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Material Familiarity and Aesthetic Learning in Early Childhood: A Mixed-Methods Study of Clay Art in Jepara, Indonesia

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Abstract

Screen-based engagement has increasingly displaced young children's opportunities for tactile, embodied, and materially grounded learning. Within this context, clay-based art offers a potentially meaningful medium through which children can translate lived experience into three-dimensional expression, yet limited research has examined how children's prior knowledge of a physical material relates to their artistic performance and emerging aesthetic learning. This study investigated children's prior knowledge of clay, examined its relationship with artistic performance, and explored the forms of expression that emerged through clay-based artmaking. A mixed-methods sequential explanatory design was employed in Jepara Regency, Indonesia. In the quantitative phase, data were collected from 150 early childhood students using proportional stratified random sampling and analysed through descriptive statistics and analysis of variance (ANOVA). In the qualitative phase, 12 children were selected purposively for in-depth exploration through observation, interviews, field notes, and thematic analysis. The findings showed that children's prior knowledge of clay was at a sufficient level and was strongly associated with artistic performance. The qualitative analysis further indicated that children's artworks were shaped by three main experiential domains: the domestic environment, the local and natural environment, and media and personal imagination. Rather than treating clay as merely a motor activity, the study shows that clay-based artmaking can function as a situated form of aesthetic learning in which material familiarity, environmental exposure, and prior experience intersect. The study contributes to early childhood art education by offering a more grounded account of aesthetic learning as culturally mediated and materially situated, while also suggesting the pedagogical value of place-based and materially responsive art practices.

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Introduction

The rapid expansion of digital media has altered how young children play, communicate, and learn. For many children, digital devices now occupy a substantial share of everyday time and increasingly function as a primary source of entertainment (Harman et al., 2021; Karkashadze et al., 2021; Martín-García et al., 2024). This shift matters educationally because it can displace forms of engagement that are materially grounded, socially interactive, and sensorily rich. In early childhood, learning is not only a matter of receiving information but of encountering the world through movement, touch, imagination, and interaction. Contemporary scholarship in early childhood education therefore continues to emphasise holistic learning, play-based pedagogy, active participation, and the importance of family and community contexts in supporting children's development (Miller, 2023; Parker et al., 2022; Ross & Snyder, 2023).

These concerns are particularly important in the early years because this period is foundational for the development of identity, emotional regulation, and social sensitivity (Aurora et al., 2024; Pahl & Barrett, 2007). When technology use becomes excessive or insufficiently guided, the consequences may extend beyond habits of attention to broader developmental domains, including concentration, language, motor coordination, and social responsiveness (Brzozowska & Sikorska, 2016; Devi & Singh, 2023; Park & Yap, 2024; Pekpak &

Altunalan, 2024; Khani et al., 2024). This does not mean that digital media should be treated as a singular cause of developmental decline, but it does underscore the need for pedagogical experiences that reintroduce children to embodied, exploratory, and socially meaningful forms of learning.

Within this context, art education offers more than an expressive supplement to the curriculum. It provides a pedagogical space in which children can engage materials directly, test ideas through making, and organise feeling, perception, and imagination into visible form (Athanasekou et al., 2025; Lines, 2022). Art activities are especially valuable because they require sustained attention, invite experimentation, and allow children to work through meaning in ways that are difficult to reproduce through screen-based interaction alone (Cimut, 2024). For early childhood settings, the question is therefore not simply whether art is beneficial, but how particular materials and environments shape what children are able to perceive, imagine, and create.

Among the available artistic media, clay deserves closer attention because its pedagogical affordances differ markedly from those of two-dimensional forms such as drawing or painting. As a three-dimensional, tactile, and resistant material, clay requires children to negotiate shape, pressure, balance, proportion, and transformation in real time. In that process, making is inseparable from sensing and thinking. Existing studies have shown that clay-based activities can support fine motor development, the recognition of form, and aspects of problem-solving in young children (Maisarah et al., 2020; Nurfajria, 2017; Supriatna, 2014). Yet the literature remains less developed in one important respect. We still know relatively little about how children's prior knowledge of a material such as clay influences the quality and character of their artistic production, and how that relationship is mediated by the cultural and environmental worlds from which children draw their ideas. In other words, clay has often been examined as an instructional medium, but less often as a site where cognition, lived experience, and aesthetic expression become visibly connected.

