around three broad domains: children's initial sensory responses and adaptation, changes in motor behavior across sessions, and the role of teacher mediation and classroom routine in sustaining engagement.

Analysis was conducted manually rather than with qualitative data analysis software, given the modest corpus size (twelve children, four sessions, three interviews). We wrote analytic memos throughout to document interpretive decisions and maintain reflexivity about the research team's dual position as observers and individuals with prior familiarity with the setting. This reflexivity is particularly important in research conducted within one's own institutional or cultural context, where assumptions about what "counts" as progress may otherwise remain unexamined (Braun & Clarke, 2022).

Ethical Considerations

The study followed institutional ethical guidelines for research involving young children. Written informed consent was obtained from parents or guardians, and verbal assent was sought from children at each session. We told children, in age-appropriate language, that they could stop painting at any time and choose not to have their artwork photographed. All names used in this article are pseudonyms. We cropped or otherwise edited photographs to exclude identifying facial features. Data were stored on a password-protected device accessible only to the research team, and audio recordings were destroyed after transcription and verification.

A specific ethical consideration arose from the study's focus on children whom teachers had identified as showing fine motor difficulties. The researcher avoided framing these children's participation in deficit terms during classroom interactions, and teachers were asked not to single out any child for special attention in a way that would be visible to peers. The purpose of the study was explained to teachers as an inquiry into how children respond to a new sensory material, not as an assessment of individual children's competence.

RESULTS AND DISCUSSION

Results

Overview of the Implementation Cycle

Finger painting was implemented across four sessions over approximately three weeks, embedded within the kindergarten's existing daily routine rather than introduced as a

separate intervention. Each session followed the same sequence: an opening prayer, a brief teacher demonstration, individual painting time, hand-washing, and a closing reflection. Across the four sessions, twelve children participated, with attendance ranging from ten to twelve children per session. Two children missed one session each due to illness; their data were retained because both participated in at least three sessions, meeting the inclusion criterion established in the Method.

We recorded observational data across the four sessions using the four descriptive foci described in the Method: finger flexibility, hand–eye coordination, grasping and pressure control, and task engagement. The presentation below proceeds in three parts. First, a session-by-session account of what was observed is provided, with attention to both typical and atypical responses. Second, a summary matrix (Table 1) organizes the observed patterns by focus area and implementation-cycle phase. Third, two figures present the distribution of task engagement and the progression of stroke continuity across sessions. These figures are descriptive visualizations of field-note counts and artwork documentation, not standardized-instrument scores; they are intended to make patterns visible, not to quantify motor precision.

Session-by-Session Observations

Session 1: Initial encounter with the medium. In the first session, ten of the twelve children approached the paint with visible hesitation. Six children initially touched the paint with a single fingertip and withdrew their hand, and four children asked the teacher to wipe their fingers before beginning. For the first several minutes, three children refused to touch the paint and instead watched their peers. When painting began, finger movements were largely irregular: strokes were short, disconnected, and applied with inconsistent pressure. Color application was uneven: some children pressed so lightly that the paint barely transferred to the paper, while others pressed so firmly that the paint pooled and tore the paper at the edges. Hand–eye coordination was limited: children frequently looked away from the paper while painting, and the color placement did not follow any intended pattern. The teacher assisted most children at some point during the session, either to model a stroke, guide a hand, or reassure a child who was uncomfortable with the texture. Sustained attention during individual painting time ranged from about two to five minutes before children left the activity or changed materials.

Session 2: Early adaptation. By the second session, the pattern shifted. Of the twelve children, eight began painting within the first minute without prompting, compared with four in Session 1. The three children who refused to touch the paint in Session 1 all participated in Session 2, though two began by using only the flat of the palm rather than their fingertips. Finger movements became somewhat more continuous: several children produced strokes that extended across the paper rather than stopping after a short distance. Pressure control remained variable, but the extremes observed in Session 1 (barely transferring paint, or pressing through the paper) were less frequent. Hand–eye coordination showed a modest change: children more often looked at the point where their finger met the paper, although they still looked away frequently. Teacher assistance was still common but was increasingly directed at suggesting color choices rather than physically guiding hands. Attention during individual painting time extended to approximately four to eight minutes for most children.

