



Arts-led co-creation in contested coastal futures

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Abstract

Coastal social-ecological systems face intensifying pressures from climate change, extractive industries, and competing claims to space and resources. These conflicts carry profound justice dimensions about who benefits from coastal resources and whose knowledge counts in decision-making. Beyond technical management challenges, we can view these as contested futures where different groups envision fundamentally different possibilities for places and communities. While sustainability science has increasingly turned to arts-based approaches, important gaps persist in understanding how artistic engagement actually operates in practice. Most studies analyze creative outputs while leaving the generative process itself under examined. Through reflexive analysis of arts-led co-creation in three contested coastal settings—embroidery workshops with displaced women in Bangladesh, stop-motion animation with fishing communities in Brazil, and documentary filmmaking with Indigenous cultural practitioners in Hawaii—we identify three interwoven orientations that characterized our work: relational co-creation, pluriversal attunement, and collective imagination. We discuss these as cultivable sensibilities that shaped how we navigated collaboration in contested contexts. Our analysis reveals how these orientations unfolded through specific practices, what they enabled, and where they met limits. By opening the co-creative process as a site of inquiry, we contribute practice-based evidence of how arts-led work actually unfolds in contested coastal contexts.

Keywords Arts-based research · coastal conflicts · participatory methods · sustainability transformations · community dialogue · ocean governance · creative practices

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Introduction

In a courtyard in Matarbari, Bangladesh, a group of women stitch together. In Ajuruteua, Brazil, children and fishermen animate drawings frame by frame drawing at the beach. At Kealakekua Bay, Hawai'i, protocol is shared through chanting and net-making. What these three processes share is that the art-making itself became the site where knowledge emerged. This paper examines what happened when we followed where art-making led.

Coastal social-ecological systems face intensifying pressures from accelerating climate change, extractive industries, and competing claims to space and resources (Spijkers et al. 2019; Glaser et al. 2023). Sea level rise, ocean warming, and acidification converge with disputes over fishing rights, tourism development, conservation priorities and Indigenous practices, these conflicts carry profound justice dimensions about who benefits from coastal resources, who bears the costs of environmental degradation, and whose knowledge counts in decision-making (Daw et al. 2015; Gupta et al. 2023). Beyond management challenges requiring technical solutions, we can view these as contested futures where different groups envision fundamentally different possibilities for places and communities (Strand et al. 2022).

Conflict transformation scholarship offers one pathway for engaging such contested settings. Lederach (2005) distinguishes transformation from resolution or management, arguing that genuine transformation addresses root relationships and structures rather than merely negotiating positions. (Galtung 1996, p.7) argues that visible conflicts are rooted in deeper structural and cultural patterns, while (Bush et al. 2004) highlight how transformative processes can shift parties' orientations toward each other rather than simply settling disputes. For decolonial thinkers, root causes of conflicts often arise from fundamentally different ontological positions (Escobar 2017), thus transformation may require holding ontological differences rather than resolving it through consensus. What becomes necessary are approaches that don't force synthesis but create conditions where multiple ontologies can be held simultaneously. This is where arts-led approaches offer distinctive possibilities.

Sustainability science has increasingly turned to transdisciplinary approaches, seeking to integrate scientific, local, and Indigenous knowledge systems while working across disciplinary boundaries to co-produce actionable knowledge (Tengö et al. 2014; Wyborn et al. 2021; Norström et al. 2020). Current critique of transdisciplinary sustainability approaches are that knowledge hierarchies are often reproduced even in participatory processes, with scientific knowledge retaining implicit authority (Breckwoldt et al. 2021; Niner et al. 2024) and that processes tend to privilege

cognitive, verbal, and rational forms of knowledge—forms of knowledge where claiming objectivity is assumed to be more possible—while struggling to engage embodied, emotional, and relational dimensions central to how many communities experience environmental change.

In this context, arts-based approaches have gained recognition in transdisciplinary sustainability science as offering distinctive epistemological possibilities of aesthetic and emotional experience, embodied practice, and collaborative making (Leavy 2015; Galafassi et al. 2018; Heras et al. 2021; Bentz et al. 2021). Growing evidence demonstrates promising possibilities for creating safer dialogue spaces and amplifying marginalised voices (Brown et al. 2017; Trott et al. 2020). An important gap remains, however, in understanding the *how* of the artistic process within transdisciplinary spaces, that is, the relationships between research intent and artistic orientations (Maggs and Robinson 2020).

This paper emerged from an international multi-national transdisciplinary project examining ocean conflicts and coastal futures (Belmont Forum NoCrises). We conducted arts-led co-creation processes in three contested coastal settings. Through reflexive analysis, we ask: What ethical-aesthetic orientations guided arts-led co-creation in these contested coastal settings? How did these orientations unfold and with what tensions, limitations, and possibilities?

We provide a grounded examination of this arts-led work in a transdisciplinary sustainability science context, opening the artistic process itself as a site of inquiry. The next section reviews theoretical foundations for arts-led transdisciplinary co-creation. Then we describe the case-studies and analyse how three core ethical-aesthetical orientations manifested in practice. In the final section we discuss implications for transdisciplinary practice.

Arts-led co-creation in transdisciplinary processes

Transdisciplinary sustainability science has increasingly recognized the need to engage forms of knowledge beyond the technical and quantifiable as the ability to attend to embodied, relational, and emotional dimensions is central to how communities experience and respond to ecological change (Heines et al. 2024; Olvera-Hernandez et al. 2025). Arts-based approaches have emerged as one avenue. The documented applications span diverse contexts and functions. Applied theatre methods drawing on Augusto Boal's Theatre of the Oppressed create dialogue in polarized settings (Brown et al. 2017; Enqvist et al. 2025); Augusto Boal's Theatre of the Oppressed promotes dialogue on social justice issues among marginalized groups. Photovoice and

participatory video amplify marginalized voices by circumventing technical vocabularies that dominate governance processes (Masterson et al. 2018); Visual arts make visible relational and emotional dimensions of human-nature relationships often excluded from conventional research (Heines et al. 2024; Galafassi et al. 2018); Creative methods enable the imagination of alternatives by making abstract futures tangible and experienceable (Vervoort et al. 2015, 2022; Merrie et al. 2018). Across these applications, certain patterns emerge: arts-based methods create safer spaces for dialogue through metaphor and embodiment rather than direct argumentation (Enqvist et al. 2025; Olvera-Hernandez et al. 2025), foster empathy by enabling participants and or audiences to inhabit worldviews different from their own (Bentz et al. 2022), and generate and share emotional and relational knowledge that conventional methods struggle to access (Fache et al. 2022; Heras et al. 2021).

Despite growing enthusiasm, important gaps persist to realise the transformative potential attributed to arts-based work. Most studies analyze creative outputs while leaving the generative process itself unexamined (Gallois et al. 2024; Vervoort et al. 2024). Power asymmetries persist even in participatory processes, with academics or facilitators controlling framing and resources despite collaborative rhetoric (Strand et al. 2024). Questions about who truly benefits, whose voices are amplified, and whether extractive patterns are merely disguised rather than transformed remain insufficiently addressed (Wilson 2008; Thambinathan and Kinsella 2021; Breckwoldt et al. 2021). The field lacks frameworks for understanding how artistic engagement operates in practice, i.e. how creative processes unfold, what moments prove generative, how facilitation choices shape trajectories, how artistic sensibilities actually operate in contested contexts. What is needed are practice-based accounts that open artistic work itself as a site of inquiry rather than treating it as a black box (Heras et al. 2021; Strand et al. 2024).

