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## We're Not Migrating Yet: Engaging Children's Geographies and Learning with Lands and Waters

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# We're Not Migrating Yet: Engaging Children's Geographies and Learning with Lands and Waters

Anna Lees and Megan Bang

Considering the places—the geographies—of children's learning, of human learning, is fundamental to seriously considering not only the “whats,” or the content of learning, but perhaps more importantly, the “whys,” or the purpose of learning, and the “hows,” or the process of learning and the overall goals of education. That is, the values and pedagogical approaches in children's learning must be engaged as thoughtfully and intentionally as content understandings often are. The whys and hows of education construct what is deemed relevant and irrelevant, as well as what is rendered invisible to the “here and now” of children's lives (Apple, 2004; Iorio & Parnell, 2015; Nxumalo et al., 2011; Tesar, 2015). For us, the here and now includes not only the present reality of human communities (Mitchell, 1934/1991), but also the ecological place in which communities have come to be. Indeed, the two are co-constructed. We argue in our work that issues of place and relevancy to the here and now are always intertwined with constructions of relations between human worlds and the more-than-human natural world, as well as with the ways in which knowledge systems, culture, history, and power shape these constructions. We suggest that learning environments are always implicitly or explicitly constructing and teaching nature-culture relations and that more intentional constructions are necessary for cultivating culturally thriving, just, and sustainable futures.

In our work, we have focused on the design of learning environments that aim to support the navigation of Indigenous children through both Indigenous and western<sup>1</sup> ways of knowing. A central way of beginning this endeavor is through core models of relations between humans and the natural world. Scholars and communities have demonstrated that there tend to be two distinct models that impact knowledge, knowledge organization, reasoning, decision-making, and values. One model positions humans as distinct or “*apart from*” the natural world and often constructs more-than-human life as not having intelligent or communicative capacities. This model is often associated with western knowledge systems and tends to construct the idea that humans are a comparatively superior life form (Kimerer, 2013; Medin & Bang, 2014; Simmard, 2021). The second model positions humans as “*a part of*” and in kin relations with the rest of the natural world; it often sees more-than-human life as having personhood with a wide range of intelligent and communicative capacities and views humans as a dependent life form, like all life forms. This model is often associated with Indigenous knowledge systems (Kimerer, 2013; Medin & Bang, 2014; Simmard, 2021). Of course, these models are not absolutes, and increasingly, in some advanced disciplines, the intertwining of human and more-than-human life is central. Further, in fields like ecology and botany and in some evolutionary fields, there are paradigmatic shifts in understanding unfolding with respect to the intelligence and capacities of plants and to cross-species cooperation (Kimmerer, 2013; Simard, 2021).

However, thus far in education, children's geographies have largely been constructed within particular cultural paradigms of human relationships in which human beings are separate and distinct from the natural world (Medin & Bang, 2014; Washinawatok et al., 2017). Mitchell (1934/1991) made important

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1 While the word “western” is typically capitalized when referring to a region or to the political, social, or cultural activities of a region, we choose not to capitalize western and resist other style guidelines that minimize Indigenous futures and continue efforts of colonization.

contributions to the ways in which children learn geographies by including human communities as part of children's studies and expanding the learning environment beyond the classroom walls. We further these efforts by asserting the essential role of lands, waters, and more-than-human beings in children's geographies. These shifts in base relational construals that assert a separation of humans from their more-than-human relations are intertwined with socio-political developments, particularly in settler colonial nations like the United States, both through the geographic structuring of lives and the forms of knowledge such relational construals facilitate. Settler colonialism is a distinct type of colonialism that functions through the violent erasure and dispossession of Indigenous populations and the acquisition (theft) of land as property to form a new settler society. Over time, the new settler society develops a distinctive identity and sovereignty (e.g., American), followed by the establishment of settler lifeways (including knowledge systems) as the normative benchmark from which to build social systems, including education (Wolfe, 2006). Settler colonialism takes place in today's education through varying aspects of school design, including curriculum, instruction, assessment, behavioral expectations, and the segregation of children by age, away from family and community (Brayboy & Lomawaima, 2018; Sabzalian, 2019). This is made visible in the exclusion of Indigenous peoples (e.g., Shear et al., 2015) and in the assimilationist design of western content and instruction in the majority of school curricula that makes western knowledge systems the norm and determines what is allowed or benchmarked within school-based learning.