Session 3: Consolidation of movement patterns. In the third session, most children (nine of twelve) began painting independently and selected their own colors without prompting. Strokes were noticeably more continuous and deliberate. Several children began to produce

repeated patterns—concentric circles, rows of dots, or zigzag lines—rather than disconnected marks. Pressure control improved: children were more often able to apply enough pressure to transfer paint clearly without tearing the paper, and a few children were observed adjusting pressure deliberately when moving from one part of the paper to another. Hand–eye coordination was more consistent, with children visually monitoring their finger movements for longer stretches. Task engagement extended further: eight children sustained attention for ten minutes or more, and three children asked to continue painting when the teacher announced that it was time to wash hands.

Session 4: Independent engagement. In the final session, all twelve children began painting independently within the first minute. The two children who had relied on palm-only contact in Session 2 now used their fingertips. Strokes were generally continuous, and several children produced recognizable shapes or deliberate arrangements of color. Pressure control was more consistent across the group, although two children continued to press firmly enough to create small tears at the paper's edge. Hand–eye coordination was sustained for most of the painting period. Task engagement differed markedly from Session 1: ten children sustained attention for the full fifteen-minute painting period, and four continued adding detail after the teacher's first reminder that the session was ending. Teacher assistance during this session was largely limited to logistical support (distributing paper, replenishing paint) rather than motor guidance.

Table 1

Observed Patterns by Focus Area and Phase of Implementation Cycle

Focus area	Session 1 (initial encounter)	Session 2 (early adaptation)	Session 3–4 (consolidation & independent engagement)
Finger flexibility	Short, disconnected strokes; fingertip contact brief and hesitant	Strokes extended across paper; some children used palm before fingertips	Continuous, deliberate strokes; repeated patterns and recognisable shapes
Hand–eye coordination	Children frequently looked away from paper; colour placement unrelated to intended pattern	Children more often looked at the point of contact; visual monitoring brief	Sustained visual monitoring; colour placement increasingly deliberate
Grasping & pressure control	Extreme pressure variation (barely transferring paint vs. pressing through paper)	Extremes less frequent; pressure still variable	Pressure more consistent; some children adjusted pressure deliberately
Task engagement	2–5 minutes sustained attention; frequent teacher assistance	4–8 minutes; assistance increasingly non-motor	10–15 minutes; assistance largely logistical; children requested to continue
Emotional response	Hesitation, withdrawal, requests to wipe hands	Growing curiosity; palm-only contact by two children	Active enjoyment; children described artwork to peers and teachers

Note. Patterns are summarised from field notes across four sessions and teacher interviews. Categories are descriptive, not scored; they are not intended as a measurement scale. Frequencies refer to the twelve participating children.