Arts-based vs. arts-led

A distinction matters here, though it is rarely made explicit in discussions of arts and sustainability. *Arts-based research* treats creative methods as tools within researcher-controlled designs artistic practice subordinated to social scientific objectives (Heines et al. 2024). Researchers determine questions, frame problems, and evaluate outcomes. Artistic methods serve predetermined research goals. *Arts-led* approaches operate differently. Here, artistic practice shapes the entire inquiry, with artists as co-researchers whose aesthetic sensibilities and creative methodologies drive the process (Bolt and Barrett 2019). The distinction addresses a fundamental problem: when arts are instrumentalized—reduced to methods serving external agendas—the very

hierarchical epistemologies that arts-based work aims to challenge get reproduced (Maggs and Robinson 2020).

Arts-led work positions artistic ways of knowing as valid epistemological stances rather than methodological tools (Leavy 2015). This requires negotiating clear domains where artistic judgment holds authority—about what to make, how to work, when to follow emergence, and what constitutes meaningful engagement. Such orientation can conflict with research expectations for replicability, predetermined outcomes, and efficient timelines (Bolt 2016). Yet this conflict may be productive, revealing what becomes possible when emergence, open-endedness, and aesthetic attention guide inquiry rather than controlled implementation of methods (Manning 2016; Bolt and Barrett 2019).

A complication is that arts-led processes exist within arts-based research projects, yet scholars typically analyze creative outputs for their impacts rather than examining the generative process itself (Vervoort et al. 2024; Gallois et al. 2024). What is needed is attention to the arts-led process as a site of inquiry. How artistic sensibilities operate, how emergent decisions unfold, how aesthetic practice generates knowledge, what choices are needed and what the implications. Where does it enable and where does it fail? What tensions arise? Such questions require documentation from within artistic practice rather than only from its outcomes.

We position our arts-led work as both practice and object of study. Through retrospective reflection with collaborators—artists, community members, and research partners—we made explicit how artistic work unfolded across our three cases. We are not claiming arts-led approaches always function in the ways we describe. Rather, we document how they manifested in the contested coastal contexts we worked with, contributing an empirical account of arts-led transdisciplinary engagement “from inside”. This approach aligns with practice-based research traditions (Bolt and Barrett 2019) and research-creation traditions that treat creative work as producing knowledge through the doing itself (Chapman 2012).

Where arts-based methodologies have methods determined a priori, arts-led work operates from orientations or sensibilities rather than fixed procedures (Bolt and Barrett 2019; Manning 2016). In performance research, these are described as ethical-aesthetic stances – not step-by-step methods but cultivable dispositions that shape how artists navigate practice. They allow for emergence, responsiveness to context, and iterative becoming rather than controlled implementation toward predetermined ends. These ethical-aesthetic orientations shape epistemological and ontological commitments of the process (Manning 2016). This contrasts sharply with methodological standardization expected in much research, where procedures are meant to be replicable across contexts.

This paper examines how three core orientations—relational co-creation, pluriversal attunement, and collective imagination—manifested in our arts-led co-creation across three contested coastal cases. These orientations resonate with broader aspirations in transdisciplinary research for relationality, pluriversal engagement, and transformative imagination (discussed in Sect. 4). Our focus is on what conditions enabled them, what constrained them, where they proved generative or elusive.

Methodology

The transdisciplinary setting

This research emerged from the Belmont Forum Project NOCRISES (‘Negotiating Ocean Conflicts Among Rivals for Sustainable and Equitable Solutions’), which brought together natural scientists, social scientists, and artists to examine governance challenges in contested coastal social-ecological systems (Glaser et al. 2023). Within this transdisciplinary project, the artistic strand was conceived not as a path to gather data on coastal conflicts but as an open-ended co-creative process with local artists, artisans, and

community members (what we came to define as arts-led co-creation).

This paper is co-authored by 9 of the collaborating artists across all cases, and the research scientists from the consortium. The lead author of this paper oversaw the artistic direction and approach across all cases (see Table 1 for list of all artists involved and roles). In each case, a “core artistic team” collaborated with local artists and artisans—all co-authors here. In collaboration with research partners, the lead artist defined the cases and groups to work with. The first move was to sensitize the artistic process with the project’s focus on conflicts in coastal areas. An early decision was taken to explore art as a potentially transformative force within conflict itself (Lederach 2005). However, it was also through the relationships developed with local collaborators that the specific focus of the co-creation process was defined.

Despite significant variation in media, scale, and dynamics, the three cases followed four distinct phases: (1) Invitation/Initiation, when lead artist and researchers defined the cases and initiated conversations with local organizations, artists, and community representatives; (2) Co-creation, the specific encounters where the artists collaborated in-site; (3) Circulation, when outcomes were shown to audiences;

Table 1 Artists and artisans involved in the co-creation process

Case	Person	Role	Medium/contribution
All cases	Diego Galafassi	Lead artist-researcher, artistic direction, process design, facilitation (Brazil, Hawai‘i), filmmaker, video editor, installation design (core team)	Video art with photographic superposition, Film, video, animation, participatory process design, Stop-motion animation, documentary filmmaking, multi-channel video installation
Project-wide	Margaréta Pinter	Research assistant	Documentation support
Bangladesh	Mahenaz Chowdhury	Artist, process design, facilitator, bilingual mediator (core team)	Workshop facilitation, translation
Bangladesh	Sara Kollberg	Photographer, installation design (core team)	Photography, photographic essay
Bangladesh	20 women artisans	Embroidery, knowledge weavers, co-creators	Nakshi embroidery, textile patches, collective quilts
Brazil	Manoel de Souza Ramos	Poet, process design, cultural knowledge holder (core team)	Poetry, oral narrative
Brazil	Leidiane Aranha do Nascimento Alves	Teacher, facilitator, participant	Drawing, animation support
Brazil	7–9 children (ages 8–14)	Animators, co-creators	Drawing, stop-motion animation
Brazil	Adult fisher-artisans (4–5)	Animators, co-creators	Drawing, maquette-making, animation
Hawai‘i	Pascale Terra Déau	Process design, interviews, co-creator (core team)	Interviews, on-site production
Hawai‘i	Shane Akoni Palact-Nelsen	Cultural practitioner, script writing, protocol guide (core team)	Oli (chanting), script development, cultural protocols
Hawai‘i	Uncle Chuck Leslie	Kupuna (elder), traditional knowledge holder	Net weaving, cultural practices, traditional knowledge
Hawai‘i	Krista Johnson	Community organizer, cultural practitioner	Script writing, community organizing, cultural knowledge
Hawai‘i	Kanani Enos	Director of Cultural and Community Affairs	Music, cultural education, community perspectives
Hawai‘i	Mina Elison, Miho Morinoue, Maki & Setsuko Morinoue	Community weavers, community liaison (Donkey Mill Art Center)	Facilitation, community connections, hosting

(4) Afterlife, the ways in which these co-creative processes evolved and generated other processes. Artistic methods and practices were defined during phases 1 and 2. They were defined through exploratory conversations with research leads and local collaborators to allow appropriate media and approaches to emerge from each context's specific dynamics.

Research observers were present during the workshops to document processes and provide independent field notes. In Bangladesh, three researchers observed and documented the embroidery workshop. In Brazil, four researchers served as observers during the animation workshop. The Hawai'i case did not include dedicated research observers due to its extended engagement format, though the core team maintained detailed field journals throughout.