A core unfolding in US settler colonial contexts is the embedding of "apart from" models of human-nature relations through the transition of children's geographies from lands, waters, and communities to a primarily indoor and stationary environment in schools. Containing children indoors, in classroom-based settings for the majority of their waking hours, premises learning through a design that we see as a disservice to all children. Indeed, over the past 50+ years, children have been spending less and less time outdoors. While the extraction of childhood from natural places to indoor settings is bad for all children, the compulsory schooling movement was deliberately designed to harm Indigenous children by removing them from their families and communities and placing them in schools (boarding schools) and other forms of US-based educational institutions. This separation of children from their families and from their lands and waters interrupts intergenerational systems of education and was intended to force children's adoption of colonial languages and knowledge systems (Lomawaima & McCarty, 2006). This forced separation of children from lands, waters, and community and forced assimilation of western colonial knowledge systems remains in schooling today. Most of children's school-based learning takes place indoors, using human-made materials and texts; for example, having children learn about the water cycle through representations on paper, on websites, or in books, rather than in connection to the actual watershed through outdoor engagements, observations, and wonderings. Nor do most children learn that there are multiple paradigms through which to understand the communicative capacities of more-than-human beings. We suggest that the persistence (and legislation) of indoor-based learning largely reinforces and facilitates humans as apart from the natural world, rendering children's geographies centered in coloniality.

Our work has been about returning children's learning to lands and waters, in and with intergenerational community, to remake forms of education in which children's geographies are defined by Indigenous ways of knowing and being, not by colonial paradigms of teaching and learning. We do so by designing learning environments, alongside community members, with lands, waters, and other more-than-human relations, where children's development can be fostered within Indigenous axiologies (values), ontologies (ways of being), and epistemologies (knowledge systems). These efforts

disrupt human supremacy and epistemicide (Paraskeva, 2016), the eradication of knowledge systems for colonial advancement, within education programming and instead value opportunities where children grow their relationships with more-than-human beings in a manner that recognizes the personhood of those beings. This work also engages Indigenous land- and water-based education (Bang et al., 2014; Calderon, 2014; Deloria & Wildcat, 2001; Simpson, 2017) that both critiques and extends the work of critical place-based education (e.g., Gruenewald, 2003; Smith & Sobel, 2010; Sobel, 2004) by addressing the ways in which criticality can fail to disrupt the perpetuation of western knowledge systems and settler colonialism. Indigenous land- and water-based education is further grounded in the recognition that all lands are Indigenous lands and centers or cultivates enacting resurgence in the everyday (Corntassel, 2012; Simpson, 2017). The examples offered in this article highlight children's interactions with more-than-human relatives and depict Indigenous education as an act of resurgence that enacts our Indigenous lifeways for our own purposes on our own terms in the here and now.

We come together in this writing as Anishinaabekwe scholars, teachers, sisters, mothers, aunties, and grandmothers. Anna is a Waganakasing Odawa descendent with Scottish, German, African American, Italian, and English ancestry. She spent her early career as a teacher in infant, preschool, and kindergarten classrooms, and has continued working with early childhood teachers to (re)imagine curricular design and teacher education that engage land and water relations within the confines of school-based learning. Megan is Ojibwe and Italian descent. She spent her early career as a teacher in a preschool classroom. She went on to teach at elementary, middle, and high school levels before becoming a researcher and teacher educator. She studies culture, learning, and identity development, with a particular focus on cross-cultural cognition about the natural world. Further, she designs innovative STEAM learning environments in efforts to develop forms of education that cultivate just, thriving, and sustainable futures. Anna and Megan collaborate in an Indigenous STEAM program (featured in this article), where we further possibilities of Indigenous education for participating children and families and for our own theorizing about and enactment of land- and water- education as an act of Indigenous resurgence and decolonization.