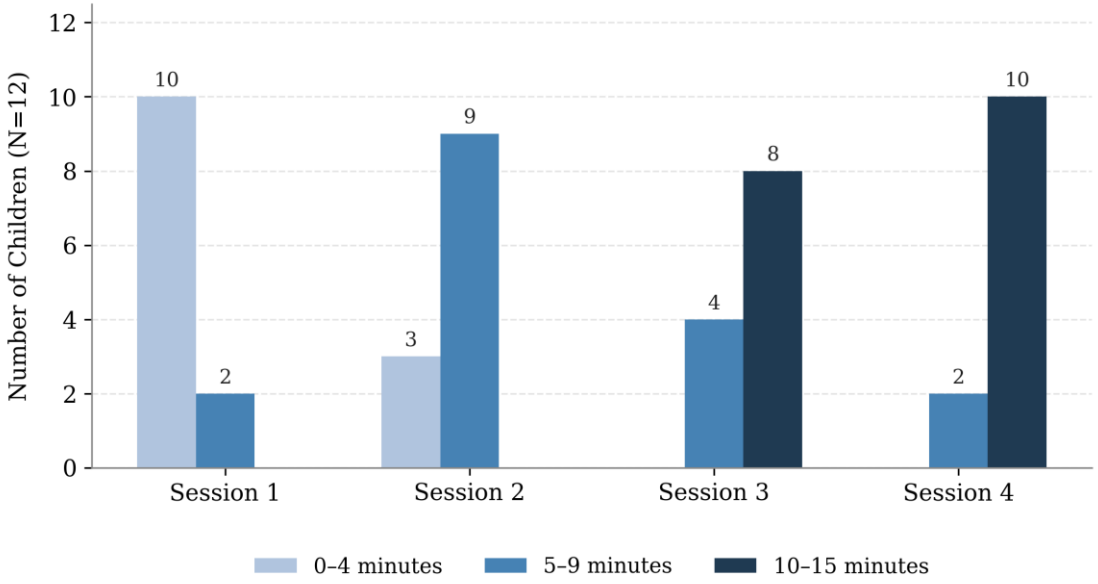


Figure 1

Distribution of Sustained Attention During Individual Painting Time, by Session

Note. Attention was recorded by the observing researcher using a stopwatch and confirmed against teacher estimates during post-session interviews. Bands are descriptive groupings, not psychometric categories. N = 12 children per session, with two children absent from one session each.

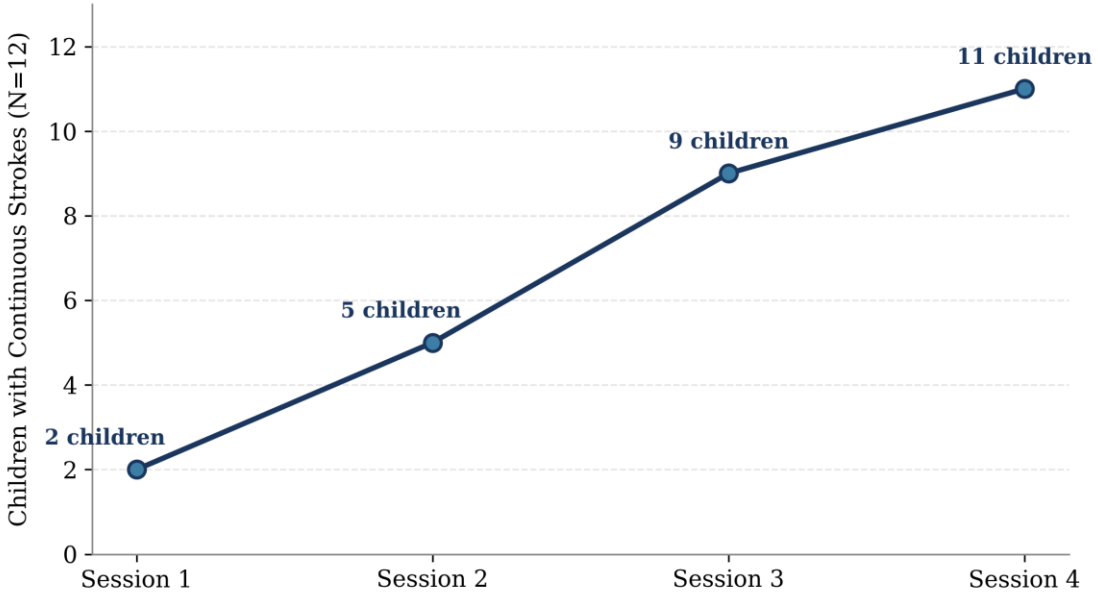


Figure 2

Progression of Stroke Continuity Across Sessions, as Documented in Children's Artwork

Note. Stroke continuity was coded from photographed artwork by two coders working independently; disagreements were resolved through discussion with reference to the original photographs. "Continuous" is a descriptive category, not a measure of precision. N = 12 children, with artwork available for all participating children in each session.

Teacher Perceptions of Change

Interviews with the two classroom teachers and the principal were analyzed thematically. We report three themes here, with illustrative excerpts translated from Indonesian.

Theme 1: From avoidance to tolerance of the sensory medium**.** Both teachers described a shift over time in how children who initially resisted touching the paint responded. One teacher described a specific child:

> *"At first, [child] would not put his finger in the paint at all. He asked me to put the paint on the paper for him. By the third time, he chose his own colors and told me what he was making. He still wipes his hands more often than the others, but he stays with the activity now."*

The principal linked this shift to the routines surrounding the activity rather than to the paint itself:

> *"The children know that after the prayer, we begin calmly. The teacher does not rush them. I think this is why the ones who were afraid of the paint could take their time."*

Theme 2: Changes noticed across contexts, not only during finger painting. Teachers were asked whether they had noticed changes in children's fine motor behavior during other classroom activities. Both teachers reported changes, but described them cautiously. One teacher noted:

> *"I see it most in coloring. Some children who used to hold the crayon very lightly now press more firmly. But I cannot say it is only from finger painting – they are also growing, and we do many activities."*

The second teacher described a similar pattern but emphasized that changes were gradual and uneven across children:

> *"Two or three children are clearly more confident with their hands. Others are still the same. It depends on the child."*

Theme 3: The role of routine and relational climate**.** Both teachers and the principal described the kindergarten's religious routines as shaping how children approached the activity. The principal explained:

> *"We do not separate the prayer from the learning. The children pray first, then they work. This helps them settle. When they are settled, they can focus on the painting."*

One teacher elaborated on the relational dimension:

> *"If a child is afraid of the paint, I do not force. I sit with them. Sometimes I paint too, so they see it is safe. After a while, they try."*

Disconfirming observations. Not all observed patterns fit a narrative of uniform improvement. Two children continued to show inconsistent pressure control across all four sessions, and one child's artwork showed no clear progression in stroke continuity between Sessions 1 and 4. One teacher also noted that a child who was highly engaged during finger painting continued to show limited fine motor control during pencil-based tasks, suggesting that engagement in one medium did not automatically transfer to another. These observations are reported here because they qualify the overall pattern and are taken up in the Discussion.

Summary of Findings

Across four sessions, the following patterns were observed. First, for most children, initial hesitation in response to the paint's texture gave way to independent engagement with

the medium. Second, finger movements became more continuous and deliberate, pressure control became more consistent, and visual monitoring of hand movements increased. Third, sustained attention during individual painting time lengthened substantially, and teacher assistance shifted from motor guidance to logistical support. Fourth, teachers perceived changes in children's fine motor behavior both within and beyond the finger painting activity, but described these changes as gradual, uneven across children, and difficult to attribute solely to finger painting. Fifth, not all children followed the same trajectory; two children showed limited change in pressure control, and one child showed no clear progression in stroke continuity. These findings are descriptive and context-bound; they are interpreted in the Discussion in relation to the study's guiding questions about sensory engagement and the role of the kindergarten's value-based relational climate.

Discussion

The findings confirm that finger painting, when implemented within the existing routines of an integrated Islamic kindergarten, produces observable shifts in children's fine motor behavior over a relatively short implementation cycle. However, these findings matter less for demonstrating that finger painting "works" in a generalizable sense than for tracing how the setting's specific sensory and relational conditions shaped the trajectory of children's engagement and movement. The discussion therefore first interprets the mechanisms underlying the observed changes, then situates them within the kindergarten's value-based climate, and finally compares the findings with prior literature to clarify what this study adds and what it does not claim.

The most consistent pattern across the four sessions was the progressive, rather than immediate, improvement in finger flexibility, pressure control, and hand–eye coordination. This trajectory is consistent with contemporary accounts of sensory-motor integration, which describe the transformation of sensory input into refined motor output as a dynamic, distributed process that strengthens through repetition. Neuroimaging evidence supports this interpretation: functional connectivity in sensorimotor networks predicts fine motor skill acquisition in preschool children (Wang et al., 2026), and movement-related cortical activity continues to mature well into mid-childhood, with marked individual differences between children of the same age (Johnson et al., 2020). In the present study, children's initial hesitation in response to the unfamiliar texture of the paint—evidenced by fingertip withdrawal, requests to wipe hands, and palm-only contact—gave way, for most children, to more sustained tactile exploration. This shift is not merely attitudinal; it reflects a gradual recalibration of how tactile feedback informed subsequent finger movement. Children who initially pressed too lightly to transfer paint, or too firmly and tore the paper, increasingly adjusted pressure in response to what they saw and felt. This is precisely the kind of sensory-to-motor feedback loop that a worksheet-based task, with its limited tactile variation, is poorly positioned to stimulate (Grissmer et al., 2010).