Overview of cases

Cases were selected based on three criteria: established research relationships, clear contested coastal social-ecological dynamics where multiple actors held competing claims, and geographic and thematic diversity. The three cases span coastal displacement and energy development (Bangladesh), tourism versus traditional and cultural governance (Hawai'i), and pollution and fisheries (Brazil). An extended description of each project is in Annex A.

Bangladesh (Maheshkhali Island, 2022): Seven-day embroidery workshop with twenty women displaced by Matarbari coal plant construction to Ward 9 (the administrative district housing relocated families). Working with fabric patches and threads, participants created individual and collective textile pieces expressing displacement narratives.

The contemplative practice of stitching facilitated storytelling and emotional processing. Photographer SK created a photographic essay documenting the workshop and women's domestic spaces, attending to how textiles functioned in daily life. Lead artist DG produced a video work using superposition of SK's photographs to explore layers of displacement and resilience. Outcomes included a mixed-media installation (photographs, video, embroidered works) exhibited in Dhaka and Japan. The project evolved into Matarbari Tales social enterprise providing livelihoods for thirty artisans through traditional Nakshi embroidery integrated into contemporary products and contributed to political decisions preventing further displacement and impoverishment.

Participants were identified through YPSA's (Young Power in Social Action) existing community development work in Ward 9. Twenty women who had been displaced by Matarbari coal plant construction volunteered to participate following community meetings explaining the project. Selection prioritized women who had experience with traditional *Nakshi kantha* embroidery but was open to all interested participants regardless of prior artistic experience (Fig. 1).

Brazil (Ajuruteua Community 2022): Four-day stop-motion film animation workshop with intergenerational fishing community (children and adult fisher-artisans) facing environmental degradation from industrial fishing and pollution. Participants created animated sequences about community challenges, cultural practices, and desired futures using drawing, cut-outs, and found objects. The informal "oficina" atmosphere enabled participants to contribute according to their capacities and schedules. Local

Fig. 1 Bangladesh embroidery workshop. Photo SK



poet MR contributed verse incorporated into animations, weaving oral tradition into animated form. Teacher Lediane subsequently integrated animation into the school local curriculum. Follow-up workshops addressed invasive species, with the “Eat the Invader” strategy preparing for COP30 presentation. The resulting animation “As Maravilhas de Ajuruteua” (The Wonders of Ajuruteua) premiered at community screenings and other occasions.

Participants were recruited through EDUCAPESCA’s existing environmental education programs and the local school. Teacher Lediane invited students from her classes, resulting in intergenerational participation including children ages 8–14 and adult fisher-artisans. Participation was voluntary with parents providing consent for minors. The fluid workshop structure meant participants could join for individual sessions based on availability and interest (Fig. 2).

Hawai‘i (Kealakekua Bay, 2023): Extended documentary engagement with Indigenous practitioners and community members navigating tensions between sacred place protocols and visitor impacts at a culturally significant site. Rather than workshop format, the process involved three-week immersion with participation in cultural practices (net-making, heiau cleanup, chanting), relationship-building with knowledge holders including Uncle Chuck Leslie, Krista Johnson, Akoni Nelsen, and Kanani Enos, and collaborative creation of five-chapter non-linear video installation exploring “how to enter a storied place.” The installation (31 min total, 4 K resolution) featured observational documentary and participatory interviews with long unedited sections preserving the feeling of presence with knowledge holders. The Community Action Plan featured in the work was officially adopted by the state in October

2023. Exhibitions occurred at Donkey Mill Art Center and community events.

Collaboration developed through relationships initiated by research partners at the Donkey Mill Art Center. Key participants including Uncle Chuck Leslie, Akoni Nelsen, and Krista Johnson were approached based on their roles as cultural practitioners and community organizers already working on place-based stewardship. Participation was understood as contribution to community-led governance initiatives rather than research, with the artistic documentation supporting rather than directing community organizing efforts (Fig. 3).

Ethical considerations

The lead artist (lead author) worked as both artist-researcher and facilitator, collaborating closely with scientific partners and local artists in Bangladesh, Brazil, and Hawai‘i (Table 1). Originally from Brazil working for a Swedish institution and with a background in participatory theatre, film, animation, performance, and transdisciplinary processes informed the artistic direction. Collaboration dynamics with local organisations was shaped also through the experience of project scientists with local knowledge and long-term experience. All participants engaged through standardized consent protocols approved by ethics review boards at the University of Bremen and University of California, Santa Cruz. Consent forms (see Supplementary Material) specified the nature of co-creative engagement and explained how contributions might appear in exhibitions, publications, and other research outputs. Forms detailed rights to withdraw, data use limitations, and participant ownership of creative contributions. For minors in Brazil, parental consent was