## CONTEXT: INDIGENOUS STEAM

This paper emerges from an Indigenous science, technology, engineering, arts, and mathematics (ISTEAM) program that fosters education in and with lands and waters in intergenerational arrangements, serving learners from first to 12th grade. ISTEAM is a community-based design research project (CBDR), co-designed by Indigenous children, families, communities, scientists, artists, and educational scholars, that has been ongoing since 2002. The iteration in this paper is part of an NSF-funded project running from 2014 to 2019. The design of ISTEAM is informed by third-generation cultural-historical activity theory (Engeström, 2011; Vossoughi & Gutiérrez, 2014), with ISTEAM designers and teachers enacting Indigenous relations and knowledge systems (Barnhardt & Kawagley, 2005; Cajete, 2005; Kovach, 2010) to engage children's development with Indigenous values, knowledges, and ways of being in the world. During co-design, we visit the places where ISTEAM will take place in order to build relationships with lands, waters, and more-than-humans to determine the kinds of learning experiences desired for our children—including the what, why, and how of their education in the here and now. These co-design experiences include extensive discussion around the histories and stories that come from and can be learned in relation to lands and waters and around how developing such relationships and understandings can work to bring about just and sustainable futures socio-politically and socio-ecologically. Some of the community co-designers go on to engage as facilitators within ISTEAM, and others participate solely as designers.

ISTEAM learning environments are therefore designed and then facilitated by community in and with lands and waters. ISTEAM programs include activities around children building relationships with plant and animal relatives, as well as with each other; walking through and with forests, beaches, ponds, rivers, and lakes; reading lands and waters; making cultural works of art like cedar baskets and clay pieces; engaging in Indigenous games and improvisation; storytelling, storylistening, and storymaking; and developing leadership capacities like ethical deliberation and decision-making that are needed to navigate the challenges of the 21st Century (see Bang et al., 2014; Barajas-López & Bang, 2018). This environment then asserts Indigenous knowledges, values, and ways of being for children as an act of Indigenous resurgence in the everyday (Corntassel, 2012; Simpson, 2011), with ISTEAM programs offering an opportunity for Indigenous children to learn through their culture rather than about their culture (Deloria & Wildcat, 2001; Simpson, 2017).

This project has multiple lines of research associated with it, from detailed study of student learning, educator practice, or familial engagement to the study of communal transformations from co-design as a form of educational self-determination. We collect pre- and post-interviews with children, teachers, and co-designers. In addition, we collect video and audio data across the full program. Because the program is outdoors (where capturing audio can be hard) and because of the way we configure activity (multiple small groups in multiple places), we have several audio and video data streams for any given activity. We have hundreds of hours of data across the project and have served over 200 children in the current iteration of it. All data is content logged and tagged for major themes. In addition, each year, data is reviewed and key events are identified as critical for further research, inquiry, and design work. For this paper, we have focused on the 2018 program for two primary reasons. First, because the paper includes data collected from that program that has been identified as a key case of expansive pedagogy; second, in part, because the two authors co-taught that program. We selected the focal clip as an example of teaching and learning and of children's developing expertise around complex ecosystems within Indigenous and western knowledge systems that forward thriving futures.

## **SPECIFIC ACTIVITY DESCRIPTION**

During a 2018 two-week summer ISTEAM program in the Pacific Northwest, we featured an activity during low tide with the seven children from the youngest age group, which ranges from six- to eight-year-olds, and two adult teachers. While the clip (below) features two young adult facilitators and a group of children, the design of this experience and the beginning activity (not featured in the clip) engaged community co-designers across the lifespan. Thus elders and children alike had a role in creating the conditions for this experience. The activity took place on a local beach at very low tide. It was designed for children to learn about biodiversity in tide pools, the causes and impacts of ocean acidification, and human peoples' responsibilities in relation to what we called our beach relatives. It took place close to a large rock about 20 feet from the water that was covered with different species. Children moved about freely, making observations, asking questions, and playing in a variety of ways. For example, several children dug in the sand, covering their limbs with it while listening and asking questions about what other group members were noticing and the questions they were raising. Children would change their physical position fairly rapidly and shift their specific attention. We describe this because we think it is important to depict this freedom of children's movement, interest, and attention as we take the reader through the activity to consider what learning geographies with lands and waters looks like. The teachers prompted children's observations and interactions with tide pool animal relatives and facilitated inquiry while children explored the beach relatives' relationship with tidal



