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Making Competence Visible: A Qualitative Case Study of Children's Drawings Transformed into Wearable Art in a Ghanaian Montessori School

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Abstract

Inclusive early education widely promotes low-cost, hands-on creative practices, yet little qualitative research in Ghana examines how the adults closest to children understand them. This interpretive case study examines how parents and Montessori guides made sense of a short program at a Ghanaian Montessori school in which 22 children transferred drawings onto T-shirts using inexpensive iron-on heat-transfer materials. Data included semi-structured interviews with 15 parents and 5 guides, children's comments recorded during the program, and researchers' field notes. Using reflexive thematic analysis informed by Social Cognitive Theory, Experiential Learning Theory, and Montessori concepts, the study developed an overarching theme, making competence visible, and five supporting themes: making as structured thinking; ownership and pride; managing difficulty; being seen through recognition without ranking; and the shirt as a bridge between school and home. A sixth theme captured tensions and implementation conditions, including instructional time, material cost, heat-source supervision, uneven fine-motor scaffolding, product comparison, and parents' initial focus on the finished shirt. Accounts were predominantly favorable, though reservations tempered this positive interpretation. The analysis refines the framework by identifying children's narration of their own making as a way to make learning legible to families and by showing how Montessori features, including concentration, avoidance of ranking, and child authorship, shaped adults' interpretations of the artifact and were invoked rhetorically in their accounts.

1. Introduction

Quality early education is a global equity concern. The 2030 Agenda for Sustainable Development commits states to inclusive, equitable, high-quality education and early childhood development [1]. Yet in many low- and middle-income settings, resources for creative, hands-on learning remain scarce, and instructional time favors structured, teacher-directed tasks. Creative expression sits at the intersection of imagination, self-appraisal, and cognitive growth [2], and drawing and coloring develop fine motor control, problem-solving, and emotional expression [3,4]. The question for schools and families is therefore not whether creative activity matters, but how its value can be sustained, recognized, and, critically, examined in research without assuming in advance that it will be well received.

Children's drawings and crafts are often discarded once completed [5,6], which may signal to children that creative work has little lasting value. Giving a drawing a durable, usable, and visible form may change what the activity means to the child and the adults around them, but it may also create new problems: visible, comparable products can invite ranking in ways private, temporary drawings do not. This study examines a program in which children's drawings and coloring-worksheet designs were transferred onto T-shirts using low-cost iron-on heat-transfer materials. The study treats the program as a social process rather than primarily a craft technique, as a private, ephemeral product becomes a worn, public, shareable artifact, and feedback from peers, parents, and guides may change it, for better or worse. The study connects research on art in child development [2,7] with the "making" tradition in

education [8,9] and with the long-running debate on process versus product in early childhood art [6], a debate we treat as substantively open rather than resolved in the program's favor.

Montessori education is organized around a prepared environment, where children choose purposeful work and carry it out during an uninterrupted work cycle, while the adult serves as a guide who presents materials and observes rather than as a conventional instructor [10,11]. Learning is understood as auto-education, or self-construction through concentrated activity; freedom is exercised within limits; error is treated as information rather than failure; and external rewards and competition are traditionally avoided [10,11]. These are not neutral background facts: they are also a professional discourse that Montessori guides are trained in and are likely to reach for when asked to explain a classroom event, independent of what that event actually afforded a given child. A wearable garment made by the child belongs to the same family of purposeful, real-world products as Montessori practical life work, making the school an informative but particular, potentially self-confirming case.

Qualitative work in this area faces a fundamental difficulty. The mechanisms linking creative practice to children's beliefs about their competence are rarely specified, and accounts from adults who witness these processes are rarely examined critically in their own right, with attention to what adults might be motivated to say. A qualitative approach is well suited to such questions because it can surface meanings, processes, and contextual conditions that outcome measures cannot [12]—provided the analysis does not simply harvest confirming quotations. This study found little qualitative research on wearable or textile-based creative practice in early education, and almost none from some Ghanaian Montessori schools. This study makes four contributions by offering a context-specific account of how parents and guides interpret a low-cost wearable-art program, including where their interpretations diverge or qualify one another. It refines a sensitizing framework drawn from Social Cognitive Theory and Experiential Learning Theory by incorporating concepts derived from the data. It documents tensions, discrepant cases, and implementation conditions that bear on feasibility. It explicitly reports the steps taken and their limits to guard against the favorable-account bias that researcher-delivered programs invite. The study asks the following research questions (RQs):

- **RQ1.** How do parents and guides understand the educational significance of children turning their own drawings into wearable art?
- **RQ2.** Through which processes, in their accounts, does the experience shape children’s creativity and confidence?
- **RQ3.** What tensions, discrepant cases, and implementation conditions do they identify?

2 Theoretical Background and Conceptual Framework

2.1 Social Cognitive Theory: self-efficacy and reciprocal determinism

In interpretive qualitative research, theory can orient attention without being tested [12]. The study adopted two theories as sensitizing frameworks. For Social Cognitive Theory (SCT), Bandura [13]

describes behavior as emerging from reciprocal interplay among personal factors, behavior, and environment (reciprocal determinism). Self-efficacy, a person's belief in their capability to perform a task, drives motivation and persistence [14] and arises from four sources: mastery experiences, vicarious experiences, social persuasion, and physiological and affective states. For young children, whose self-appraisals depend heavily on adult and peer feedback [15], what counts as evidence of competence, and who sees it, is consequential. This framework was used as a set of sensitizing questions: what might count as a mastery experience here, who is the audience, what affective states are visible, rather than as a claim that the program would necessarily generate these outcomes. The study deliberately asked interview questions capable of returning disconfirming answers (e.g., "Was there a moment where this felt discouraging rather than encouraging?"). SCT therefore directs attention to what children experience as evidence of their own competence, and to who sees and responds to that evidence.

The study operationalized Bandura's reciprocal determinism by treating children's beliefs, behaviors, and social environment as mutually reinforcing: early mastery (e.g., successfully transferring a design) sustained effort through later, harder phases, while behavior at home (wearing/narrating the process) reshaped family responses, which fed back into children's self-beliefs—evident in the near-identical creativity and confidence gains. The intervention also deliberately built in all four sources of self-efficacy: mastery (using the child's own authentic drawing), vicarious experience (peer comparison at the exhibition), social persuasion (facilitator encouragement and public applause), and affective states (managed pride/frustration during challenging steps).

2.2 Experiential Learning Theory: the iterative learning cycle

Kolb [16] conceptualizes learning as a recursive cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. This framework directs attention to whether and how a sequenced, hands-on activity affords planning, anticipation of consequences, and revision of approach—components of creative thinking [17,18]—without presupposing that every child moved through the cycle successfully or that difficulty was always resolved productively. As a sensitizing device, Experiential Learning Theory (ELT) suggested interview prompts about planning, obstacles, and revision (e.g., "What did the child do when something went wrong?"), and it also sensitized this study to look for children who became stuck rather than cycling forward—a possibility realized in some of the discrepant material.