This gap matters because early artistic production is often treated as if it were largely spontaneous. Such an assumption risks obscuring the role of prior knowledge in shaping what children notice, remember, attempt, and finally produce. Prior knowledge, in this context, should not be reduced to abstract cognitive information alone. It includes children's familiarity with material properties, tools, forms, everyday objects, and the sensory worlds through which meaning becomes available. Likewise, aesthetic sensitivity is not approached here as an elite or purely subjective disposition, but as children's emerging capacity to organise form, recognise visual relations, and translate experience into expressive three-dimensional work. A clearer account of the relationship between prior knowledge and aesthetic expression is therefore needed, particularly through designs that can connect measurable patterns with close qualitative interpretation.

The cultural setting of Jepara Regency makes this question especially productive. Jepara is widely recognised for its craft traditions and for the continuing presence of clay-based artisanal practices in everyday community life (Anisa, 2017). This local ecology offers more than a convenient backdrop for art instruction. It provides a place-based learning context in which children's encounters with objects, materials, home industries, and local symbols may directly inform what they imagine and make (Ningrum et al., 2018). Situating the study in Jepara therefore allows clay art to be examined not as an abstract classroom technique, but as a form of learning shaped by a specific cultural-material environment.

Against that background, this study uses a mixed-methods sequential explanatory design to examine clay art as a learning approach for fostering aesthetic sensitivity in early childhood. Quantitatively, it investigates the level of children's prior knowledge of clay and tests the extent to which that knowledge is associated with their artistic performance. Qualitatively, it explores the forms of expression that emerge in children's clay work and the experiential sources from which those forms are drawn. By bringing these strands together, the study contributes to current discussions in early childhood art education by showing how prior knowledge, material

engagement, and environmental experience intersect in children's clay-based artmaking. In doing so, it offers a more grounded account of aesthetic learning as a situated and culturally mediated process. More specifically, the study is guided by three interconnected questions: what prior knowledge children possess of clay as a medium for creating art, how far that prior knowledge influences their artistic experiences with clay, and what forms of expression emerge through children's engagement with clay-based artmaking.

Methods

Research Design

This study employed a mixed-methods design using a sequential explanatory model. The design was selected to ensure that the qualitative inquiry was anchored in the quantitative results, rather than conducted in parallel without an explicit basis for participant selection or interpretive follow-up. In this design, quantitative data were collected and analysed in the first phase, followed by a qualitative phase intended to explain, deepen, and contextualise the initial statistical patterns. This structure allowed the study to identify general trends numerically before moving to a more interpretive examination of how children experienced clay-based artmaking and how those experiences were reflected in their artistic expression.

The first phase focused on measuring children's prior knowledge of clay and examining its relationship to their artistic performance. The results of this phase informed the second phase through a connecting strategy, in which quantitative trends and distinctive response patterns guided the selection of participants and the focus of the qualitative inquiry. The qualitative phase was then used to explore the forms of expression that emerged in children's work, together with the experiential and cognitive processes that appeared to underpin the quantitative findings.

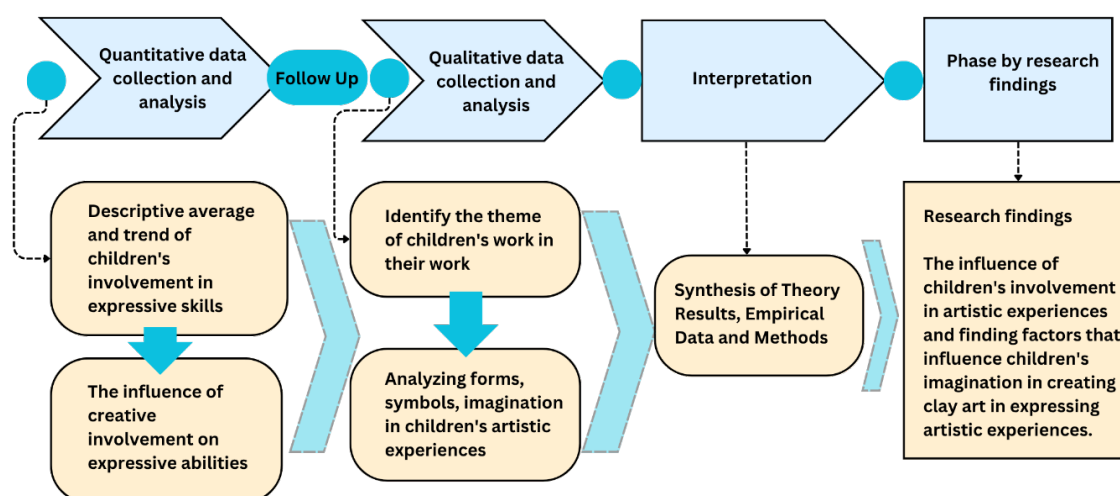


Figure 1. Research Design.