zones and, ultimately, the animal relatives' ecological systems. The teachers introduced specific topics of discussion, such as estuaries, animal's habitats and physical properties, changing climates, and human and more-than-human relationships. Teacher-directed observation and thinking were balanced with, and enacted in response to, children's exploration, play, interests, and developing expertise. The following analysis dives into specific moments and interactions in which children and teachers engage their understandings and interactions with geographies through three dimensions: content, attention, and care and dignity. While there are other important dimensions to explore, we focus on these because we think they are foundational to pedagogies that engage children in land- and water-based education.



## CONTENT

Young children's capacities and their interests in the complexities of the world are astounding. Yet far too often, children are viewed through a deficit lens that implicitly or explicitly suggests that young children are not developmentally ready to engage with sophisticated phenomena like complex socio-ecological-political systems. In ISTEAM programs, we deliberately engage young children in learning about changing ecological systems and the social and political histories and presents that have created these changes. More importantly, we work to layer and pedagogically mediate children's conversations and inquiries into these complexities at the same time as we support children's navigation of multiple knowledge systems. We do this by recognizing the ways in which some ways of knowing are valued over others and shape the very foundational learning opportunities that claim territory in children's lives. In ISTEAM programs, we aim to support the development of knowledge and expertise in both Indigenous knowledge systems and others, like western science, in ways that transform historically powered construals. We value multiplicities of knowledge systems, elevating multiple Indigenous ways of knowing, not singular ones, in an effort to disrupt colonial dominance in children's learning and foster children's understanding and development within and across Indigenous axiologies, ontologies, and epistemologies. The activity in this clip occurred after ISTEAM activities around the role of human people in creating changing climates and its impact on more-than-human relatives. In this activity, children explore a wide range of beach-dwelling relatives, including anemones, worms, clams, mussels, crabs, and starfish, and engage in learning about their behaviors, needs, interactions, and habitats.

Further, the children continue learning about shifting ecological systems due to climate change. These engagements emphasize both the scientific content of a low-tide ecosystem and the Indigenous understandings of relationality and responsibility between human and more-than-human peoples in a time of changing lands and waters. We see this as a deliberate construction of a learning environment that weaves the social and political dimensions of learning with ecological or scientific dimensions of learning across multiple knowledge systems—a learning environment in which children are a part of the natural world.

In the clip above, the teachers are opening up space for learning about the impacts of climate change on oceans and ocean life through an emphasis on more-than-human personhood. The teachers are working toward children understanding the impact of ocean acidification on shellfish and toward connecting that to previous summers' inquiries into starfish and the starfish die-off that occurred on the Pacific Coast due in part to shifts in ocean temperatures. Emphasizing the experiences of shellfish as an indication of their right to a sustainable ecological future engages Indigenous knowledge and values in children's science education.

1. Teacher 1 (7:00):... so clams and mussels, they have a lot of calcium in their shells ... that make them really hard and helps protect them from predators.
2. Children: Yeah, that's the reason why.
3. Children: But the predators that break the mussels open.
4. Teacher 2: Yeah... I wonder how they get the energy so that they can put all that calcium into their shells.