The second mechanism concerns the relationship between motor engagement and self-regulation. Children's sustained attention during individual painting time lengthened substantially across sessions, and teacher assistance shifted from motor guidance to logistical support. This pattern aligns with evidence that executive function mediates the relationship

between fine motor skills and later academic outcomes (Khoury-Metanis & Khateb, 2024) and that fine motor competence supports persistence and self-regulation in learning activities (Cameron et al., 2012; Piek et al., 2008). Furthermore, well-developed fine motor skills actively promote children's productive task behaviors and sustained engagement during classroom activities (Karimi, Poznanski, Hart, & Nelson, 2025). In this setting, however, the longer attention span cannot be attributed to the paint alone. Teachers described deliberately not rushing children, sitting with those who were hesitant, and modeling the activity so children could observe before touching. These relational practices appear to have scaffolded children's ability to tolerate the paint's sensory discomfort long enough for adaptation to occur. In other words, the mechanism is not purely neurological; it is relational and environmental. A child who is given time, reassurance, and a visible model is more likely to persist with a novel tactile material than a child who is hurried or physically guided before they are ready. This interpretation aligns with recent work on guided mediation in Indonesian Islamic early childhood education, which shows that structured, emotionally mediated routines shape how young children respond to sensory learning experiences and how they internalize them (Muthohar et al., 2026).

The third mechanism concerns the specific contribution of the integrated Islamic kindergarten's value-based climate. This is where the study makes its most distinctive theoretical contribution, and where the evidence must be handled most carefully. Teachers and the principal consistently linked children's engagement to the routines surrounding the activity—the opening prayer, the calm transition into painting, the absence of hurry—rather than to the paint itself. One teacher described sitting with a hesitant child and painting alongside them, so that the child could see the activity was safe. The principal described the prayer as helping children "settle" before they worked. These are not incidental details. They describe a relational climate in which patience, encouragement, and predictable routine are deliberately cultivated as pedagogical values, not merely as classroom management techniques. This reinforces broader evidence that cultivating an enjoyable, supportive, and safe learning environment serves as a crucial foundation for accelerating early childhood fine motor development (Wulan and Watini, 2023) This climate is consistent with holistic Islamic educational frameworks that integrate spiritual, cognitive, affective, and psychomotor domains within a single pedagogical structure (Fauzi et al., 2019; Asri et al., 2025), and with recent evidence that religious routines and multisensory engagement in Islamic early childhood settings foster emotional regulation and moral internalisation (Sholehuddin et al., 2023; Muthohar et al., 2026). The proposed mechanism is that a value-based relational climate conditions the sensory-to-motor feedback loop by increasing children's tolerance for sensory uncertainty, giving them the time to adapt and refine their movements. This is a plausible mechanism, not a demonstrated causal pathway. The study design cannot isolate the Islamic climate's contribution from teacher patience, peer modeling, or repeated exposure. The study can describe how these elements were woven together in practice and offer a framework for future research to test their relative contributions. This study can describe how these elements were woven together in practice and offer a framework for future research to test their relative contributions, as visually presented in Figure 3.