Population and Sample

The participants were early childhood students aged 5–6 years from educational institutions in Jepara Regency. In the quantitative phase, the sample comprised 150 children drawn from 10 institutions, including public kindergartens (TK Negeri) and private community-based playgroups (Kelompok Bermain), in order to reflect a range of socio-economic backgrounds. A proportional stratified random sampling technique was used to obtain a sample that was sufficiently varied across institutional types while maintaining a structured basis for quantitative comparison.

For the qualitative phase, 12 children were selected purposively for more in-depth exploration. Participant selection was informed by the quantitative results, particularly cases that displayed notable variation or distinctive response patterns in relation to prior knowledge

and artistic performance. The qualitative sample also considered institutional location, including coastal and inland pottery areas, as well as accreditation status, to capture variation in the children's learning environments and cultural exposure.

Research Instrument

In the quantitative phase, a questionnaire was developed to measure prior knowledge using a modified pictorial 5-point Likert scale appropriate to the cognitive characteristics of young children. The instrument covered several aspects of children's familiarity with clay, including sensory properties, functional understanding of tools, and recognition of basic geometric forms. To assess artistic performance, the study also used an artwork assessment sheet based on six indicators: unity, balance, rhythm, proportion, emphasis, and clarity. Content and construct validity were examined through expert review by three specialists in art education and child psychology. The instrument demonstrated acceptable internal consistency, with a Cronbach's alpha coefficient greater than 0.80.

In the qualitative phase, data were collected through non-participant observation, semi-structured interviews, and field notes. Observation was used to document children's behaviour, interaction with materials, and visible expressions during the artmaking process. The interview guide was organised around three themes: the child's source of inspiration, the emotional experience of tactile engagement, and the narrative meaning attached to the completed artwork. Field notes were used to support contextual interpretation and triangulation across data sources.

Analysis Data

Data were analysed sequentially in accordance with the sequential explanatory design. In the quantitative phase, questionnaire data were analysed using descriptive and inferential statistics. Means and standard deviations were calculated to describe patterns in children's prior knowledge of clay. Before hypothesis testing, the assumptions for parametric analysis were examined using the Shapiro-Wilk test for normality and Levene's test for homogeneity of variance. Analysis of variance (ANOVA) was then used to test differences in artistic performance across levels of prior knowledge.

The qualitative data were analysed to explain and elaborate the quantitative findings. Interview, observation, and field-note data were examined through thematic analysis following Braun and Clarke's six-phase framework: familiarisation with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This process enabled the identification of recurring categories relevant to the study, including tactile engagement, symbolic expression, and emotional response. To strengthen trustworthiness, the analysis drew on the criteria of credibility, transferability, dependability, and confirmability, supported through triangulation and member checking.

Ethical Considerations

Ethical clearance was granted by the Ethics Committee for Research Involving Human Subjects at Muria Kudus University (503/MPD.PPS.UMK/AD.19.69/V/2025). Because the study involved young children, verbal informed consent was obtained from parents or guardians prior to data collection, and child assent was sought in age-appropriate ways before participation in the activities, observations, and interviews. To protect participants' privacy, all data were anonymised through code-based identification, and no personally identifying information was included in the reporting of interview responses, observations, or children's artworks. Any visual documentation and creative outputs used for analysis and presentation were handled solely for research purposes and reported in ways that safeguarded the children's dignity, confidentiality, and well-being.

Result

Students' initial knowledge level

Based on Tables 1 and 2, a descriptive analysis of the questionnaire data has been conducted, which shows that the initial level of children's knowledge about clay as an art medium is in the "Sufficient" category with an average score of 3.25 on a 5-point scale. Rather than exhibiting fragmented understanding, the data indicates a consistent cognitive baseline, with scores evenly distributed across all indicators ranging from sensory understanding (M = 3.3) to art elements (M = 3.18). the understanding of tools, materials, processes, and techniques was 3.25, the understanding of art elements was 3.18, and the understanding of the environment was 3.28, where all of these indicators fall into the "Sufficient" criteria. This uniformity suggests that while the children have not yet reached mastery, they possess the foundational cognitive readiness required to engage in tactile exploration and complex artistic processes.