The first teacher focuses on the chemical makeup of shells, as well as the shells' function (to protect shellfish from predators). The children are eager to contribute and are already familiar with the function of shells, as seen in line 2. The children expand their observations further to recognize that predators can still break the mussels open. The second teacher further layers the complexity of the concepts to raise the question of how shellfish get the calcium in their shells and how they get their energy to do the work of shell-building. This opens the discussion to considering shellfish anatomy through the perspective of clams and mussels as more-than-human relatives with agency by recognizing that their coming to be as we know them in the world takes intentional effort and energy on their part. It also forwards an understanding of socio-ecological complexity in considering not just the function of shells, but also the relationship between predators and shellfish, as well as the active efforts of shellfish to protect themselves.

As children continue their observations and discussion around clams and mussels in response to Teacher 2's question while simultaneously engaging in sand play, the teachers transition the focus toward starfish. They draw on an earlier activity where they discussed the social conditions leading to changing ecosystems and the impact of climate change on the starfish population, as well as their observation of a starfish.

1. Teacher 1 (8:30): Starfish. Okay, so we learned earlier, they don't like high temperatures. And a few years ago, they almost completely died out around here. [crosstalk 00:08:39]
2. Teacher 2: Do you remember seeing that... did you all see the starfish back there?
3. Children: Yeah, I saw one sea-
4. Teacher 1: We were kind of lucky to see that, right? Because a lot of them can't live in this area anymore because it's too hot.
5. Children: But the way, there's caves. Yeah, the ones we found... well, we found a couple.

6. Teacher 1: Did you see, in the cave? So, they were in kind of shady spots, away from the sun.
7. Children: And then there was a starfish. [crosstalk 00:09:08]
8. Children: Because he was still wet. [crosstalk 00:09:10]
9. Teacher 1: Do you think maybe he got trapped right there? He didn't realize the tide was going out and he just wasn't in the preferred area?

Teacher 1 revisits content around climate change with a focus on starfish preference and biological need for cold water. The inclusion of starfish preference, and the starfish being referred to as he—not it—asserts more-than-human personhood and helps children to connect Indigenous axiologies, ontologies, and epistemologies with the curriculum content of starfish habitat and changing climates. The starfish die-off that occurred in previous summers provided the children with a lived, observational experience of the impact climate change is having in the here and now, and they have developed relationships in this place and with these shellfish relatives that foster an empathy toward the ecological challenges being discussed. Teacher 1 prompts children to consider the significance of observing starfish this summer (line 4), and children demonstrate their content understanding of climate change as they name the habitat where they noticed a starfish (line 5). The teacher expands the content depth to connect the presence of starfish to the cave habitat providing shade (“away from the sun”) and thus, a cooler water temperature. The children continue demonstrating their understanding of starfish physiology in line 8 by indicating that while the starfish was seen at low tide, “he was still wet.” In line 9, through a set of questions regarding why starfish may have been in the cave after the tide had receded, Teacher 1 continues prompting children’s complex thinking around starfish needs, habitat, and intertwined relations with other ecological processes (tides). In this prompt, Teacher 1 again asserts starfish personhood by considering his preferred habitat and how he may have gotten “trapped” in the cave area during low tide. Developing complex scientific content understandings is necessary to bring about sustainable socio-ecological futures. In ISTEAM, we work intentionally to connect science content with Indigenous knowledge systems, values, and ways of being. These engagements offer an example of connecting the what of learning to the why and how, in the here and now.

## ATTENTION

Understanding and recognizing children’s brilliance through their attentional focus and their capacity to engage multiple attentions throughout a learning engagement can foster our teaching and children’s development of complex thinking (Marin & Bang, 2018) while also supporting children’s agency and allowing for playful interactions. Believing in children’s autonomy and their right to participate in their education on their own terms is central to Indigenous values and necessary to facilitate children’s learning beyond settler colonial framings. In this activity, we see children engage multiplicities in their attentional focus, along with their constant desire and repeated appeals to move into the water. We also see teachers following children’s attentional shifts while maintaining a focus on the activity design. Teachers coordinate children’s attentions and, in relationship with more-than-humans, engage children’s complex ecological thinking and their understanding of the relations around and within the tide pools (Marin & Bang, 2018; Tzou et al., 2019). Children attend to teacher-prompted content while engaging their own interests, developing expertise, and acting on their desire to move into the water, demonstrating the co-facilitation and respectful relations within this context.