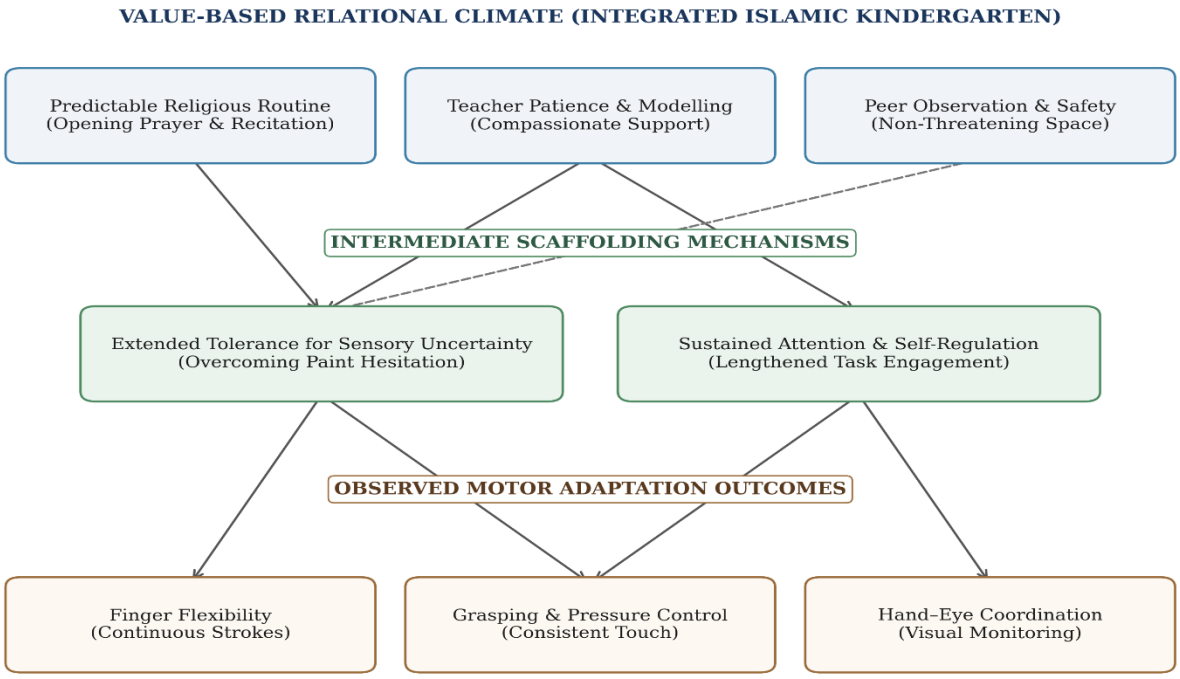


Figure 3

Proposed Framework Linking Value-Based Relational Climate to Sensory-Motor Adaptation

Note. The framework is interpretive and derived from observational and interview data. Solid arrows represent pathways supported by the present data; the dashed arrow represents a plausible pathway that the study design cannot confirm. The framework is intended to guide future hypothesis-driven research, not to assert causal claims.

Comparison with prior literature clarifies what this study supports and what it extends. The findings are consistent with a substantial body of work showing that sensory-based activities, including finger painting, support fine motor development in early childhood (Sutari et al., 2025; Wahyuningsih et al., 2023). They also align with the broader finding that motor skill interventions can produce moderate effects on fine motor outcomes (Strooband et al., 2020) and with recent reviews indicating that targeting multiple sensory systems is more effective than targeting a single system (Piller et al., 2025). This study extends prior work by attending to the relational and value-based conditions under which the activity was delivered. Prior studies have tended to treat finger painting as a technique whose effects are independent of context. The present study suggests that context is not a backdrop but a constitutive part of the activity: the same paint, the same paper, and the same task would likely have produced different trajectories in a classroom where children were hurried, where hesitation was treated as non-compliance, or where the activity was disconnected from the routines that gave it meaning. This interpretation is supported by a qualitative study of Singaporean kindergarten teachers, which found that fine motor performance is closely tied to the quality of teacher–child interaction and the classroom's responsiveness to individual developmental needs, rather than to the activity in isolation (Shorouk et al., 2025). The present study extends that finding by showing that in an integrated Islamic kindergarten, the relational climate is explicitly value-laden—framed by religious routine and moral concepts such as patience and

compassion—and that this framing appears to shape how children approach a sensory challenge.

The study also contributes to the Islamic education literature by demonstrating that sensory-based learning and value-based pedagogy are not separate domains that must be balanced or sequenced, but can be integrated within a single activity. The holistic-integrative model of Islamic kindergarten education emphasizes integrating spiritual, cognitive, affective, and psychomotor domains (Fauzi et al., 2019), and curriculum frameworks inspired by *al-Ghazālī*'s thought similarly stress the simultaneous cultivation of moral and practical capacities (Asri et al., 2025). The present findings offer a concrete, low-cost illustration of what this integration looks like in practice: a prayer before painting, a teacher who sits with a hesitant child rather than forcing contact, and an activity that is allowed to take time. These are not elaborate interventions. They are ordinary practices, made deliberate. The theoretical contribution is to show that the effectiveness of a sensory medium such as finger painting cannot be assessed in isolation from the value-based ecosystem in which it is embedded. This refines existing sensorimotor accounts, rather than replacing them.

These contributions must be weighed against the study's substantive limitations. The sample of twelve children in a single institution, observed over one implementation cycle, cannot support generalization to other Islamic kindergartens, other age groups, or other cultural contexts. Without a control group, the observed changes cannot be attributed to finger painting rather than to normal developmental maturation, repeated exposure to novel material, or increased teacher attention during the study period. Reliance on teacher interviews introduces the possibility of social desirability bias, although specific behavioral examples and disconfirming observations partially mitigate this risk. The qualitative descriptive design does not measure fine motor precision against standardized instruments, and the study therefore makes no claim about effect size or comparative efficacy. The proposed framework in Figure 3 is interpretive and requires testing through designs that can isolate the value-based climate's contribution from other relational and environmental factors.