Fig. 2 Still frame from animated film

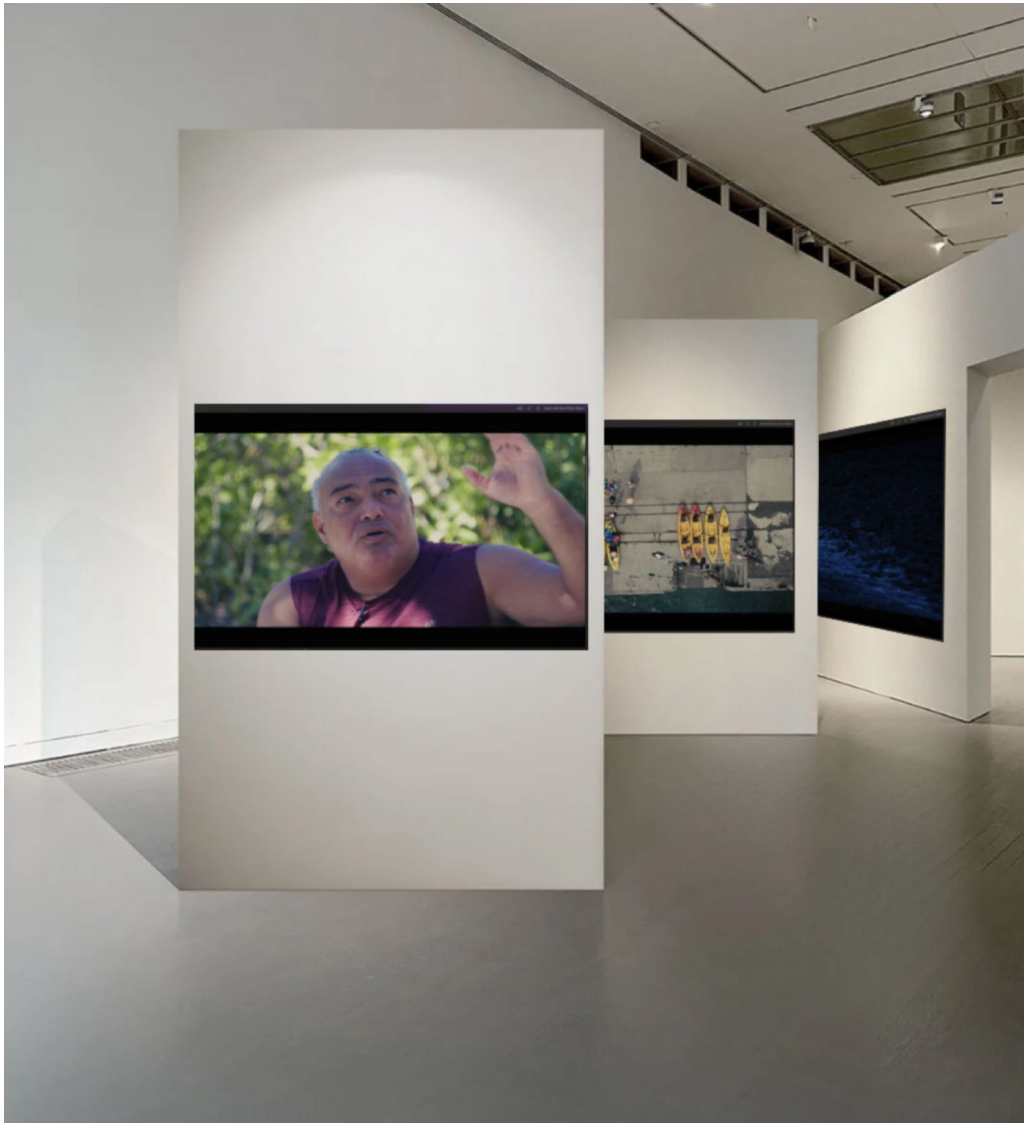


Fig. 3 Installation “Paths- Entering Kealakekua Bay” layout

obtained prior to participation, and all imagery involving children was reviewed with parents before public circulation. Importantly, the work was framed to participants as collaborative art-making rather than research, positioning community members as creative partners rather than data subjects.

In Hawai‘i the international team followed consultation with community leaders and attended to local protocol (taught by local collaborators), joining community activities in the spirit of reciprocity. The artists also opened up the collaboration by listening to how their work could be useful to the community. Hence the decision to develop a work in connection to the recently (2022) approved Community Action Plan, a culture-based governance document led by community organizers. Beyond the artists and cultural holders that collaborated in the resulting installation, this work

would not have found its path without the generous contribution and hosting of many from the Donkey Mill Arts community. Local partners and Indigenous collaborators held authority over representation of cultural knowledge. All footage and sounds were reviewed with participants for cultural appropriateness before any public sharing. The artists are infinitely grateful for the generous welcoming.

In Bangladesh, photographer SK work required navigating cultural norms around women’s visibility and domestic spaces. Women reviewed all photographs before any were included in exhibitions or publications, maintaining control over their own representation. The embroidery workshop created a rare social space where conservative norms usually prevented women from gathering, requiring sensitivity to how this space was documented and described. Here

cultural guidance by local NGO and research partners was important.

Participants reviewed and approved their representation in all public-facing materials. Workshops and documentation were conducted in local languages (Bangla in Bangladesh, Portuguese in Brazil, English in Hawai'i) to ensure full participation and minimize linguistic barriers. The lead artist's fluency in Portuguese and English, combined with bilingual capacities of core artistic team members, enabled direct communication. In Bangladesh, bilingual facilitator Mahenaz Chowdhury worked in both Bangla and English, ensuring women's voices were heard without mediation.

Reflexive comparative analysis

Our interpretive process followed reflexive comparative analysis, a hybrid of interpretive phenomenological analysis, collaborative autoethnography, and cross-case synthesis (Bieler et al. 2021; Finlay 2009; Tavory and Timmermans 2014). This approach aligns with traditions of reflective practice in the arts (Bolt and Barrett 2019), where meaning arises through cycles of doing and reflecting. We treat these orientations as ethical-aesthetic dispositions that shape how artists navigate transdisciplinary collaboration, not as evaluative criteria or replicable methods. The analysis thus reads as an interpretive narrative of how these orientations unfolded, what they enabled, and where they met limits.

Each case-study generated heterogeneous documentation: artist journals, field notes from research observers, audio and video recordings, photographs, artifacts, and written reflections by participants. This paper draws on multiple sources. Artist journals maintained by the lead artist and core team members provided ongoing field notes capturing observations, reflections, and process decisions. Research team members participated as observers in Bangladesh and Brazil, contributing independent observational notes. Participant reflections were collected in audio and video format. This multi-source documentation created the evidence base for comparative analysis.

At the end of each case, artist-researchers, local collaborators, and scientific partners undertook collective reflection sessions. Drawing on journals, field notes, and recordings, we traced recurring moments that felt generative or difficult. Each session focused on specific questions: What moments felt most generative? Where did we struggle? What patterns appeared across sites? What distinguished arts-led work from conventional research? Field notes and visual documentation served as prompts for discussion, allowing us to revisit specific moments and examine them collectively.

Three orientations emerged (Sect. 4) iteratively as recurring sensibilities across cases, refined through multiple rounds of collective articulation. Initial reflection identified

numerous themes: trust, time, protocols, materials, emergence, surprise, failure. Through comparative analysis, we recognized that these themes clustered into three interwoven orientations that captured ethical-aesthetic stances guiding practice. We discussed these orientations against a fourth case in the project (Fiji), where a different approach was used. This comparison helped clarify what conditions enable arts-led work. We include participant voices, but this analysis reflects our (co-authors') interpretive lens, not a systematic evaluation of participant experiences.

Arts-led co-creation in practice

Through reflexive analysis with collaborators across our three cases, three interwoven orientations crystallized as characterizing our arts-led co-creation: relational co-creation, pluriversal attunement, and collective imagination. These are not methods but cultivable sensibilities that manifested through practice in our work and that have strong resonance with ongoing debates across indigenous research methodologies, decolonial scholarship, performance studies, and sustainability science. Before presenting how they appeared in our process, as a means of definition, we briefly outline the literature surrounding them.

Pluriversal attunement In coastal contexts, communities may relate to fish, coral reefs, ancestors, and spirits as co-inhabitants within relational webs rather than as resources within management systems (Alvarez et al. 2025). Development agencies may view the same spaces as sites for extraction, tourism infrastructure, and economic growth. Scientists may approach them as ecosystems to be studied and managed. What constitutes legitimate knowledge, what entities exist, and how relationships function is ontologically grounded (Escobar 2017). Decolonial scholars argue that conflicts in coastal systems often arise from fundamentally different ontological positions about what exists, whose knowledge counts, and how relationships function (Mignolo 2000). With this, scholars have discussed the need to cultivate ontological agility and agency (Maggs and Robinson 2020), i.e. the ability to move between different ontological groundings without establishing hierarchy. There are ongoing debates on how to cultivate openness to multiple ontologies without forcing integration or synthesis.

Relationality centers how knowledge emerges *in* relationships rather than *through* them (as in participatory processes that treat relationships as a means to collect data). Shawn Wilson argues, while writing on indigenous research methods in 'Research is Ceremony' (Wilson 2008), that research emerges from a matrix of relationships and is fundamentally about reciprocity and accountability. Knowledge is not extracted from communities but co-created through

sustained relational engagement. Sustainability scholars have also been highlighting the importance of relationality (West et al. 2024). This orientation challenges instrumental participation models in sustainability science that treat relationships as means to research ends (Strand et al. 2024). Relational work demands temporal commitments and ethical stances often in tension with research structures—extended presence, following community rhythms, and allowing emergence rather than imposing predetermined project-specific timelines (Wilson 2008). In our discussion, we also link relationality with Bourriaud (1998) concept of relational aesthetics, which describes art as creating social interstices and fostering human relations rather than producing autonomous objects.