In the following excerpt, children direct their attention to observations of anemones and their physical attributes and then make a shift toward their own interest in water. The teacher furthers their observation and also reorients their water play back to the designed activity by introducing worms.

1. Children (0:30): Oh, I think I found one. I found one. Right here.
2. Children: It's sticking onto me.
3. Teacher 1: What'd you find?
4. Teacher 2: How'd you do that?
5. Children: I found these sticky dudes. You know how they stick on you?
6. Teacher 1: The anemones?
7. Children: These feel wet. [crosstalk 00:00:48]
8. Teacher 1: Okay, (child), we're not making [inaudible 00:00:48] please.
9. Children: Okay, grab some wet water. We need some wet water.
10. Children: Look right here, see, see? Right here. See?
11. Teacher 1: So this little puddle, we got some of those...
12. Children: I'm going to have to go in the water. [crosstalk 00:00:48]
13. Children: Oh. Ew! There's wet sand.
14. Children: He made a huge wave!
15. Teacher 1: You guys, there's some worms over here if you want to see.
16. Children: I love worms. [crosstalk 00:01:11]

In line 5, we see that children's observations and interactions with sea anemones are deeply focused as they describe the physical properties of sea anemones and recognize these beach relatives as more-than-humans with personhood ("I found these sticky dudes"). We also see the quick pace at which children shift attentional focus to their interest in moving into the water (line 12). When the children's attention moves away from observation of the tide pool beings, the teachers redirects their focus by prompting observation toward worms; thus, worms act as collaborators for intended instruction, as well as behavior guidance.

This cycle continues through the learning engagement, with children's attention toggling among observations, interests, and desires while the children engage in complex thinking and teachers parallel children's engagement while maintaining their planned teaching goals. In this next excerpt, we examine how teacher and child knowledge about and attention toward crabs and estuaries inform both the learning engagement and behavior guidance.

1. Teacher 1 (2:55): Have you guys heard the word estuary before?
2. Children: Yeah.
3. Teacher 2: Do you know what it means?
4. Children: No, I just heard it before.
5. Teacher 1: Heard it before?
6. Children: But I don't know what it means.
7. Teacher 1: So it's an area where, kind of the saltwater gets with the freshwater [crosstalk 00:03:10] like when rivers are going toward the ocean.
8. Children: I'm a crab! I'm a crab!
9. Teacher 1: You look like it.
10. Children: I'm a crab. Crab. Crab. [crosstalk 00:03:14] I need to go in the water! [crosstalk 00:03:14]

11. Children: Are you guys using this? [crosstalk 00:03:14]
12. Children: I can't breathe inside! I need to go in water! Bye, guys!
13. Teacher 1: We're not migrating yet.
14. Teacher 2: Let's stay over here. Let's talk about what we see right now. What we're...
15. Children: I see worms.
16. Teacher 1: So, over here, there was a crab. Why do you think he might like this spot?
17. Children: He could climb on it.
18. Teacher 1: Over here, there's a crab [inaudible 00:03:42] and we're not going to touch him though, because we don't want to freak him out.

Teacher 1 introduces the term estuary at just about three minutes into the clip, having offered ample time for open exploration and self-guided observation of the tide pool. While the teacher explains the meaning of estuary, a child begins embodying a crab both physically (moving like a crab) and biologically (line 12). We see children's developing expertise here in utilizing their knowledge of ecology and of the biological needs of crabs, as well as demonstrating their ethical respect for the crab's personhood and well-being to leverage their argument for moving into the water. As his attentional focus is shifting away from the teacher-led discussion, the child maintains complex, scientific reasoning (Bang et al., 2007; Hackett et al., 2019). Simultaneously, the teacher affirms and joins the child's engagement ("I'm a crab! I'm a crab!"), saying "You look like it" (lines 8–9) while also engaging the play-based scenario to refocus attention to observations in the tide pool (line 13). The child enacting the crab's behaviors demonstrates his understanding of crab biology ("I can't breathe inside! I need to go in water!") and his creative, informed persistence to play in the water. The teacher's response to this, joining the play, also displays her depth of ecological knowledge (e.g., crab migration) and Indigenous pedagogies of relationality with both humans and more-than-humans.