Table 1. Students' Initial Knowledge Level.

Score (5-point scale)	Criteria	Number of students	Percentage
≤ 2.4	Low	48	32 %
2.5 ≤ n ≤ 3.4	Sufficient	54	36 %
≥ 3.5	High	48	32 %
Total Students		150	100%
Students Who Understand		102	68 %
Students Who Lack Understanding		48	32 %
Average score	3.25	Sufficient	

Table 2. Students' Knowledge Score for Each Indicator.

No.	Indicator	Average	Understanding Criteria
1.	Understanding of the Five Senses	3.3	Sufficient
2.	Understanding of Tools, Materials, Processes, and Techniques	3.25	Sufficient
3.	Understanding of Art Elements	3.18	Sufficient
4.	Environmental Understanding	3.28	Sufficient
	Average	3.25	Sufficient

The Influence of Initial Knowledge Level on Students' Artistic Performance

To test the influence of initial knowledge level on students' artistic performance, an Analysis of Variance (ANOVA) was conducted, which is detailed in Table 3. The analysis results show a very significant influence of initial knowledge on students' artistic performance (F (2,138) = 2226.855, p < .001). The calculated omega squared (ω^2) value of 0.969 indicates an exceptionally strong effect size. Practically, this implies that 96.9% of the variance in artistic performance is attributable to prior knowledge, identifying cognitive understanding not merely as a variable, but as the primary determinant of a child's capability to produce aesthetically resolved clay work.

Table 3. Analysis of Variance (ANOVA).

Cases	Sum of Squares	df	Mean Square	F	P	ω^2
Initial Knowledge	112.241	2	56.121	2226.855	<.001	0.969
Residuals	3.478	138	0.025			

Furthermore, a post-hoc analysis using the Tukey test, referenced in Table 4, was performed to examine specific differences between the groups (low, sufficient, and high knowledge). The results indicate significant differences in artistic performance among all

three groups ($p < .001$). The group of students with "High" initial knowledge demonstrated significantly better artistic performance than the "Sufficient" group (mean difference = -2.163) and the "Low" group. Similarly, the "Sufficient" group showed significantly superior performance compared to the "Low" group (mean difference = -1.066). This step-wise progression confirms that incremental improvements in cognitive understanding directly translate into measurable gains in artistic output.

Table 4. Analisis Post-Hoc with tukey.

		Mean Difference	SE	df	t	Cohen's d	p_{tukey}
low	moderate	-1.066	0.033	138	-32.356	-6.714	< .001
	high	-2.163	0.032	138	-66.734	-13.622	< .001
moderate	high	-1.097	0.033	138	-33.292	-6.908	< .001

Forms of Student Art Expression Based on Their Artistic Experiences

In the process of creating art with clay, the artistic experience was explained through a qualitative analysis of the works produced by 12 children. In the research, coding was used to identify the children's gender: '1' for boys and '2' for girls. As detailed in Table 5, the analysis confirms that technical knowledge alone does not dictate the content of the work; rather, the thematic substance of the children's expressions was heavily mediated by their immediate cultural and sensory environments. The main inspirations for the children's artworks can be grouped into three primary sources: the Domestic Environment, the Local Environment and Nature, and Media and Personal Imagination.

Many children created objects they encounter daily at home. For example, AAN1 made a "*Cobek & Ulekan*" (a traditional Indonesian mortar and pestle) because he was inspired while helping his mother make sambal, MALN1 made an "Ashtray" because he sees one at home, and NBM2 made a "Plate" because she is used to helping with washing dishes. Experiences visiting places around Jepara Regency also served as a strong source of ideas. Several children, such as MBU1, ANR2, AKN2, and FA2, created works in the shape of a "turtle" after being impressed by the iconic turtle statue at Kartini Beach. The influence of digital media and personal imagination also appeared in the children's works. ISM1 made a "Pinocchio Statue" after watching the movie on YouTube, while ZF2 created "Grapes" because it is her favorite food. Additionally, symbolic expressions also emerged, such as in the work of DFQ2 and RDTJ2 who made a "Love Ashtray," a combination of a familiar object (their father's ashtray) with the 'love' shape, which they found personally appealing. The resulting artworks reflect a direct translation of the children's ideas and feelings into concrete, three-dimensional forms, encompassing both functional objects (bowls, plates, vases) and imaginative forms (statues).