The study translated Kolb's four-stage cycle directly into the intervention's eight-phase structure, making the cycle repeatable rather than a single pass-through. Each phase of the T-shirt-making process was designed to correspond to one or more ELT stages: concrete experience occurred as children physically drew, colored, cut, and registered their designs onto the transfer medium; reflective observation was built into moments such as checking alignment before the irreversible heat-application step, where children were prompted to notice how their paper design would translate onto fabric; abstract conceptualization emerged as children grasped underlying principles, for instance, that heat activates the cling rubber to bond the image to fibers, or that leaving a margin around a cut-out affects the clarity of the final transfer;

and active experimentation was evident when children adjusted pressure, trimmed edges, or corrected misalignment based on what they had just observed. By embedding Kolb's cycle into a sequenced, hands-on process culminating in a tangible product, the study used ELT to explain not merely that creativity improved, but how a structured, reflective making process cultivates the specific cognitive sub-components of creativity (originality, flexibility, elaboration, fluency) that a single, unstructured drawing or coloring task would be unlikely to develop on its own.

2.3 An artifact-mediated model of creative self-efficacy

The two theories answer complementary questions: ELT concerns how children might learn through a reflective making process; SCT concerns why particular experiences might become durable beliefs about competence. Neither, on its own, addresses a distinctive feature of this program: the product of making is a durable artifact that can be worn, displayed, and discussed beyond the classroom, and that can therefore also be compared, criticized, or ignored by others. Fig. 1 presents the sensitizing model, and Table 1 lists six sensitizing propositions (S1–S6) that guided the interview questions. We emphasize that these are lenses for interrogating the data, including for signs that they do not hold, rather than hypotheses confirmed by this study.

Table 1 Sensitizing propositions and how they informed the study

No.	Sensitizing proposition	Use in the study
S1	Turning a child’s own drawing into a durable wearable artifact may be experienced as authentic mastery (SCT: mastery experience).	Interview prompts on pride, ownership and children’s self-appraisal.
S2	A sequenced making process may cycle children through experience, reflection, conceptualization and experimentation (ELT).	Prompts on planning, problem-solving and learning observed.
S3	Wearing and exhibiting the artifact may extend the audience and generate vicarious experience and social persuasion (SCT).	Prompts on exhibition, peers’ and families’ reactions.
S4	Perceived gains in creativity and confidence may reinforce each other and later engagement (reciprocal determinism).	Prompts on changes over time and willingness to continue.
S5	Time, cost, supervision, motor support and family or cultural context may condition what is possible.	Prompts on practical concerns and conditions for adoption.
S6	Because the artifact travels, it may extend effects to family engagement with learning.	Prompts on conversations at home and with the school.

2.4 Montessori concepts as a contextual

Because the case is a Montessori school, we also attended to Montessori constructs as contextual sensitizing concepts: the prepared environment, the guide's role, the child's authorship of work, concentration and normalization (the settled, focused engagement Montessori describes as arising from

meaningful work), freedom within limits, the control of error, and the absence of extrinsic rewards [10,11]. We treat these constructs in two ways simultaneously: as possible explanations for what we observed, and as a professional vocabulary that guides have been trained to use when narrating classroom events to researchers and visitors. Distinguishing between these two readings is not always possible from interview data alone, and we return to this interpretive problem directly rather than treating Montessori language as self-evidently descriptive.

3 Background

3.1 Art, recognition, and confidence

Drawing and coloring support fine motor skills, problem-solving, and imagination [3] and provide children with a nonverbal channel for emotion [19], yet children's artwork is often treated as temporary and unrecognized [6, 7]. Acknowledgment of creative effort is associated with children's self-esteem [15], though acknowledgment can also be experienced as evaluative pressure, particularly when effort becomes visible and comparable to others'—a tension this study takes as a live empirical question rather than a settled finding. Custom garment printing has long served as a means of self-expression among young people and in community art [20], and preliminary work suggests that seeing one's work realized in wearable form may increase satisfaction and motivation [21], though this literature is thin, mostly concerns older participants or therapeutic settings, and offers little evidence from school contexts in low- and middle-income countries. Maker education places tangible, shareable products at the center of learning [8, 9], and accessible techniques such as iron-on transfer allow children to take part directly in producing a garment [22]; tactile making is also used in inclusive education [23, 24], though evidence specifically on textile-based making with young children remains sparse.

Early childhood art pedagogy has long argued for process-focused, exploratory work over product-focused tasks [6]. This is not a settled debate, and we do not treat the program under study as a resolution of it; rather, we ask how the adults around a product-centered activity narrate, reconcile, or fail to reconcile the tension between valuing the process and valuing the artifact—a question to which the study returns with more texture than a simple "process won out" conclusion would suggest. Family involvement in school activities is associated with children's social-emotional development partly through school engagement [25], which makes a worn artifact that crosses between school and home a theoretically interesting, but not automatically beneficial, object of inquiry: an artifact could as easily become a source of parental disappointment (if it does not meet expectations) as a bridge to richer conversation.

Montessori classrooms typically group children of mixed ages, offer self-chosen work, and rely on guides who observe and present materials. Research on Montessori outcomes is extensive but not uniform, and the label is applied to programs of varying fidelity [11]; a Montessori school is therefore a distinctive, not a generic, setting for any creative program, and findings read with that specificity in mind rather than treated as representative of early childhood settings generally.

4 Methodology

4.1 Paradigm and design

The study used an interpretive paradigm and an instrumental qualitative case study design [12], examining a single school program in depth to illuminate broader questions about artifact-based creative learning. Meaning was treated as constructed by participants and researchers together, and findings were presented as interpretations, not as measurements or causal claims. Reporting followed the Standards for Reporting Qualitative Research [26].

4.2 Context and program

The case study examined International Community Montessori School (ICMS), a Montessori school in Anaji, within the Takoradi Metropolitan Area of Ghana's Western Region. The school was purposively selected because drawing and coloring at home and at school were already regular parts of its curriculum, allowing the study to build on familiar practices rather than introduce an unfamiliar activity. ICMS used a Montessori approach, with a prepared environment, mixed-age groupings in a combined Children's House and Lower Elementary classroom of 22 children (approximately ages 4–9), guides instead of conventional teachers, and self-selected work during a daily three-hour work cycle. The program was not part of the special educational needs department. However, two participating children had guide-identified fine-motor delays and received individualized support during the cutting phase.

Over a two-week period, during four 45–60 minute sessions embedded within the existing work cycle (children opted into the activity as one of several available work choices on offer during those sessions, consistent with Montessori practice, though the sessions themselves followed a fixed eight-phase sequence rather than being self-paced—a departure from typical practice that we discuss as a tension, children created original drawings and coloring-worksheet designs. We transferred these onto T-shirts using low-cost iron-on heat-transfer film, culminating in a classroom exhibition where children wore and presented their garments to peers, guides, and visiting family members. The eight phases were: (1) design on paper; (2) coloring/finishing; (3) cutting around the design; (4) registering the cut-out onto heat-transfer film; (5) trimming the film to match; (6) positioning the design on the T-shirt; (7) heat application, conducted exclusively by an adult with the child observing and, where developmentally appropriate, holding the iron handle under direct hand-over-hand supervision; and (8) peeling the backing and inspecting the result.