Because this teacher holds a developed relationship with the lands and waters, she is able to use her sophisticated knowledge of the more-than-humans as they are situated within this particular place to facilitate this engagement; that is, because of her land/water relations, she knew where crabs would be in that moment. And because of the established relationship between the teachers and children, the continually shifting attentional focus occurs fluidly within the learning experience. We see this in line 16, where in response to children's embodiment of crabs and desire to move into water play, she invites their observations of an actual crab. This interaction continues and cultivates children's thinking in Indigenous knowledge systems through discussion about the crab's preferred habitat and food source; the activity transitions with a child's quick return of attention to their previous desire to move into the water. This interaction offers an example of what community co-design looks like in ISTEAM, where adults and children reciprocally participate in the construction of the activity in relation to each other. "We're not migrating yet" became an important point of analysis in understanding how teaching about complex ecological systems through Indigenous knowledges, values, and ways of being takes form in practice.

## CARE, DIGNITY, AND CHILDREN'S LEADERSHIP IN INDIGENOUS RESURGENCE

Demonstrating relationality with more-than-humans offers an example of what Indigenous resurgence looks like with young people in practice, in the here and now (Simpson, 2017). Relationality between humans and more-than-humans is premised on, among other values, expressed and implied care and dignity (Kimmerer, 2013; Van Horn et al., 2021). To be in kinship, a necessary lifeway to enact

resurgence, we must engage reciprocally in fostering each other's positive development across the life span; we must care for each other through difficult and joyful times and sustain each other's dignity (Bang et al., 2015). Because relationality and kinship have been intentionally excluded from traditional school-based curriculum, we offer extended examples of how care and dignity can and must be central to positive learning environments. Throughout the learning engagement, we see examples of both children and adult teachers articulating and embodying thoughtful relationships with more-than-humans, showing that care and dignity are valued as important aspects of the how-tos in learning geographies. One example of this can be seen in a discussion and observation of worms, where children converse around their like or dislike of worms and demonstrate their care for worms by ensuring they are not harmed through human interaction.

1. Teacher 1 (1:23): No. Guys come and look at the worms. Guys, come feel these worms. Very gently, though. Very gently.
2. Children: Oh my... Look at those... There's a baby worm.
3. Teacher 1: Have you guys seen these before? The ones sticking out of the sand?
4. Children: Oh yeah, I
5. Teacher 2: Boys, do you like worms?
6. Children: Yeah... No!... Yeah.
7. Teacher 1: Do you happen to remember what it's...
8. Children: There's some over here, Ms. will show you.
9. Teacher 1: Yeah, come look. Come check these out. Be just very gentle though, if you touch them. See those things sticking out?
10. Children: Can I?... I like worms, they
11. Teacher 2: Do you think that the sand is...
12. Children: Look. They're moving on me. I really like [crosstalk 00:02:00] they're very interesting.
13. Children: I'm putting on sunscreen. [More talk about sunscreen]
14. Teacher 1: This one might be a water worm so it might prefer to be in the water.

In this excerpt, we see teachers directing children's attention away from the water and guiding their observations toward worms in the tide pool (line 1). Teacher 1 premises the invitation to "feel these worms" with guidance around how to touch worms with care ("very gently"), as the children's immediate response to her invitation is to touch and feel. In line 5, as one group of children observe and begin interacting with worms, Teacher 2 entices other children to shift their attention from sand play (and desired water play) to worm observation by pointing them to Teacher 1, who again pairs the invitation with guidance around how to interact with worms carefully and gently (line 9). This pattern of inviting children to observe and touch worms and providing a structure for doing so with care assumes a commitment to the dignity of all beings—both children and worms. Teacher 1 emphasizes the need for children's careful touch in their interactions with worms in an effort to articulate the need to uphold the worms' dignity and well-being. She also assumes the dignity of children by encouraging their desire to touch and, as she provides reminders, shows that she trusts that they can do so ethically and in good relation with the worms (Bang et al., 2015).