Table 5. Analysis of Student Artworks.

Name (Code)	Creative Process	Artwork Assessment					
		Unity (1-5)	Balance (1-5)	Rhythm (1-5)	Proportion (1-5)	Emphasis (1-5)	
AAN ¹	Artwork Idea Mortar & Pestle (<i>Cobek & Ulekan</i>) Helping his mother make sambal.	Sufficient (3)	Poor (2)	Sufficient (3)	Sufficient (3)	Good (4)	
ISM ¹	Pinocchio Statue Watching the Pinocchio movie on YouTube.	Sufficient (3)	Sufficient (3)	Poor (2)	Poor (2)	Sufficient (3)	
MALN ¹	Ashtray Seeing an aluminum ashtray at home.	Good (4)	Sufficient (3)	Poor (2)	Good (4)	Sufficient (3)	
MBU ¹	Turtle Seeing the turtle statue at Kartini Beach.	Sufficient (3)	Poor (2)	Sufficient (3)	Sufficient (3)	Sufficient (3)	
MRW ¹	Flower Seeing a flower vase at	Sufficient	Sufficient	Good (4)	Poor (2)	Sufficient	

Name (Code)		Creative Process	Artwork Assessment				
	Vase	home and at the night market.	(3)	(3)			(3)
PAM ¹	Bowl	Seeing a bowl at his parents' food stall.	Good (4)	Good (4)	Sufficient (3)	Sufficient (3)	Good (4)
AZ ²	Plate	Holding a plate when about to eat.	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)
ANR ²	2 Turtles	Visiting Kartini Beach.	Good (4)	Sufficient (3)	Good (4)	Good (4)	Good (4)
AKN ²	Turtle	Being impressed by the turtle statue at Kartini Beach.	Good (4)	Sufficient (3)	Sufficient (3)	Good (4)	Sufficient (3)
DAM ²	Bowl	Holding a meatball bowl while helping at a food stall.	Good (4)	Good (4)	Sufficient (3)	Very Good (5)	Sufficient (3)
DFQ ²	Love Ashtray	Seeing her father's ashtray & wanting to create with feeling.	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)
FA ²	Turtle	Seeing the turtle icon at Kartini Beach.	Good (4)	Good (4)	Good (4)	Good (4)	Very Good (5)
NAM ²	Plate	Getting a plate at her mother's food stall.	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)
NKW ²	Plate	Seeing plates at home and at a food stall.	Sufficient (3)	Sufficient (3)	Good (4)	Sufficient (3)	Sufficient (3)
NBM ²	Plate	Helping wash dishes; considered the shape to be easy.	Good (4)	Very Good (5)	Good (4)	Good (4)	Good (4)
RDTJ ²	Love Ashtray	Seeing her father's ashtray & the attractive 'love' shape.	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)	Sufficient (3)
SSA ²	Plate	Seeing plates everywhere & it's easy to make.	Sufficient (3)	Poor (2)	Sufficient (3)	Poor (2)	Sufficient (3)
SS ²	Bowl	Eating from clay dishes at a food stall.	Good (4)	Sufficient (3)	Sufficient (3)	Good (4)	Good (4)
SM ²	Bowl	Seeing pottery crafts on social media.	Good (4)	Sufficient (3)	Good (4)	Good (4)	Sufficient (3)
ZF ²	Grapes	Grapes are her favorite food.	Good (4)	Good (4)	Sufficient (3)	Good (4)	Good (4)

Each artwork created by the children is based on the stages of creation and an assessment of the work according to the elements and principles of art. The stages of creation consist of the initial idea and the aesthetic experience of creating. The assessment of the artwork consists of unity, balance, rhythm, proportion, emphasis, and clarity. Some examples of the artworks can be seen in the following images.