Illustrative process vignettes indicated in Figs. 2–5 tell the composite, not a single child's record. A child selects a worksheet character already colored during morning work, decides independently to add a background "because the picture looked empty" (field note), and is guided by a peer rather than an adult to notice that the background will need its own margin when cut. During trimming, the same child cuts too close to a limb of the figure; rather than restarting, a guide asks, "What do you notice?" and the child adjusts the next cut, leaving a wider margin—an instance of the control-of-error principle operating through peer and guide prompting rather than adult correction. During heat application, the child

watches closely and narrates aloud, "it's like melting but not melting," an early, imprecise but self-generated causal explanation. This vignette, constructed from recurring patterns across field notes rather than a verbatim single case, illustrates the kind of process the later quotations refer to in the aggregate; we present it to make the abstract eight-phase description concrete, not as data in its own right.

4.3 Participants and sampling

This study purposively recruited parents and guides with direct knowledge of their child's or students' participation (Table 2). The first researcher recruited the guides directly; all five guides working with the combined classroom agreed to participate. The researchers recruited parents through a notice sent home with children, followed by direct invitations from a research assistant; of 24 parents invited, 15 agreed to an interview (62.5%). The researchers reported this response rate because it is informative: informal feedback to the research assistant indicated that several non-responding parents cited time constraints rather than disinterest in the program, though we did not systematically document reasons for non-participation and treat this as a limitation.

The researchers judged sample adequacy using the concept of information power [27]: the research aim was narrow, participants had specific and relevant experience, and the resulting dialogue was rich, though the single-site sample limited the range of perspectives available and likely narrowed the diversity of family socioeconomic backgrounds and cultural orientations represented. Children's comments recorded during the program and brief follow-up conversations supplemented, but did not substitute for, adult accounts; we treat the absence of structured child interviews as a significant limitation, not a minor omission.

Table 2
Participants and data sources

Participant group	n	Data source	Characteristics
Parents	15	Semi-structured interviews, individual, in person	Ages 27–48 (median 34); 12 mothers, 3 fathers; occupations spanning trading, teaching, civil service, and skilled trades; all had at least one child enrolled in the program classroom
Montessori guides	5	Semi-structured interviews, individual, in person	1 lead guide (12 years' experience), 4 assistant guides (1–6 years' experience); none had prior formal art-teaching training; all had delivered or co-delivered at least two sessions of the program
Children	22	Comments recorded during the program and brief follow-up conversations (not formal interviews)	Ages 4–9; 12 in Children's House age range, 10 in Lower Elementary age range; mixed gender (10 girls, 12 boys)
Researchers	3	Field notes	Two authors served as facilitators and co-delivered sessions; a third author and a research assistant served as non-delivering observers and interviewers

4.4 Data collection

The researchers used semi-structured interviews to explore perceived benefits and drawbacks, changes adults observed (or did not observe) in children's confidence and creativity, children's own descriptions of the experience as reported by adults, and practical concerns and interest in continuing the activity. Critically, the interview guide included explicit invitations to criticize—for example, "Was there anything about this that did not work well for your child or that you would change?" and "Did you notice any child who did not seem to enjoy or benefit from this?"—precisely because we anticipated, given our dual role, a risk of eliciting only favorable accounts.

To reduce social-desirability pressure toward the program's designers, a research assistant not involved in designing or delivering the program conducted parent interviews in English; the first author conducted guide interviews, a limitation because guides had worked alongside this author during delivery. Interviews lasted 20–40 minutes (parents) and 30–50 minutes (guides), were audio-recorded with consent, and transcribed verbatim. Researchers kept field notes during all four sessions and the exhibition.

4.5 Data Analysis

Data were analyzed using reflexive thematic analysis [28, 29]: familiarizing with the data; generating initial codes; constructing candidate themes; reviewing them against the dataset and research questions; defining and naming themes; and writing up. Themes are understood as patterns of shared meaning constructed through the analyst's engagement with the data, not as topics that "emerge"

independent of the analyst. Two researchers independently coded the full parent and guide transcript set; codes were compared and discussed in three meetings, with disagreements resolved through discussion of the underlying transcript rather than by majority vote. A third researcher, who had not been involved in program delivery, acted as a peer debriefer, reviewing candidate themes against a 20% random sample of transcripts and explicitly probing whether more critical or ambivalent material had been underweighted—a step that led directly to the expansion to include the "qualified enthusiasm" material reported below. Because reflexive thematic analysis does not treat saturation as a criterion [30], we did not count themes or claim prevalence; where we note that a pattern was common or rare, this is an analytic judgment, not a frequency count. Excerpts are labeled by participant and are illustrative of the interpretation offered, not evidence of how many participants held a given view.

4.6 Trustworthiness

The researchers drew on the criteria of credibility, transferability, dependability, and confirmability [31], and the "big-tent" criteria of worthy topic, rich rigor, sincerity, resonance, significant contribution, ethics, and coherence [32]. Credibility was supported by triangulating parents', guides', and children's accounts with field notes; by the division of interviewing labor described in this study; and by returning a two-page plain-language summary of candidate themes to all five guides and six parents (chosen to include both strongly positive and more qualified interviewees) for comment, which resulted in one guide requesting that the time-and-cost tension be stated more strongly, a change reflected in this study. Thick description of context and an explicit statement of the case's boundaries supported transferability. Dependability and confirmability were supported by a shared coding log and analytic memos documenting decisions, including the decision to add explicit negative-case prompts after an initial debriefing meeting suggested the first several transcripts were uniformly favorable. Discrepant and negative cases were deliberately sought, through the measures above, and were reported in this study.

4.7 Positionality and reflexivity

Two of the three researchers designed the program and delivered most sessions; the third did not. This creates a genuine and only partially resolvable tension: participants who viewed the program favorably had reason to express that favorably to researchers associated with it, and participants who viewed it unfavorably may have been reluctant to say so to anyone connected with the school, researchers included, given the small, relationship-dense context of a single school community.

The researchers took four concrete steps to address this issue, with varying success. First, a research assistant with no delivery role conducted parent interviews. The researchers judged that this reduced, but did not eliminate, social-desirability pressure, because the assistant was still introduced as working with "the T-shirt program researchers." Second, the interview guide explicitly invited criticism. This elicited some qualifying material, but neither parents nor guides outright rejected the program. The researchers treated this pattern as a substantive limitation, not evidence of unanimous success, since it is equally consistent with genuine appreciation, residual social desirability, and the self-selection of parents willing to be interviewed in the first place.

Third, a non-delivering author served as peer debriefer and was specifically tasked with challenging overly favorable interpretations during analysis. Fourth, staffing constraints prevented the researchers from interviewing guides with a non-delivering researcher, so a delivering author conducted those interviews. For this reason, the researchers considered guide accounts more vulnerable to favorable bias than parent accounts. The researchers flagged this explicitly wherever researchers relied on guide testimony to support a claim about the program's benefits, rather than about classroom process more generally. The researchers did undertake member checking of individual quotations with the specific parents and guides quoted (theme-level summaries were checked).

4.8 Ethics

The study followed strict ethical guidelines to protect participants' rights and well-being. The study followed ethical guidelines, including respect for participants, voluntary participation, informed consent, confidentiality and data protection, and integrity. Ethical approval was obtained from the university's ethics committee (TTUERC). Written informed consent was obtained from parents or guardians, and age-appropriate verbal assent was sought from children before each session, with assent re-confirmed verbally at the start of subsequent sessions; children could withdraw at any time without consequence, and two children chose not to continue past the first session and are not included in the n = 22 reported in Table 2. Adult participants provided separate informed consent for interviews. Facilitators were screened and trained in child protection procedures [33]. Adults supervised heat transfer at all times, with a fire extinguisher and first-aid kit on site, and no child handled the iron unsupervised; no injuries occurred. Children received equitable materials regardless of family contribution to costs and could draw characters and motifs from their own cultural context; informally, several children incorporated locally familiar imagery (e.g., national flag colors, football motifs), though the researcher did not systematically document this and cannot make a strong claim about cultural specificity of content.