These limitations point toward specific directions for future research. A quasi-experimental design with a comparison group in a similar Islamic kindergarten, using a standardized fine motor assessment such as the Bruininks–Oseretsky Test of Motor Proficiency or the Movement Assessment Battery for Children, would allow researchers to estimate the magnitude of change and to distinguish it from maturation. A longitudinal design following the same cohort across multiple semesters would clarify whether the observed gains are sustained and whether they translate into later writing readiness. A multi-site study across Islamic kindergartens in different regions would test whether the relational climate described here is a general feature of integrated Islamic education or a local institutional culture. Finally, a mixed-methods design combining standardized assessment with the qualitative observation reported here would allow researchers to examine the relationship between measured motor precision and the relational processes that appear to support it. Each design would address a specific limitation identified in this study, and together they would strengthen the empirical basis for integrating sensory-based, value-oriented learning strategies into early childhood education policy and practice.

CONCLUSION

This study aimed to describe how finger painting, implemented within the routines of an integrated Islamic kindergarten, shaped children's fine motor behavior and to interpret those changes in relation to the setting's sensory and relational conditions. Three conclusions follow from the findings. First, children's finger flexibility, pressure control, and hand–eye coordination changed progressively across four sessions, moving from short, disconnected strokes and extreme pressure variation toward more continuous, deliberate movements. This trajectory is consistent with sensory-motor integration accounts in which repeated tactile feedback gradually refines motor output (Wang et al., 2026; Johnson et al., 2020), and it suggests that the medium's value lies less in any single session than in the cumulative sensory experience it affords. Second, sustained attention lengthened substantially, and teacher assistance shifted from motor guidance to logistical support. This shift was not attributable to the paint alone; it was scaffolded by teachers who deliberately avoided rushing hesitant children, who modeled the activity, and who allowed time for adaptation. The mechanism linking sensory engagement to self-regulation is therefore relational as much as neurological, consistent with evidence that executive function mediates fine motor development (Khoury-Metanis & Khateb, 2024) and that guided mediation shapes how young children respond to sensory learning (Muthohar et al., 2026). Third, teachers and the principal consistently linked children's engagement to the kindergarten's value-based climate—the opening prayer, the calm transition into painting, and the moral framing of patience and encouragement. This climate appears to have extended children's tolerance for sensory uncertainty, giving them the time needed to adapt and refine their movements. This study contributes theoretically by arguing that the effectiveness of a sensory medium cannot be assessed in isolation from the value-based ecosystem in which it is embedded, and by offering a framework (Figure 3) that connects relational climate, self-regulation, and motor adaptation. This extends holistic-integrative models of Islamic early childhood education (Fauzi et al., 2019; Asri et al., 2025) by showing what integration looks like in a single, low-cost activity, and it refines sensorimotor accounts (Piller et al., 2025; Strooband et al., 2020) by treating context as constitutive rather than incidental.

These conclusions are bounded by limitations that must be stated plainly. The sample of twelve children in one institution, observed over a single implementation cycle, cannot support generalization. Without a control group, observed changes cannot be attributed to finger painting rather than maturation, novelty, or increased adult attention. Teacher interviews risk social desirability bias, which specific behavioral examples and reporting disconfirming observations partially mitigate. The qualitative descriptive design does not measure precision against standardized instruments, and the proposed framework is interpretive rather than tested. Future research should therefore proceed in four specific directions: a quasi-experimental study with a comparison group in a similar Islamic kindergarten, using the Bruininks–Oseretsky Test of Motor Proficiency or the Movement Assessment Battery for Children to estimate magnitude of change; a longitudinal study following the same cohort across multiple semesters to determine whether gains are sustained and translate into writing readiness; a multi-site study across Islamic kindergartens in different regions to test whether the relational climate described here is a general feature of

integrated Islamic education or a local institutional culture; and a mixed-methods design pairing standardised assessment with qualitative observation to examine the relationship between measured precision and the relational processes that appear to support it.

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Use of AI Statement	The authors declare that no generative Artificial Intelligence (AI) tools were used in the writing, qualitative analysis, or data interpretation process of this manuscript. Grammarly was used exclusively for language refinement and grammatical checking.
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