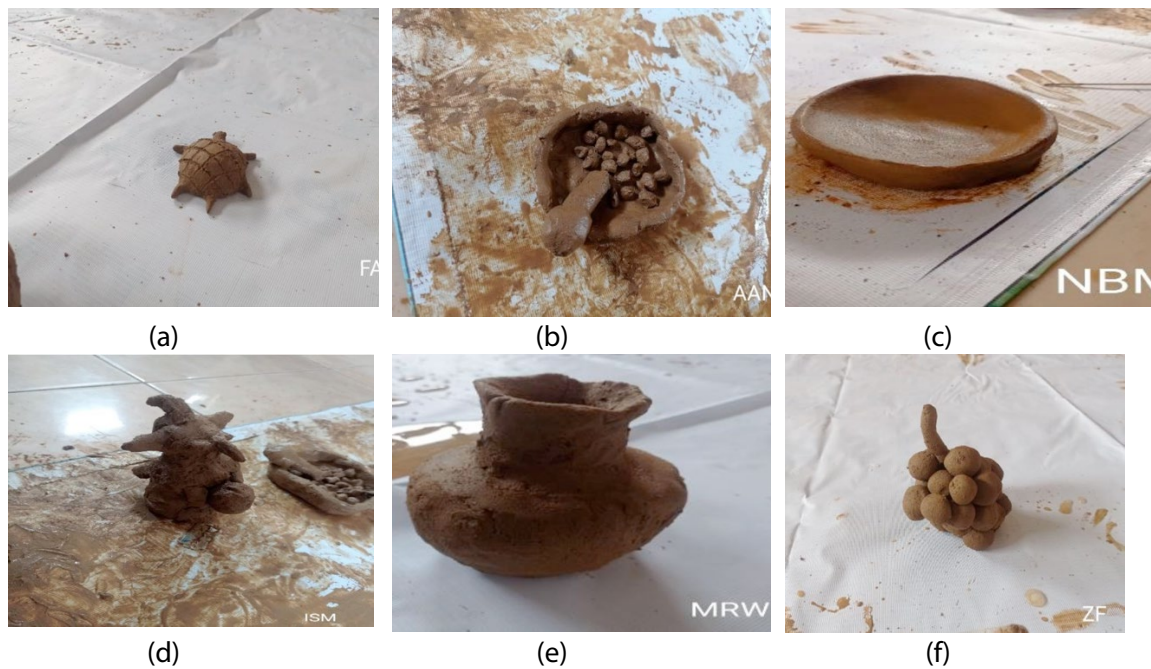


Figure 2. Clay media works of (a)FA²; (b)AAN¹; (c) NBM²; (d) ISM¹; (e) MRW¹; dan (f) ZF²

Discussion

The findings suggest that clay-based artistic activity can function as a meaningful context for the development of young children's aesthetic engagement, but the contribution of the study lies less in proving the universal superiority of clay than in clarifying the conditions under which clay-based artmaking becomes pedagogically productive. The quantitative results indicate that children's prior knowledge of clay was generally at a sufficient level, with a mean score of 3.25 on a five-point scale, and that this knowledge was strongly associated with artistic performance. Rather than treating prior knowledge as a minor background factor, the results point to its importance in shaping how children approached the material, organised form, and translated ideas into three-dimensional work. Read in relation to constructivist perspectives on learning, this pattern reinforces the argument that new understanding is built through prior cognitive structures rather than formed in isolation (González & Alvarado, 2024; Iba & Munakata, 2019; Johnson, 2010; Piaget, 1968; Robson, 2019). At the same time, the scale of the statistical association warrants interpretive caution. While the analysis indicates that differences in prior knowledge were closely related to differences in artistic performance, the result should not be read as implying that aesthetic expression is determined by cognition alone. What it does show, more plausibly, is that material familiarity provides an important foundation from which children can act with greater confidence, control, and expressive range. This interpretation is also consistent with work showing that prior knowledge shapes learning performance more broadly (Butcher & Sumner, 2011; Simonsmeier et al., 2022).

The qualitative findings deepen this argument by showing that children's artistic expression did not emerge from abstract imagination alone, but from concrete encounters with the worlds they inhabit. The three broad sources of inspiration identified in the study, namely the domestic environment, the local and natural environment, and media and personal imagination, suggest that clay-based artmaking operates as a process of selecting, reworking, and materialising lived experience. Domestic objects such as plates, bowls, mortar and pestle sets, and ashtrays reveal how

familiar household routines enter artistic production through memory and repeated contact. In this respect, the findings resonate with scholarship showing that home environments and ordinary objects can become meaningful resources for expression and representation (de Groot et al., 2023; Hurdley, 2006). The repeated appearance of turtle forms linked to Kartini Beach similarly indicates that local visual culture and place-based experience shaped what children found memorable and worth recreating. Here, the study supports arguments that children's artistic learning is informed by emotional and dialogic relations with the surrounding environment rather than by formal instruction alone (Mäkelä & Aktaş, 2023; Saidah, 2017; Sulkipani et al., 2023). Meanwhile, works derived from films, favourite foods, or transformed symbolic objects indicate that children were not merely reproducing what they saw, but reconfiguring experience through selection, emphasis, and imaginative adaptation (Pérez-Fabello & Apostolou, 2024; Richert et al., 2024).