5 Findings

This section presents one overarching theme, making competence visible, and six supporting themes (Fig. 2; Table 3). Across the accounts, the garment made children's abilities visible to the children themselves, peers, and families and guides, who, in turn, responded in ways that, in these adults' retrospective accounts, appeared to reinforce children's engagement. Guides and parents emphasized different aspects: guides stressed learning that extended beyond the task itself, such as sequential reasoning and cause-and-effect thinking; parents emphasized pride, social engagement, and well-being. The study treats this divergence itself as analytically interesting—it may reflect guides' professional incentive to frame any classroom activity in developmental terms, and parents' more direct access to the child's emotional state at home, rather than two independent confirmations of the same underlying reality.

Table 3
Themes, sub-themes and participants whose excerpts illustrate them

Theme	Sub-themes	Illustrative participants	Link to sensitizing model
T1 Making as structured thinking	Planning and sequencing; cause and effect; new vocabulary used at home	Parent 3, Parent 8, Guide 2	S2; ELT
T2 Ownership and pride	Work experienced as 'theirs'; wearing the artefact; shifts in self-appraisal	Parent 7, Parent 6, Guide 5, children's comments	S1; SCT mastery
T3 Managing difficulty	Persistence; concentrated effort; support for motor difficulty	Parent 12, Parent 8, Guide 1	S1, S5; SCT affective states
T4 Being seen	Exhibition and applause; recognition without ranking; becoming 'the expert'	Guide 1, Parent 11, Guide 5, Guide 3	S3; SCT social persuasion and vicarious experience
T5 The shirt travels	Family conversation; from test scores to learning; adults' shift from product to process	Parent 9, Guide 4, Parent 15, Parent 4	S6; reciprocal determinism
T6 Tensions and conditions	Time; cost; heat supervision; motor support; product comparison	Guide 4, Guide 1, Guide 3, Parent 4, Parent 15	S5

5.1 Parents and guides understood the educational significance of wearable art (RQ1)

Parents and guides generally understood the program's educational significance through the final artifact's visibility and durability. Parents and guides did not interpret the T-shirt merely as a craft product; instead, it became evidence of a child's imagination, effort, decision-making, and competence. A parent contrasted the shirt with ordinary classroom artwork: *"It's not just art on a wall that gets taken down in a term. She wears her imagination. That's powerful (Parent 6)*." Similarly, a guide said, *"The T-shirt made the learning visible and touchable (Guide 4)*." This visibility changed how adults interpreted the children's work. Drawings that might normally have remained private, temporary, or easily discarded became public and usable. For parents, this appeared to give the work emotional weight. One parent explained:

My daughter has never been this proud of anything she's made at school. She wore that T-shirt for three days straight. It wasn't just clothing; it was her story, her character, her imagination made real (Parent 7)

In this account, the program's educational significance was not only in artistic production but in the child's authorship. The shirt mattered because it was recognized as "hers": her drawing, her choice, her story. Parents repeatedly interpreted the artifact as a sign that the child's inner world had been made visible to others. Guides, by contrast, tended to emphasize the educational structure behind the product.

They described the activity as a sequenced process requiring planning, attention, and cause-and-effect reasoning. One guide linked the activity's multi-step nature to executive function, noting that "*the sequential nature of the project… taught them to follow a process. That's executive function in action (Guide 2).*"

A parent similarly observed that the activity seemed to involve more than art-making:

I was amazed watching my son plan his design step by step. He talked about 'registration' and 'alignment' at home, words I'd never heard him use before. It wasn't just art; it was engineering in disguise (Parent 3)

These accounts suggest that adults understood the program as educational because it combined creativity with structured thinking. For guides, the value lay partly in the children's movement through stages: choosing, drawing, cutting, positioning, waiting, observing heat transfer, and inspecting the outcome. For parents, the value became visible when children explained these stages at home.

The Montessori context shaped these interpretations. The guides' emphasis on process, concentration, and non-competition aligned with Montessori principles such as purposeful work, control of error, and freedom within limits. The T-shirt was therefore read as more than a decorative product: it was a meaningful object produced through purposeful effort. However, Montessori professional language also shaped this interpretation. When guides described the crooked cut or off-center image as "where the learning lives" (Guide 3), they were not simply reporting an event; they were interpreting it through a pedagogical lens that values process over perfection.

Overall, in response to RQ1, parents and guides understood the educational significance of wearable art as residing in the transformation of ordinary drawings into personally authored, durable, and socially meaningful artifacts. The shirt made children's competence visible, but adults interpreted this visibility differently: parents emphasized pride and self-expression, while guides emphasized process, concentration, and cognitive sequencing.

5.2 Processes through which the experience shaped creativity and confidence (RQ2)

Participants' accounts suggested several processes through which the program appeared to support children's creativity and confidence. These processes were not treated as measured effects, but as adult interpretations of what they observed. Four processes were especially prominent: authored mastery, narration of making, scaffolded difficulty, and recognition without ranking.

5.2.1 Authored mastery and ownership

The first process was the child's experience of authored mastery. Because the T-shirt displayed the child's own drawing, participants interpreted the finished garment as evidence that the child had successfully created something real and usable. From a Social Cognitive Theory perspective, the shirt

functioned as a concrete mastery experience: children could point to, wear, and show others something they had made.

Children's brief comments supported this interpretation. One child said, "*I felt good wearing a T-shirt with my own drawing. I want to make more.*" Another said, *"I used to think my drawings weren't good enough, but now I know they are special."* These statements suggest that the artifact fostered confidence not merely because it was attractive, but because it gave children visible evidence of their capability. Guides also observed engagement among children who were usually hesitant in art activities. One guide explained: *"Even my most reluctant artists were fully engaged… The stakes feel real (Guide 5)."* The phrase "stakes feel real" matters: participants believed children invested more effort because the product would leave the page, become wearable, and be seen by others.

5.2.2 Children's narration of the process

A second process, and one of the most analytically significant findings, was children's narration of their own making. The artifact alone did not automatically communicate learning to families. Instead, parents often understood the activity's educational value when the child explained how they made the shirt.

Parent 15 described this shift clearly:

At first, I just wanted to see a nice shirt. But then my son spent twenty minutes explaining why he chose that character, how he had to register it on the rubber, and why the heat had to be just right. I realized the shirt was just an excuse; the real learning was everything that happened before (Parent 15)

This account refines the original sensitizing framework. The shirt did not simply "travel" home as evidence of learning; the child's explanation made the learning legible. Narration transformed the product into a record of planning, decision-making, problem-solving, and experimentation. Without narration, parents could easily remain focused on whether the shirt looked neat or attractive. This process also helps explain why guides and parents noticed different things. Guides observed children during the making process; parents often encountered the finished shirt first. Children's narration helped bridge that gap by carrying the process into the home.