Collective imagination has emerged as a frontier topic in transformations towards sustainability (Moore and Milko-reit 2020). It is about sensing current conditions and seeing what they can become. For Appadurai (2013), culture matters for development, because it is in the capacity to aspire that people can alter the conditions of contested and unfair systems. As such, collective transformative imagination differs from the pragmatic use in research for the creation of “futures scenarios” (Cork et al. 2023). It centers community agency in defining what futures matter and begins to build them through creative practice (Galafassi 2018). Collective transformative imagination operates through materials, metaphors, and stories grounded in embodied experiences (Leavy 2015). It is about igniting the cultural resources to generate new pathways of development. Artistic processes function as spaces where alternatives become materially experienceable – not representing futures but beginning to enact them through making (Yusoff and Gabrys 2011; Trott et al. 2020).

Now we will turn towards the reflexive analysis of our cases. We organise it around three interwoven orientations which we treat as ethical-aesthetic dispositions. They shaped how we navigated collaboration, made decisions, and responded to emergence in contested settings. Importantly, they were made explicit through retrospective reflection rather than predetermined as research design. These orientations are simultaneously descriptive and aspirational. They describe what we observed unfolding but also what we strove toward, acknowledging that constraints, failures, and partial successes are inherent in this work. Our contribution is not claiming that these orientations always function this way, but providing grounded documentation of how they manifested in our contested coastal contexts, what enabled them, what constrained them, and what they made possible.

Relational co-creation

We stood at Kealakekua Bay facing the mountains. We met Akoni Nelsen that morning who guided us through the protocol: “This is the proper way to introduce ourselves to this place.” He taught us the words of an Oli, a traditional chant of introduction. Stumbling on the words, we sang it alongside a small group gathered for the Heiau (temple) cleanup that early morning (Table 2, Q1—artist journal). In that moment the two international artists coming to collaborate (DG, PTD), learned about the specific way of entering a place, i.e. with humility and reciprocity, asking permission from all beings that belong to this land. This experience captured what became central to our work in Hawai‘i—it was experiential learning in place with others (Table 2, Q1). So much so that the final installation became about “how to enter a storied place”, structured around the question of proper protocols for arrival.

In our reflexive analysis, we crystallized that our approach throughout all cases was prioritizing authentic relationships (to people and place) rather than treating them as means to gather information or even to trust-building for research purposes. This required an active choice to prioritize friendship, attentionality and care with people and organisations.

In Hawai‘i, we spent three weeks living within the community, allowing relationships to develop organically, attending to what was relevant and resonant at that moment. In Bangladesh, during an early workshop check-in, some women explained they had come for friendship (Table 2, Q2). This reoriented our understanding of the workshop’s purpose. Relational work extended beyond formal workshop spaces. In Hawai‘i, we participated in everyday activities, co-organized net-making sessions, attended community talks, shared meals. In Brazil, we went for walks together, drew on sand at beaches.

Relationships with organisations were critical for artistic engagement. In Bangladesh, access to communities was mediated by a local NGO and in Hawai‘i, the Donkey Mill Art Center was critical in introducing the international artists to the community and local artists. In Brazil, we worked with a community where Brazilian research partners had longstanding relationships.

A central part of relational co-creation was to be open to be changed by those we worked with. In Bangladesh, we arrived with intentions of experimental stitching practice. However, participants prioritized friendship and developing craft skills that later became a possibility for a new economy. We followed participant’s priorities (Table 2, Q4), asking ourselves what would be “useful and relevant here” in their terms. As we will describe later, this reorientation led to a social enterprise trajectory we had not anticipated (Table 2, Q8).

Table 2 Evidence matrix

Quote ID	Case	Orientation	Speaker/source	Quote text	What it represents
Q1	Hawai'i	4.1 Relational	Krista Johnson	The real work happened in the informal moments—cleaning the heiau together, making nets, sitting and talking story. That's when we get to develop the relations needed, so you can see what matters here	Relationality through everyday co-presence rather than formal encounters
Q2	Bangladesh	4.1 Relational	Workshop participant	This was the first time we could sit together like this and talk freely. In our homes, there is no time, no space for gathering with other women. It was like a found my sister here	Social space creation in restrictive contexts
Q4	Bangladesh	4.1 Relational	Mahenaz Chowdhury (facilitator)	We had to keep reminding ourselves and participants—this isn't about teaching techniques. It's about creating space where women's voices and creativity are valued, where relationships can form	Explicit prioritization of relationship over skill acquisition
Q6	Brazil	4.1 Relational	Manoel de Souza Ramos	It seems we have only started here	
Q7	Brazil	4.1 Relational	Marion Glaser (observer field notes)	Many things happening in parallel. Main facilitator stretched—filming, facilitating, translating, documenting. Impossible to hold everyone equally	Resource constraints and facilitator overload
Q8	Bangladesh	4.1 Relational	Workshop participant (follow-up)	After the workshop, we kept meeting. We realized—we could make beautiful things together and sell them. This could be our livelihood, not just art	Relationships catalyzing entrepreneurial imagination
Q10	Hawai'i	4.2 Pluriversal	Field notes (net-making workshop)	Uncle Chuck barely spoke while demonstrating net-making. His hands moved in patterns learned from his grandfather. Watching, trying, failing, trying again—this was the teaching. The net holds knowledge the words cannot	Embodied knowledge transmission through material practice
Q11	Bangladesh	4.2 Pluriversal	Workshop participant	Stitching together, we didn't need to explain everything with words	Non-verbal communication through shared making
Q12	Bangladesh	4.2 Pluriversal	Sara Kollberg (photographer, debrief)	It is important to let the artists do they work	
Q14	Bangladesh	4.2 Pluriversal	Workshop participant	You asked what we wanted to create, not what we had lost. That let us talk about hope, not just suffering	Active reframing toward resilience
Q15	Brazil	4.2 Pluriversal	Workshop observer	Different people found different ways in. Some children drew, others animated, others voiced characters. Adults built models or told stories. The variety meant everyone could contribute something	Multiple aesthetic modalities enabling participation
Q16	Bangladesh	4.2 Pluriversal	Sara Kollberg (photographer, debrief)	Photographing their homes made me see a deeper layer of what these fabrics meant to them	Material engagements
Q21	Bangladesh	4.3 Imagination	Social enterprise participant (follow-up, months later)	The workshop showed us we could make things people value. Now thirty of us work together making embroidered products. We have income, but more than that—we have purpose and recognition	Material prefiguration leading to economic infrastructure
Q22	Brazil	4.3 Imagination	Lediane (teacher, follow-up)	The children can see this as way to tell our community's story, to imagine our future. Animation can be a tool we use across subjects—environment, language, social studies	Imagination embedded in pedagogical infrastructure
Q23	Brazil	4.2 Pluriversal	Roberta Barbosa	here conflict means violence, that is not very creative	Reframing from conflict to cultural protocols
Q24	Brazil	Pluriversal	Marion Glaser (observer field notes)	I did not know about this conflict	Identifying new conflicts
Q25	Brazil	Pluriversal	Diego Galafassi	In Brazil a participant asked during a walk to the local beach "If nature were our body, what would be the lungs?"; this later became part of the animated film	

This sometimes required abandoning research agendas to prioritize connection. In Brazil, we shifted from a fixed agenda to an open “oficina” model, allowing participants to come and go according to their rhythms. Children arrived earlier than scheduled, adults joined when work permitted. We followed community rhythms rather than imposing research timelines.