Taken together, these patterns suggest that the role of prior knowledge is not exhausted by technical familiarity with clay as a material. Prior knowledge appears to operate more broadly through children's accumulated sensory experience, their recognition of everyday forms, and their familiarity with culturally available objects and symbols. This matters because it shifts the interpretation of children's artistic performance away from a narrow skills-based model toward a more situated understanding of aesthetic production. What becomes visible in this study is not simply that children who know more perform better, but that artistic making is mediated by the intersection of material familiarity, environmental exposure, and experiential meaning. In this sense, the study extends previous work on clay as a medium for fine motor development and three-dimensional understanding by showing that clay also functions as a medium through which prior experience is organised into visible form (Maisarah et al., 2020; Nurfajria, 2017; Oh et al., 2009; Supriatna, 2014; Yachou et al., 2024).

This pattern can be read productively through Cognitive Flexibility Theory, although the present findings do not justify an overly expansive theoretical claim. The children's artworks suggest that clay-based making required them to move between perception, memory, and material adjustment while translating familiar experiences into new three-dimensional forms. When a child turned a remembered household object, a local landmark, or a media image into a clay artefact, the process involved more than simple imitation. It required the child to adapt remembered forms to the affordances and resistance of the material, which is consistent with the broader idea of flexible cognitive coordination across contexts and representations (Carroll et al., 2016; Highgate & Schenk, 2020; Ionescu, 2012). Even so, the contribution of the present study is not to establish Cognitive Flexibility Theory as definitively proven in early childhood clay work, but to suggest that the theory offers a useful lens for understanding how children negotiate between experience, imagination, and material constraint. From this perspective, clay becomes pedagogically significant not because it automatically produces creativity, but because it slows down representation and requires children to work through form, proportion, and structure in a materially grounded way.

The implications of these findings are therefore best framed with some care. For educators, the study indicates that clay-based art learning may become more meaningful when it is connected to children's everyday environments, domestic routines, and local cultural references, rather than presented as a detached classroom exercise. For early childhood pedagogy more broadly, the findings support approaches

that treat artmaking as an embodied and situated mode of learning, especially in contexts where children's daily experience is increasingly shaped by screen-based interaction (Fajrie et al., 2020; Lu & Huang, 2024; Wood, 2010). At the same time, the study does not warrant broad curricular prescriptions on the basis of a single regional case. Its more modest contribution lies in showing how material engagement, place-based exposure, and prior knowledge can intersect in early childhood art education in ways that are pedagogically consequential.

These findings should also be read in light of several limitations. The study was conducted in Jepara, a setting in which clay-related craft traditions remain culturally visible, and this may have influenced children's baseline familiarity with the material and the forms associated with it. In addition, although the qualitative sample was sufficient for in-depth interpretation, it was not designed to support broad generalisation about all children's creative processes. The exceptionally strong quantitative association between prior knowledge and artistic performance should also be interpreted carefully, particularly given the possibility that aspects of material familiarity and evaluative criteria may overlap more closely than they first appear. Future research could strengthen this line of inquiry by using longitudinal designs, comparative studies across different cultural settings, and more differentiated measures of aesthetic learning, spatial reasoning, and emotional engagement.

Declarations

Author Contribution Statement

Endar Ismintarti: Investigation, Data curation, Formal analysis, Writing – original draft. Nur Fajrie: Supervision, Methodology, Formal analysis, Writing – review & editing. Sri Utaminingsih: Supervision, Validation, Writing – review & editing. Hisbulloh Als Mustofa: Writing – review & editing, Validation. All authors have read and approved the final version of the manuscript.

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Data availability statement

The dataset in this study was obtained academically and scientifically and analyzed based on the process and results of the research method. Requests for research data can be made reasonably to the author.

Declaration of interests statement

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Additional Information

No additional information is available for this paper at this time.

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