5.2.3 Managing difficulty through scaffolding

A third process was managing difficulty. Parents and guides described moments of frustration, especially during cutting, alignment, and waiting for adult-supervised heat transfer. They saw these moments as opportunities to build persistence when adequate support was available. One parent recalled, *"When he struggled to cut out his character, I saw him take a breath and try again. That resilience, that's not something you can teach from a textbook (Parent 12)."*

Guides also emphasized that children with fine-motor difficulties could succeed with adaptations: "With adapted scissors and peer support, everyone succeeded" (Guide 1). This suggests that confidence grew not by removing difficulty, but by helping children persist long enough to succeed. However, this process was conditional. The same cutting stage that supported persistence for some children consumed time

and reduced creative engagement for others. As Guide 4 noted, “some children spent so long struggling with cutting that they had less time for the creative parts.” Thus, difficulty became developmental only when adequate scaffolding was present.

5.2.4 Recognition without ranking

A fourth process was social recognition. The exhibition allowed children to wear and present their shirts to peers, guides, and families. Participants described this as especially powerful for quieter children. One guide recalled that “*One of my quietest students lit up during the exhibition. She explained her design to everyone who passed by. That was the most I’ve heard her speak all term (Guide 1).”* A parent similarly described a child who became more confident after public applause: *“He walked taller for days after (Parent 11).”*

Importantly, guides emphasized that recognition was framed as celebration rather than competition. One guide said, “There was no competition, no comparison. Just pure celebration of each other’s creativity. That’s rare in a classroom” (Guide 5). This distinction matters because public visibility can either support confidence or undermine it, depending on whether children experience the audience as appreciative or evaluative. The Montessori culture of avoiding ranking likely shaped this process. The exhibition was not organized around winners, best designs, or neatest shirts. Instead, the program recognized each child’s work as meaningful in its own right. Nevertheless, as discussed under RQ3, the program had to actively maintain this non-comparative framing because some parents still compared the finished products.

5.2.5 The shirt as a home–school bridge

Finally, the program appeared to shape confidence and creativity by extending school-based learning into family conversation. Parent 9 described posting a photograph of the shirt on a family WhatsApp group:

I posted a photo of her wearing the shirt on the family WhatsApp. Her grandmother in Kumasi called to ask about it. Suddenly, the whole family was talking about what she had learned at school (Parent 9)

This account shows how the artifact expanded the child’s audience beyond the classroom. The shirt invited questions from family members and gave the child an opportunity to explain, remember, and take pride in the process. A guide observed a similar change in parental engagement: *“For once, parents weren’t just asking about test scores. They were asking, ‘How did you get the image to stick to the fabric? (Guide 4).”*

In response to RQ2, then, participants’ accounts suggest that creativity and confidence were shaped through several interconnected processes: children experienced authored mastery, narrated their own making, persisted through scaffolded difficulty, received public recognition without formal ranking, and carried the artifact into family conversation. These processes were mutually reinforcing, but not automatic; they depended on adult scaffolding, parent interpretation, and careful management of comparison.

5.3 Tensions, discrepant cases, and implementation conditions (RQ3)

Although the accounts were mostly favorable, parents and guides noted several tensions that temper the program's promise. These tensions matter because they suggest the activity's value depended on specific conditions, not simply on the T-shirt technique itself.

5.3.1 Time and instructional pressure

The first tension concerned time. Guides noted that the program required more time than ordinary drawing or coloring. Children needed time to draw, color, cut, align, wait for heat transfer, and inspect the final product. This extended timeline supported concentration for some children, but it also created pressure within the school schedule. Guide 4 suggested that the activity might be difficult to repeat frequently: "I don't think we could do this every term without help. It's the kind of thing you do once, as a special project." This indicates that the program was feasible as a short, special activity, but not necessarily as a routine classroom practice without additional resources.

5.3.2 Material cost

A second tension concerned cost. Although the program used low-cost materials compared with commercial printing, it was not cost-free. Blank T-shirts, transfer film, protective sheets, and replacement materials cost more than ordinary paper-based art supplies. This matters in a resource-constrained context because the term "low-cost" can obscure real barriers to adoption. The findings therefore suggest that scalability would require transparent budgeting. A program may be affordable as a pilot, but less feasible if repeated across multiple classes or terms.

5.3.3 Supervision and safety

A third implementation condition concerned the heat-transfer stage. Because the process required an iron or a heat press, children could not complete it independently. Heat application required close adult supervision, creating a bottleneck. Guide 1 observed: "With twenty-five children and one iron station, most of them would just be waiting." This limitation is both educational and logistical. Waiting can disrupt concentration, reduce autonomy, and move the activity away from the Montessori ideal of self-paced work. The heat stage therefore required careful organization, adult availability, and safety protocols.

5.3.4 Unequal benefit and fine-motor support

A fourth tension concerned unequal benefits. Cutting and alignment were developmentally demanding, particularly for children with fine-motor challenges. While some children saw these difficulties as opportunities to persist, others lost creative time because they spent so long struggling with the task's technical aspects.

Guide 4's observation that "some children spent so long struggling with cutting that they had less time for the creative parts" complicates more positive accounts of resilience. It suggests that difficulty is not inherently developmental. Difficulty becomes productive only when children receive sufficient scaffolding, adapted tools, and time. This finding has implications for inclusive practice. Programs of this kind should not assume that all children can access the creative benefits equally. Preparatory scissor-skill sessions, adapted scissors, peer support, and adult assistance may be necessary to prevent the activity from privileging children with stronger fine-motor control.

5.3.5 Product comparison and parental expectations

A fifth tension involved comparison. Although guides framed the exhibition as non-competitive, some parents still compared children's shirts. One guide reported that parents asked, "Why didn't my child's shirt look like the others?" The guide reframed imperfection as evidence of learning: *"The crooked cut or slightly off-center image is where the learning lives. Perfection was never the goal (Guide 3)."*

This exchange is analytically important because it shows that product-centered activities can easily reintroduce evaluation, even when adults intend to emphasize process. The visibility that made competence recognizable also made differences between children's products visible. Recognition without ranking therefore required active adult mediation; it was not guaranteed by the activity itself.

5.3.6 Parent readiness to value process

A final tension concerned parental readiness. Some parents initially focused on the finished shirt's appearance rather than the learning process behind it. Parent 15's account, discussed under RQ2, shows that this focus could shift when children narrated their process. However, Parent 4 suggested that families might need more structured preparation: *"a parent workshop first so we understand the steps and can reinforce the learning at home."*

This suggests that home–school engagement cannot be assumed simply because an artifact travels home. Parents may need orientation to understand the process, ask useful questions, and avoid overemphasizing neatness or comparison.

5.3.7 Limits of discrepant evidence

Despite explicit attention to tensions, the dataset contained few strongly negative accounts. No parent or guide directly rejected the program or reported that a child disliked it consistently. This absence should not be taken as evidence of universal success. It may reflect genuine appreciation, but it may also reflect social desirability, the researchers' involvement in program delivery, and the self-selection of parents who agreed to be interviewed.

In response to RQ3, the findings indicate that the program's promise was conditional. Its success depended on sufficient time, affordable materials, safe heat supervision, fine-motor support, careful management of comparisons, and a parent orientation toward process. These implementation

conditions are not peripheral; they shape whether the central mechanisms described under RQ2 can occur.