Relations to place The creative and aesthetic practices became vehicles for relating to the social-ecological realities we were entering. Taking photographs, recording sounds, listening to stories where landscape intertwined with memory and future imagination. These were ways to enter in contact with the mangroves (Brazil), the sea and mountains (Hawai’i), the housing environment (Bangladesh). In Brazil, we collaborated with poet Manoel de Souza Ramos whose cordel poetry tradition connected people to coastal landscapes and livelihoods. His verse, integrated into the animation, wove oral tradition into animated form. Mangrove recordings, beach walks, attention to where birds landed—all were guided by community members’ embodied place knowledge.

Generative outcomes Despite constraints, relational co-creation proved generative beyond immediate workshop engagements. In Bangladesh, relationships catalyzed entrepreneurial imagination that materialized as Matarbari Tales social enterprise (WHF 2026). Women kept meeting after the workshop, realizing they could create valued work together (Table 2, Q8). The social enterprise now employs thirty artisans integrating traditional nakshi embroidery designs into contemporary products, providing both income and recognition (Table 2, Q21). In Brazil, teacher Leidiane Aranha Nascimento continued conducting animation workshops as part of school curriculum. The pedagogical infrastructure seeded through initial relational work continues growing as children teach each other and create films about their community (Table 2, Q22). Digital infrastructure through WhatsApp enabled ongoing connection, with children asking to stay in touch and sharing films they were working on. These generative outcomes reveal how relational work catalyzes initiatives participants carry forward, though such continuation depends on local capacity and resources existing beyond the initial artistic engagement.

Limitations Key challenges were time and resource constraints. In Brazil, four days felt too short (Table 2, Q6). LK continued working with the community after we left, and we maintained a WhatsApp group to share ongoing work. Although relationality is not only about the length of time (but also about the quality of attention and the protocols for approach), the groups worked in tight timeframes and limited resources. Facilitators mentioned the difficulty of holding relational work when stretched over many activities (Table 2, Q7). Holding everyone equally proved impossible

when overloaded. This approach did not always work—some participants who contributed meaningfully dropped from the process. This reveals how relationality is labor-intensive and typically under-resourced in research projects. Cultural dynamics, gender norms, religious contexts, and existing community hierarchies all mediated relational possibilities in ways difficult to gauge.

Pluriversal attunement

Where relational knowing centered connections with people and places, pluriversal attunement describes an orientation toward openness to plural ways of being. Together they resemble anthropologist Tim Ingold’s notion of ‘correspondence’—the attentive movement of life between people and things and how they respond to one another as they go along together (Ingold 2020).

Attunement began by deliberately de-centering the research framing on contested coastal issues that had initiated and funded the process. Rather than integrating different knowledge traditions (science, art, communities) into a unified framework or establishing hierarchy among them, we let the creative process hold multiple ways of knowing simultaneously.

In Brazil, instead of using “conflict” language (that defined the research framing) (Table 2, Q23), we used other articulations such “what gives life” and “what needs more life” in this community. This reframed contestation as questions about animation and vitality rather than problems to solve. We also used discussions about the story structure of the film (e.g. three act structure—setup, confrontation, resolution), as a way to invite contested issues into the fold. Despite these “indirect” strategies, many conflicts emerged in conversations including one that researchers were not aware of (Table 2, Q24).

In Bangladesh, participants actively chose to move from trauma focus toward resilience and strength. They wanted to talk about what they were creating, not what they had lost through displacement (Table 2, Q14). Attunement to their framing of why they had chosen to attend required suspending the workshop activities and allow space for participants to shape the direction of the work.

However, attunement to local framings created tensions within the research team. The perceived lack of procedural steps and the inherent emergent character was challenged. One artist felt scientists needed to give space for artistic process even when that process remained unclear (Table 2, Q12). These tensions reveal how attunement to pluriversal ontologies can conflict with research expectations. They point to the importance of pre-emptive agreements about domains where artistic and community judgment holds authority.

Attunement through making Shared material practices were central. In Hawai‘i, learning net-making alongside master Uncle Chuck Leslie exposed international artists to knowledge held in gesture and rhythm rather than verbal instruction (Table 2, Q10). Making nets together, beyond the sharing of skills, was about glimpsing a way of seeing and living in the world, learning how knowledge lives in craft, how traditions of observation (kilokilo) and alignment (pono) are carried in embodied practice.

In Bangladesh, stitching together enabled communication transcending words (Table 2, Q11). Artisans stitched together in groups of four sharing single quilts, bodies moving as a unit, turning and adjusting to each other (Table 2, Q11). The slowness and rhythmic quality opened contemplative space where stories were learned and shared. At points artisans would break into improvised songs expressing displacement emotions. The process of making itself opened up worlds and enabled deep listening.

Attunement unfolded through diverse creative modalities In Bangladesh, photographer SK documented how women used textiles in domestic spaces, attending to visual details and cultural patterns (Table 2, Q16). Textile and thread color selection became a site for discussing symbolic meanings. In Brazil, poet Manoel Ramos cordel oral tradition was integrated into animation. Children drew on sand, adults built maquetes (scale models), contemplative questions generated metaphorical responses. Workshop observers noted how different modalities meant everyone could find ways to contribute according to their capacities (Table 2, Q15). Mixed-media installation, animation, textile arts emerged through the process of attunement itself.

Following threads We could not define a priori what format artworks would take. The practice was one of following aesthetic curiosity and attending to what emerged as significant. Questions, provocations, possibilities would emerge (see Table 2Q25), and the co-creative process emerged by following them. However, we acknowledge that the core artistic team in each case held significant decision power about what to follow. Thinking pro-actively about decision-making in these spaces can be helpful.

Circulation of pluriversal artworks Attunement possibilities extended through artwork circulation beyond originating contexts. Bangladesh embroidered pieces moved from a community workshop to a Dhaka exhibition to Japan exhibition to social enterprise products. Multiple audiences encountered pluriversal perspectives embedded in the work—displacement narratives, resilience, women’s creative agency, traditional craft reimaged. In Brazil, animation was prepared for COP30 presentation in Belém, carrying community voices and ecological knowledge into international climate negotiations. The installation from Hawai‘i is planned to be shown in hotels and other

tourist-gathering venues. Artworks became vehicles for pluriversal attunement beyond workshop contexts, though the question of who encountered them and impacts is beyond our scope.

Limitations Despite these efforts, power hierarchies, religious divisions, and cultural norms persisted. In Bangladesh, what could be spoken was shaped by gender norms and religious contexts that workshops could not dissolve. In Brazil, generational gaps meant children and adults struggled to find shared purpose at times. In Hawai‘i, although the resulting installation is co-created with native Hawaiian collaborators, the artworks provide only a very small glimpse to depth of stories of the Kealakekua Bay. Screening this work in tourist venues may also be challenging as it may counter some of the interests of touristic operators. Further, despite a co-creative process and a final ‘sign-off’ by all involved, the lead artist still held authority in editing material, selecting what to include in exhibitions, and influencing final presentations. This required constant reflexivity about whose perspectives were being centered, whose voices were being amplified, and what remained outside the frame. The problem was both about depth—we could not address all layers of contested issues within project timeframes—and inclusion. We did not engage all stakeholders involved in coastal conflicts, working primarily with communities experiencing impacts rather than those making development decisions or holding political power.

Collective imagination

Where relationality and attunement grounded processes to place, and opened space for multiple ontologies to emerge, collective imagination explored what could be. This orientation manifested through materials, stories, and prefigurative practice-making futures materially experienceable rather than abstractly envisioned.