5.4 Summary of key findings

Organized around the three research questions, the findings show that parents and guides viewed wearable art as educational because it made children's competence visible in a durable, socially meaningful form. They believed the program fostered creativity and confidence through authored mastery, narration, scaffolded difficulty, recognition without ranking, and home–school conversation. At the same time, the program introduced practical and interpretive tensions related to cost, time, safety, fine-motor access, product comparison, and parent expectations. The findings therefore support a qualified interpretation: wearable art may be a powerful medium for making children's learning visible, but only when the surrounding pedagogical, material, and social conditions are carefully managed.

6 Discussion

The accounts are consistent with the sensitizing model in several respects, and also complicate it in ways we think are more analytically productive than simple confirmation. The pride and ownership described by parents are broadly consistent with Bandura's [14] account of mastery experience (S1); guides' emphasis on sequencing and cause-and-effect reasoning is broadly consistent with Kolb's [16] cycle (S2); and accounts of exhibition and peer interest point toward vicarious experience and social persuasion (S3). Taken together, the data suggest why both theories are needed to interpret this program, even provisionally: ELT-oriented material (T1) foregrounds reasoning that SCT does not directly address, and SCT-oriented material (T2, T4) foregrounds identity and belief that ELT does not directly address. In participants' accounts, the artifact functions both as an occasion for reflection and as portable evidence of competence to third parties.

But the analysis also yielded four refinements that qualify, rather than simply extend, the original propositions (see Table 4). First, narration, not the artifact itself, appears to be the operative mechanism connecting the garment to adults' recognition of learning (T5; Parent 15). This was not anticipated in S6, which treated the artifact's mobility as sufficient to extend effects into the home; our data suggest the artifact is closer to a prompt for a conversation that does the actual communicative work, which implies that programs relying on the artifact alone, without structured opportunities for children to narrate their process, may not achieve the home–school bridging effect we observed. Second, "recognition without ranking" is an aspiration actively maintained through guides' rhetorical framing, not a straightforward description of outcomes (T4, T6). Parents' direct comparative questions ("why didn't my child's shirt look like the others?") indicate that the underlying comparative pull of a visible, personal artifact persists regardless of how guides structure the exhibition; guides' responses manage this pull rather than eliminate it. This refines S3 by suggesting that social persuasion through public recognition is conditional on continuous adult labor to reframe comparison, which is itself an implementation cost worth naming alongside the material ones. Third, mastery through difficulty (T3) is conditional on scaffolding resources that are not guaranteed, and may fail to materialize when those resources are

stretched (T6). This qualifies S1 and S5 jointly: rather than treating implementation conditions (S5) as a separate, lower-stakes category of findings, our data suggest that implementation conditions determine whether the central mechanism (S1, mastery through difficulty) occurs at all for a given child. We think S1 and S5 should be read as interacting, not independent, propositions in any future version of this framework. Fourth, consistent with reciprocal determinism (S4), parents' own framing of value seems to shift through engagement with the program (Parent 15), but our data cannot establish how durable or general this shift is, nor rule out that it is partly an artifact of being interviewed by someone associated with the program shortly after a positively-framed exhibition. We regard S4 as plausible but under-evidenced by this design, which lacked any follow-up timepoint.

Table 4
How the findings support or refine the sensitizing framework

Framework construct	What the accounts suggest	Refinement
Mastery experience (S1)	Pride, ownership, sustained wearing	Mastery is experienced as authored and consequential, but conditional on scaffolding that is resource-dependent, not automatic
Experiential cycle (S2)	Planning, cause and effect, new vocabulary	Later cycle stages are most visible to adults when children verbalize them; earlier stages may be underreported for this reason
Social persuasion and vicarious experience (S3)	Exhibition, applause, expert role	Recognition-without-ranking is a maintained framing, not a guaranteed outcome; comparison persists and must be actively managed
Reciprocal determinism (S4)	Children want to "make more"; parents' talk changes	Plausible but not demonstrated to be durable; single-timepoint data cannot rule out novelty effects
Implementation conditions (S5)	Time, cost, supervision, motor support	Not a separate category: implementation conditions determine whether mastery experiences (S1) occur at all for a given child
Home–school bridge (S6)	Family conversation, shared photos, shifting parent framing	Refined: the child's own narration, not the artifact's mobility per se, appears to be the operative mechanism

Participants' accounts can be read through a Montessori lens, but we want to be explicit that this reading is partly ours, not simply theirs, and that guides' use of Montessori vocabulary ("no competition," "error as information," "the stakes feel real") should be read with some caution precisely because it is the vocabulary guides are trained to produce when describing classroom events to any outside observer, let alone researchers who are also their program's designers. Several accounts describe concentration consistent with Montessori normalization: a parent had "never seen her concentrate so hard" (Parent 8), and guides reported that typically reluctant children became fully engaged (Guide 5). A guide's reframing of a crooked cut as "where the learning lives" echoes the Montessori principle of control of error, and children's choice of their own character reflects freedom within limits. The garment, as a real and useful

product of purposeful effort, resembles practical life work, which may help explain why, for most participants, the product did not simply displace the process.

However, a purely confirmatory reading would miss a genuine tension: this program was a time-bound, adult-organized activity with eight fixed, sequenced stages, which departs substantially from the child-chosen, self-paced work that marks authentic Montessori practice. Guides' own concerns about insufficient time and the need for preparatory skill sessions may partly reflect this friction between the program's structure and the pedagogy it was embedded within—a friction the guides' own Montessori-inflected language (emphasizing concentration and non-comparison) may obscure rather than reveal, since that language foregrounds what the program shared with Montessori ideals rather than how it departed from them. For conventional, non-Montessori classrooms, the implication is not simply that "recognition without ranking" and "concentration" will transfer; it is that these qualities, to the extent they were present here, may depend on an institutional culture actively oriented against comparison and extrinsic reward—a culture this program did not create but may have borrowed credibility from. We would caution strongly against reading our findings as evidence that the T-shirt-making technique itself produces non-comparative recognition; the more defensible claim is that a Montessori culture's existing non-comparative norms were extended to cover a new, product-centered activity, with partial but not complete success.

The sensitizing model's emphasis on personal mastery and individual recognition draws heavily on theory developed in individualist settings. Where the self is construed as more interdependent [34], recognition from family and community may carry weight that individual distinction does not fully capture. The prominence of the extended family in at least one account (Parent 9's grandmother in Kumasi), the collective framing of the exhibition, and guides' emphasis on non-comparison are compatible with this reading, though we want to be careful not to overstate it: we did not systematically ask about cultural self-construal, we have only one explicit extended-family example, and the comparison concerns raised by other parents suggest that individual, comparative evaluation of children's products is also clearly present in this setting, alongside more collective framings.

7 Implications

For practice, the finding including the qualified material suggest specific, costed attention to: protecting creative time by teaching cutting skills in a preparatory session rather than assuming scaffolding capacity will be available during the main activity; organizing supervised heat stations with a realistic adult-to-child ratio rather than assuming one adult can manage several children at once; providing adapted tools proactively for children with known motor differences, rather than reactively; orienting parents to the process explicitly, and early, so that the shift described by Parent 15 does not depend on chance narration; and preparing guides with specific, non-generic language for managing comparative questions from parents, since our data suggest such questions arise even when the classroom exhibition itself is framed non-competitively.

For policy and community programs in resource-constrained settings, the accounts show clearly that low-cost does not mean cost-free, time-free, or staffing-free: consumable materials, supervision time, and instructional time should be budgeted and reported transparently by pilot programs before claims of scalability are made, and the unequal-benefit pattern suggests that per-child cost estimates should explicitly include the additional adult time needed for children who require more scaffolding, not just an average across the group. The home–school bridge finding suggests that family-facing creative outputs may be a promising, low-cost route to engagement, complementing evidence on family involvement and school engagement [25]—but only, our data suggest, if children are given structured opportunities and encouragement to narrate their process to family members, rather than simply bringing the finished object home.

8 Limitations and transferability

This is a single-site case study of one Montessori school, where an institutional culture of concentration, mixed-age grouping, and the avoidance of competition and ranking may have shaped both the program's reception and the vocabulary participants used to describe it; we do not know how a conventional, non-Montessori classroom would receive the same activity, and we think this is a substantially open question rather than one this study can speak to. The findings are interpretations offered by adults who observed the program, filtered through our own analytic choices; they are not evidence that the program improved children's creativity or confidence, and the absence of a validated, analyzed outcome measure means no claim in this paper should be read as evidence of effect.

Researchers who designed and delivered the program also conducted the guide interviews and the analysis, which we judge to be the most serious threat to credibility in this study; we partially mitigated this for parent interviews by using a non-delivering interviewer, but we could not do so for guide interviews, and we think guide testimony should accordingly be weighted more cautiously than parent testimony throughout this paper, a point we have tried to flag at each relevant juncture rather than only here. Despite explicit prompts for criticism, the available excerpts remain predominantly favorable; we see this as an unresolved design limitation, not a feature that our measures have adequately corrected. Children's perspectives appear only as brief recorded comments and informal follow-up conversation, not structured interviews, a significant gap given that the study's central claims concern children's sense of competence; future iterations should treat this as the most important omission to correct.

The sample of 15 parents and 5 guides, drawn from a single school, provides some breadth of adult perspective within that school but no variation across schools, regions, or pedagogical philosophies, and the 62.5% parent response rate means we cannot rule out that non-responding parents held more critical views. Reflexive thematic analysis relies on analysts' interpretation; another team, particularly one not involved in program delivery, could reasonably construct a more critical set of themes from the same transcripts, and we would not consider that an error.

9 Directions for further research

- Ghana's rich visual and textile traditions, including Adinkra cloth stamped with symbolic motifs and woven Kente, in which patterned cloth communicates identity and values, could provide a handmade, wearable design with particular cultural resonance. However, we did not systematically document whether children's designs drew on these traditions, and we flag this as a missed opportunity for the present study rather than a finding. Future work could deliberately co-design activities with local textile artisans and prospectively examine how culturally anchored prompts shape the meanings adults and children attach to the resulting garments.
- Studies with a comparison condition and validated, culturally appropriate measures (e.g., waitlist or matched-school designs) to test whether the perceived benefits reported here are associated with measurable change, and critically, whether they hold outside a Montessori setting.
- Dismantling designs that vary wearability, public exhibition, and the making process independently, to examine which specific ingredient—if any—participants and children value, rather than treating the bundled program as a single unit.
- Child-centered qualitative methods, such as drawing-elicitation and participatory interviews conducted by researchers not involved in program delivery, to obtain children's own accounts directly rather than through adult report.
- Designs with an interviewer fully independent of program design and delivery for all participant groups, including guides, to more rigorously test whether the favorable tenor of these findings survives removal of researcher involvement.
- Comparative cases in Montessori and conventional schools, across other cultural contexts, including culturally anchored prompts developed with local artisans, and explicit attention to teacher/guide preparedness for managing comparison and unequal scaffolding needs.
- Longitudinal follow-up, at minimum one school term later, to examine whether the shifts in parental framing described (Parent 15) persist or fade, and whether children's stated wish to "make more" translates into sustained engagement.
- Systematic collection and reporting of non-response and attrition reasons, to better distinguish disinterest from practical constraint.

10 Conclusion

This qualitative case study examined how parents and guides understood a low-cost program in which children's drawings became wearable art, and it sought not to smooth over the ambivalence that a researcher-delivered, single-site design is especially prone to obscuring. Participants' accounts suggest that the garment made children's competence visible to children themselves, peers, and families and guides, and that this visibility was experienced—for most, though not all, participants—through structured thinking, ownership and pride, scaffolded management of difficulty, celebratory recognition, and conversation that crossed school and home. Children's own narration of their making emerged as the specific mechanism that appeared to convert a finished product into legible evidence of process for families, a genuine refinement to the sensitizing framework we began with. At the same time, the

accounts revealed real tensions—time, cost, supervision of a heat source, unevenly available scaffolding, persistent product comparison despite guides' efforts to reframe it, and a default parental focus on the finished object that shifted only through specific, narrated encounters with the child's process. Given a single Montessori site, substantial researcher involvement in both delivery and interviewing, and a predominantly, though not unanimously, favorable set of accounts obtained despite explicit efforts to elicit criticism, we offer these findings as a deliberately qualified, theoretically generative starting point rather than a demonstration of the program's value: a refined framework, a documented set of implementation costs, and a set of specific questions—about independence of interviewers, children's direct voice, and comparison across settings—that future research, including our own, should be designed to answer rather than assume.

Declarations

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Author contributions

EKA: Conceptualization, Data curation, Formal analysis, Writing – original draft; DNAM: Investigation, Methodology, Resources; EDK: Supervision, Validation, Visualization; EKD: Supervision, Validation, Writing – review & editing.

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Data availability

The datasets generated and/or analyzed in the present study are available from the corresponding author upon reasonable request.

Ethics approval and consent to participate

The Takoradi Technical University (TTU) Research Ethics Committee waived ethical review and approval for the study because the interviewees remained anonymous and no sensitive data were collected. All data collection procedures were conducted confidentially in accordance with TTU’s Declaration on Ethics. Informed consent was obtained from all individual participants (respondents) included in the study. Participants were told that the survey was anonymous and participation was voluntary.

Consent for publication

We obtained written informed consent from parents or guardians of all participating children and age-appropriate assent from the children. Parents or guardians gave explicit consent for the use of anonymized images and excerpts.

Competing interests

The authors declare no competing interests.