Materials and metaphors The process of working with fabrics, animation, cultural practices and filmmaking stimulated new metaphors and reframings. Materials were not neutral tools but generative sites where alternatives became thinkable and palpable. In Bangladesh, participants tore fabric and then mended it through stitching, reflecting on thoughts and feelings. The act of repair became rehearsal for thinking about restoration and possible futures. Material practice grounded imagination in embodied experience.

In Brazil, animation functioned as a medium for temporal imagination. One adult participant explained, “Animation can show our children what the mangrove used to be, what it could be again. It makes time visible—the growing, the loss, the possible return”. Drawing ecological processes frame by frame allowed children to imagine transformation

unfolding over time. The medium itself enabled imagining ecological recovery and possible futures.

Making stories and finding questions Collective imagination manifested in making stories about desired futures situated in place. In Brazil, the final animation scene featured children recording their voices inside a fishing boat pulled up on the beach. The question posed was, “What future do you desire?” Their voices, captured against the sound of waves, articulated hopes: “clean water”, “thriving mangroves”, “abundant fishing”. Future visioning was grounded in the lifeworld participants knew—the boat, the beach, the sounds and smells of their coastal home.

In Hawai‘i, the installation emerged through the question “how to enter a storied place?” This allowed exploring tensions around tourism and cultural preservation. The non-linear structure invited audiences to enter through different chapters, following their own questions, without being directed toward singular perspective.

Prefigurative futures Creative work also opened possibilities for participants to reimagine themselves and reflect on their self-understanding. In Bangladesh, women who had been displaced and lost traditional livelihoods were able to test out “being artisans” through the workshop. After the Dhaka exhibition where their work was displayed alongside other artists, one artisan reflected, “I never thought people would want to see our work, our stories. When visitors stood looking at what we made, I realized—we are artists. Our experience has value”. Later, discussing the social enterprise possibility, another artisan said, “We can do a whole economy on this!”.

The workshop created a rare space where women could gather, create together, and have their work valued in a context where conservative norms usually prevented such gathering. Women developed relationships, aspirations, and alliances for making the entrepreneurial vision happen. This seeded something much larger that continues unfolding. Matarbari Tales social enterprise generated an economic path for 20 artisans integrating traditional embroidery designs into contemporary products. Economic infrastructure materialized from imaginative rehearsal—women who had lost traditional roles through displacement found pathways to a new economy through creative practice (Table 2, Q21).

In Brazil, children wanted to make more films independently. Teacher Lediane integrated animation across school subjects—environment, language, social studies—also as a way to imagine community’s stories (Table 2, Q22). We wondered with teacher Lediane whether the creative workshops could ignite a different pedagogy—one where children see themselves as storytellers and knowledge-makers about their environments. Further studies would be needed to follow-up on the ramifications of the work within the

school and community. However, the integration of techniques across the curriculum and the further workshops that occurred leading to work presented at COP30 are positive signs of the prefigurative power of the work.

In Hawai‘i, the group imagined tourists engaging with the installation before coming to the bay. What if proper entry protocols could be learned through artwork? What if visitors understood the sacredness of place before arriving? The Community Action Plan featured in the installation was officially adopted by the state in October 2023. However, as of today, the installation has not reached large numbers. This remains a limitation: the imaginative work of creating alternative protocols for tourism exists, but scaling to reach the thousands who visit annually has not yet occurred.

Limitations The ways Bangladesh and Brazil took off with generative potential were not anticipated by the original project. These continuations were possible because of other funding sources and local initiatives that emerged after our engagement. Ideally, such processes should be iterative, returning multiple times and aiming to engage broader groups. We did not engage all sides of the contested issues—working primarily with communities experiencing displacement, environmental degradation, and tourism impacts rather than with developers, policy-makers, or those benefiting from extractive economies. This shapes what collective imagination could accomplish. The value lies in creating openings and beginnings, but we must acknowledge whose imagination was cultivated and whose remained outside these processes.

Arts-led orientations in transdisciplinary practice

Serendipity and emergence could have been included as further orientations but they appear across those we discussed so far. Throughout the process, we maintained an inclination towards embracing what happened and allowed space for emergence, seizing opportunities to follow curiosity and nurturing a sense of joy (Brown 2017). Our analysis reveals what pursuing relational co-creation, pluriversal attunement, and collective imagination actually looked like in these contested coastal settings. It was complex, partial, sometimes uneasy and complicated, constrained by resources and shaped profoundly by contexts. Yet it proved generative, catalyzing social enterprises, pedagogical innovations, and ongoing initiatives.

These orientations are entwined. Relationality and attunement form a process of open-ended correspondence (Ingold 2020), while collective imagination builds from relational foundations to rehearse alternatives. In this section we explore what this means for transdisciplinary sustainability

science, first for process design, then for artistic practice, before examining some of the persistent challenges these orientations cannot resolve alone.

On designing for relational co-creation If transdisciplinary work is to honor relational co-creation, structures need to reflect it. Funding must resource relational labor adequately, recognizing relationship-building is research work, not preliminary activity (Heras et al. 2021). Evaluation frameworks must recognize process as outcome, not only measure policy impacts or behavior change (Vervoort et al. 2024; Strand et al. 2024).

By positioning attentionality, and creative expression as valid ways of knowing, arts-led work can redistribute epistemic authority and validate emotional, creative and embodied experience as legitimate knowledge. Participant who reflected that finding “sisters” was “more valuable than learning stitching techniques articulates this distinction clearly”. Relationships generated insights about displacement, resilience, and community solidarity that formal interviews or surveys could not access. Much of what emerged through our processes resists the kind of clear articulation that academic outputs typically demand. Tamas (2018) argues for protecting such knowledge as a form of intellectual biodiversity, i.e. not everything worth knowing can be distilled into communicable findings, and the pressure to do so risks flattening precisely what makes arts-led inquiry distinctive.

This suggests transdisciplinary practice must negotiate clear agreements about domains where artistic judgment and processes have authority, about how conflicts between scientific and creative logics will be addressed, and about what flexibility exists to follow emergence. This negotiation should happen early and explicitly rather than allowing tensions to emerge implicitly during collaboration. When artistic reframing abandons research concepts that prove alienating, scientific partners must be prepared to follow rather than insist on original frames.

This tension surfaced concretely in our own process. When conversations between a local artist-collaborator and displaced women in Bangladesh yielded rich material, we faced a question that initially appeared procedural: should these conversations be transcribed and analyzed as data? But the disagreement revealed something more fundamental, i.e. whether we were conducting interviews through artistic means or building relationships through artistic practice. These are not the same activity, and the distinction matters. If the purpose of arts-led work is relational—developing a connection with the people we work with—then treating what emerges in that relational space as data to be extracted and analyzed undermines the very orientation that made the work possible. This does not mean arts-led processes generate no knowledge. It means the knowledge is of

a different kind: embedded in the relationship itself, in what becomes possible between people, rather than in what can be captured from them. The growing interest in arts-based research methods risks reproducing extractive logics in more aesthetically refined forms, i.e. devising more nuanced ways to access people’s emotional lives so that researchers can write about them. Arts-led work, as we experienced it, pushes in the opposite direction.

Navigating pluriversal attunement We argue that more attention to contested coastal issues as deriving from ontological pluralism is necessary. As our collaborator in Hawai’i stated, “years of family disputes were rooted in divergent ways of telling the story of this place”. What appears as social conflict may reflect ontological difference about how place, ancestry, and relationship function.