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Figures

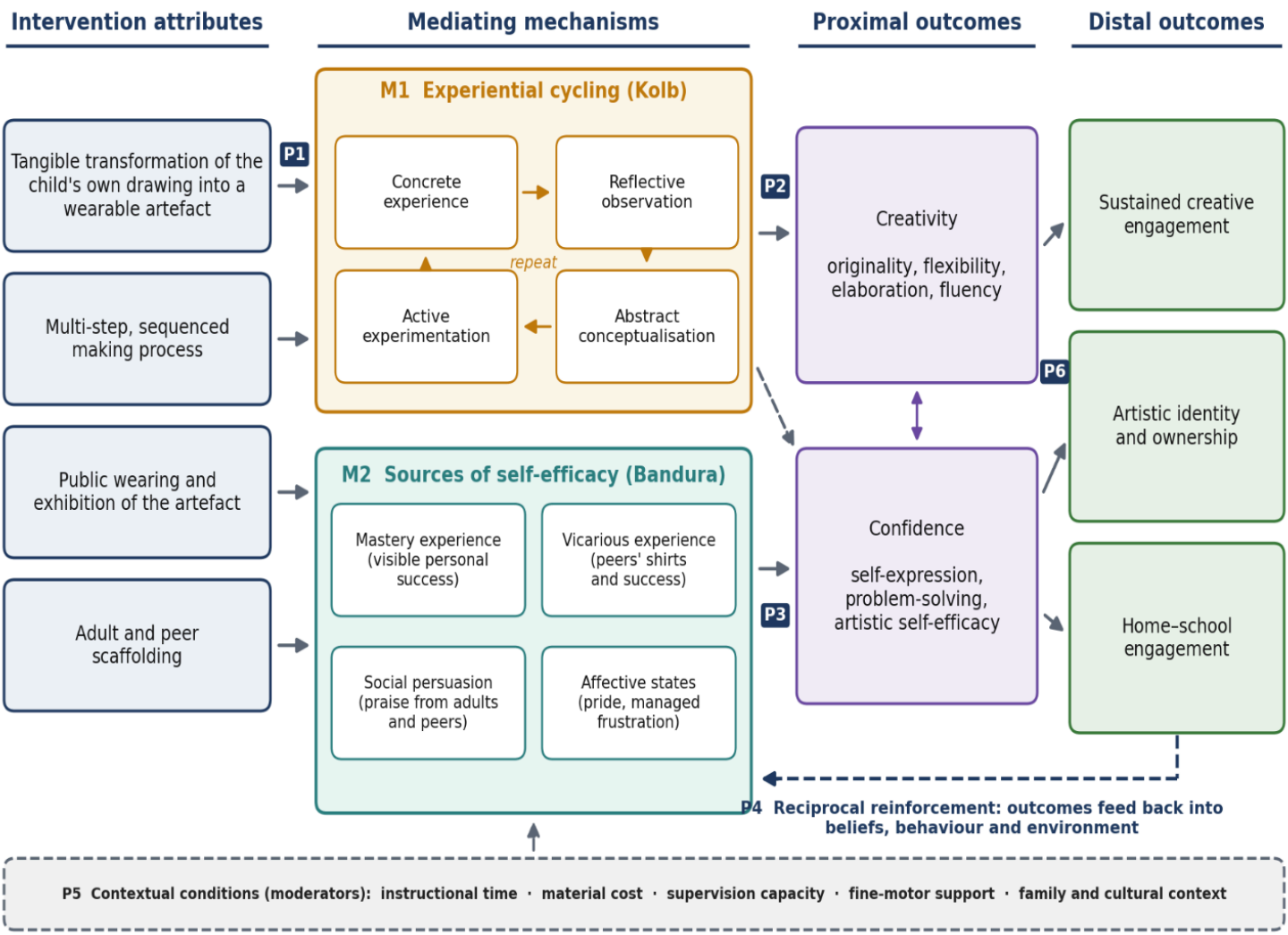


Figure 1

Conceptual framework illustrating an artifact-mediated model of creative self-efficacy (Authors' construct, 2026)



Figure 2

Creating drawings on paper by children using pencils, markers, crayons, colored pencils, and white A4 paper sheets (Source: Field data, 2026)



Figure 3

Children cutting out drawings with scissors and registering the drawings on a Falcon cling rubber 300 mm x 30 cm to fit the image size (Source: Field data, 2026)



Figure 4

Placing a Teflon sheet over the image in cling rubber on the T-shirt by children and applying heat to the Teflon sheet with the image in cling rubber on the T-shirt (Source: Field data, 2026)



Figure 5

Exhibiting designs by children and discussing their experiences of finished T-shirts (Source: Field data, 2026)

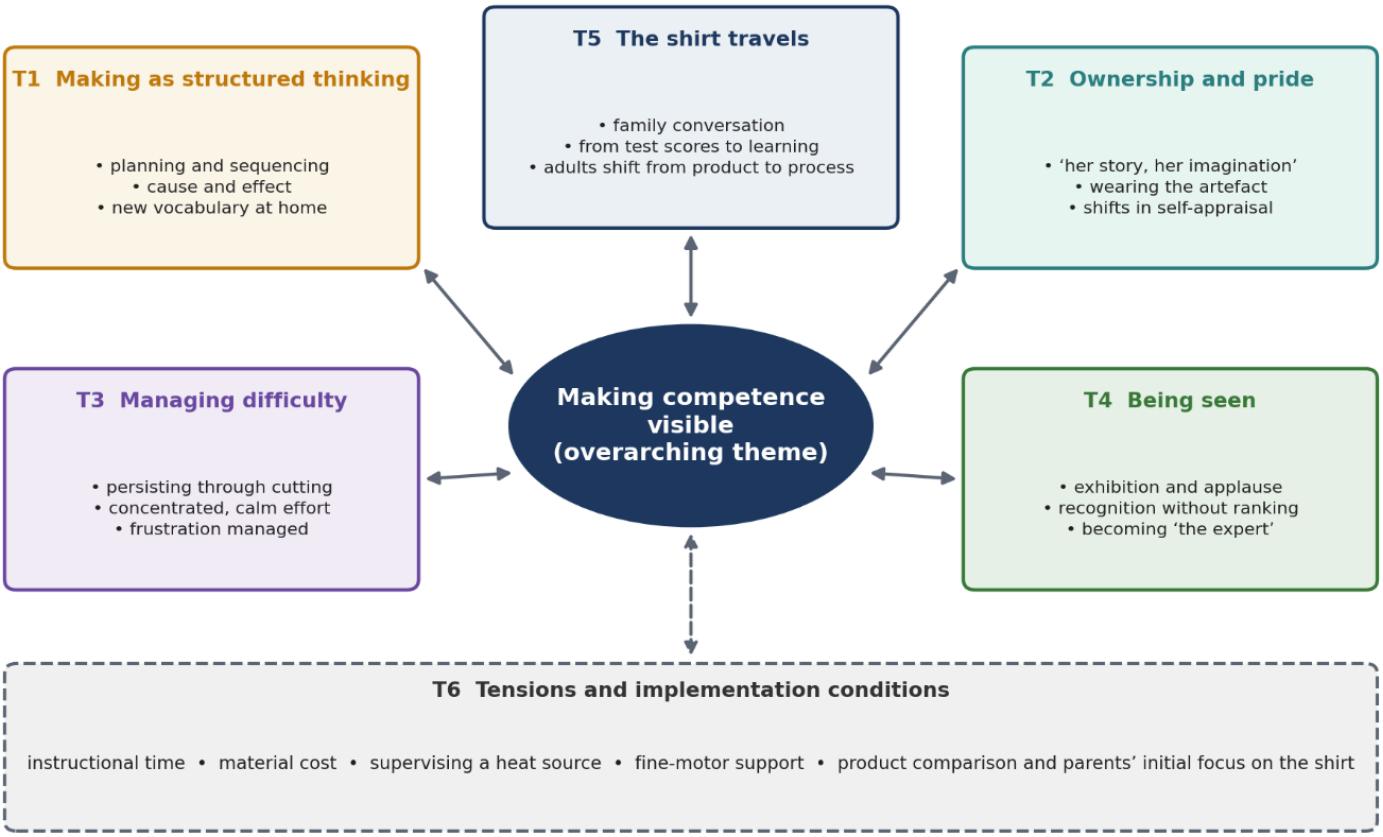


Figure 6

Thematic map illustrating overarching theme, five supporting themes and a sixth theme on tensions and implementation conditions.