Attuning to pluriversal perspectives is difficult. It involves suspending researchers’ assumptions about what constitutes valid knowledge, proper methods, and desirable outcomes. In an arts-led process, pluriversal attunement can happen through storytelling and aesthetic practice—making alongside, observing with sensory attention, following local protocols and rhythms, openness to learn and be changed. It opened conversational pathways that research language on conflicts could have foreclosed.

However, connecting creative insights to governance action remains challenging, as decision-making systems often lack mechanisms for incorporating aesthetic and relational knowledge (Heines et al. 2024; Strand et al. 2022). This points to the need for institutional innovation in how knowledge enters policy.

Attunement remained fragile and partial in our work. Contested issues are deeply layered, and we could not reach all levels. Yet the work demonstrated that multiple worlds can be held simultaneously without forcing synthesis. The Hawai’i installation’s non-linear structure, for instance, invites audiences to enter through different chapters, following their own questions, without being directed toward one singular perspective. The value lies in creating such openings rather than resolving all tensions.

Cultivating collective imagination Transformation depends on embodied rehearsal spaces where futures are materially prefigured rather than only cognitively envisioned—Boal used to speak about the Theatre of the Oppressed as a “rehearsal for reality” (Boal 1998, 2006). When women mended torn fabric while reflecting on repair, when children animated mangroves growing frame by frame, when participants voiced desires inside fishing boats, imagination became tangible and actionable. The materialization of imagination in social enterprises, pedagogical infrastructure shows how creative work can generate lasting structures. The Bangladesh artisan who explained “the workshop showed us we could make things people value”

articulated how material imagination opened economic possibilities they then pursued.

Collective imagination manifested through working with materials and creative media to stimulate new possibilities. Prefigurative practice meant enacting desired futures through the making itself. Conventional research produces scenarios and recommendations but rarely creates spaces where communities can feel, try, and begin enacting alternatives (Vervoort et al. 2024).

For future work, this suggests designing for prefigurative possibility—creating conditions where imaginative rehearsal can materialize into ongoing structures. This means considering what infrastructure enables continuation beyond initial engagement. It also means securing resources for continuation before projects end rather than hoping generative work will find support later.

Does transdisciplinarity need the arts? What does this process reveal about conflicts and contested settings? If we approach contested coastal settings through an ontological lens—recognizing that conflicts often arise from fundamentally different understanding of the nature of the contested issues—then arts-led approaches offer distinctive capacities. What surfaced through our work was not conflict resolution but something more unexpected—the generative potential within contestation itself. The contact between different ontologies proved creative rather than frictional. Consider how the Bangladesh social enterprise materialized: it emerged through the encounter between researchers’ framing of conflict, artisans’ experiences of loss and knowledge of traditional craft. The coming together of these realities generated an economic pathway that honored traditional practice while creating contemporary livelihoods. Similarly, in Brazil, the pedagogical possibilities emerged from contact between children’s ecological perspective, adults’ fishing practices, researchers’ environmental concerns, and film animation’s temporalities. These outcomes were not predetermined solutions but emergent possibilities activated by holding differences.

We posit the true potential of arts-led process is not necessarily to produce knowledge about the contested systems from outside, but to reveal and activate generative potentials already present in the encounter of plural worlds. What appears as conflict from a problem-solving stance appears as creative possibility from an arts-led orientation. Contestation becomes not friction to reduce but creative potential to cultivate.

This insight suggests what transdisciplinary sustainability science needs from arts-led approaches. Rather than methods for stakeholder engagement or conflict resolution, they offer ways of engaging fundamentally different epistemological and ontological dimensions (Maggs and Robinson 2020): holding pluriversal contexts without demanding

synthesis, enacting prefigurative possibilities rather than roadmap plans, and validating emergent transformation over predetermined outcomes.

Does the arts need transdisciplinarity? Why not simply make art independently? The question is both pragmatic and political. Pragmatically, in times of diminishing arts funding and repeated calls for artists to step into leadership roles in knowledge for transformations (Fazey et al. 2020), transdisciplinary spaces offer important infrastructure—funding, links to communities through research partnerships, institutional legitimacy that opens governance pathways often closed to independent artistic practice. Politically, arts-led work within these spaces can complicate and challenge what counts as legitimate knowledge in sustainability science. When artists hold authority to reshape inquiry rather than illustrate findings, when aesthetic sensibility guides collaborative framing, when relational depth and embodied knowing are validated as epistemological contributions rather than methodological supplements, new protocols emerge for collaborative work across epistemological traditions (Strand et al. 2024; Maggs and Robinson 2020). This is not simply the arts serving science, but rather, they are transforming what science can become in transdisciplinary contexts. Artists risk instrumentalization when creative methods serve research agendas rather than reshaping them (Heines et al. 2024).

The challenges we found with an arts-led orientation—constrained timeframes, under-resourced relational labor, persistent power hierarchies, incomplete stakeholder engagement—is mirrored across studies involving arts in sustainability contexts (Heras et al. 2021; Strand et al. 2024). We contend that understanding the specificity of arts-led processes, and the distinctive knowledge that artists bring into collaborative inquiry, is a foundational step to create the conditions under which the work proves generative for both artistic practice and sustainability science.

Conclusion

Through reflexive analysis of arts-led engagements in Bangladesh, Brazil, and Hawai‘i, we identified four interwoven orientations that characterized our co-creation work. We discussed how these orientations unfolded through specific practices to enable (and at times limit) distinctive forms of knowledge co-creation. Relational co-creation establishes conditions of openness, reciprocity, and connection while pluriversal attunement describes the dynamics of attending to multiple ways of being through artistic means. Collective imagination builds from relational foundations to co-create what could be, using material practice to rehearse alternative futures. Importantly, these orientations are not

prescribed procedures, but cultivable sensibilities that can guide navigation of co-creation.

By opening up the co-creative process as a site of inquiry and discussing its dynamics and challenges, we seek to stimulate other transdisciplinary practitioners to share similar accounts. This is necessary to mitigate epistemic injustices in knowledge co-production and to search for comprehensive transdisciplinarity. We have shown how artists can lead processes that augment and support transdisciplinary sustainability science in its aspirations of moving beyond knowledge integration toward relational approaches in pluriversal and prefigurative spaces.

The work we document created temporary spaces of “ontological encounters”, where displaced women’s creativity gained recognition, where children learned ecological relationships through animation, where Indigenous protocols shape artistic endeavour. These openings matter not because they resolved conflicts or achieved full transformation but because they demonstrated the relevance of arts-led approaches to pluriversal knowing, that alternatives can be materially rehearsed, and that relationality generates insights that extraction cannot access. In contested settings where technical solutions prove insufficient and stakeholder dialogues reproduce hierarchies, arts-led orientations offer pathways for engagement that honor complexity, hold difference, and begin enacting futures worth pursuing. The challenge is creating conditions that allow these orientations to unfold rather than demanding their results on timelines and terms that foreclose the very emergence they require.

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Declaration of generative AI and AI-assisted technologies in the writing process During the preparation of this work the authors used Claude Sonnet 3.5 (Anthropic) in order to improve readability and language of the manuscript. The same tool was used to standardize and format information in Supplementary Materials S1, S2, and S3 by extracting and reorganizing content from project reports into a consistent template structure provided by the authors. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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