We can see children's enactment of care through their dialogued interest in worms and affirmative response to the guidance around interacting with care, as well as through their association of small worms as babies (line 2). We also see a child, who enthusiastically expressed that she loved worms early in the clip, carefully hold a worm and closely observe the worm's movement on her skin, and express

how interesting worms are (line 12). Teacher 1's response to this child's interest and focused observation is respectful to both the child and the worm, as she gently encourages the child to place the worm back in the wet sand (line 14). In doing so, she expresses valuing the worm's desire, indicating a recognition of the worm's personhood, as well as a regard for the child's dignity by sharing information about the worm's preferred habitat and believing the child has the worm's best interest in mind.

Continuing an enactment of care and regard for dignity toward animal relations, Teacher 1 asks children to consider why a crab is situated in a particular location on the beach (line 16, previous excerpt). Again, she upholds the personhood of crabs by considering their desires rather than focusing solely on their physical needs. Inquiry around crabs continues, and Teacher 2 asks children to consider why Teacher 1 has set an expectation of refraining from touch.

1. Teacher 2 (3:58): Why do we not want to touch him?
2. Children: Because we don't want him to die.
3. Children: We don't want him to get scared.
4. Teacher 1: Yes, scared and stressed out. So we can look at him. But why do you think he likes this area? Do you see anything around here that he might like to eat?

Teacher 2 offers an opportunity for children to narrate their consideration of the crab's well-being, and they reiterate Teacher 1's attention to the crab's emotional state and also consider risk to the crab's life. Teacher 2 furthers consideration of care for the crab's emotions, stating that he could get "stressed out" (line 4). Focus on touch concludes, and the teachers circle back to the crab's preferred habitat and then his food source. This transitions back toward a framing of ecological thinking that maintains a personhood stance around the crab's preferences that moves beyond biological need and thus values the dignity of more-than-human relations.

We see a continuation of expressed care and dignity in children drawing Teacher 2's attention to her proximity to an animal.

1. Children (5:09): Wait, wait, stop! You're in a place where an animal is!
2. Teacher 2: What? Really?
3. Children: You guys, I can't. I found something.
4. Teacher 2: Where at, where at?
5. Children: You almost stepped... he's right here.
6. Teacher 2: Where are we going? Let's not feel it.
7. Teacher 1: Guys be very gentle, okay?

Teacher 2 upholds children's dignity by listening to their appeals that she had the potential to harm an animal. While just before this excerpt, Teacher 2 was redirecting children's behavior, stating, "let's not throw sand," she still listens to children's contributions and takes their appeals seriously. And again, she maintains an emphasis on care for more-than-human relations (line 6). Teacher 1 then reiterates this expectation (line 7).

Children's care for more-than-humans extends to their thinking around animal-animal relations. As part of an extended discussion around snail and mussel shells functioning as defense, children consider how changing climates are placing clams at greater risk of becoming a food source.

1. Teacher 1 (7:31): Yeah. And then, in [Teacher 3's 00:07:32] workshop, we learned that the calcium in their shells breaks down, right? When all the carbon dioxide gets in the water. What do you think... and that made their shells really soft. So, what do you think is going to happen if their shells get too soft?
2. Children: Then they'll break it open [inaudible 00:07:51]
3. Teacher 1: Yeah, predators can break it open real easily.
4. Children: We don't want that to happen.

Children express their understandings of the techniques predator animals use in breaching the hard shells that protect clams, and, in their response to Teacher 1's question about the impact of shells becoming softer, of how predators have an easier time getting to the clams. The children express care for clams and concern for changing climates, stating, "we don't want that to happen" (line 4).

We close this article with a discussion around the importance of content, attention, and care and dignity as integrated dimensions fostering children's complex ecological thinking as they learn about geographies on and with lands and waters.

## CONCLUSION

Examining the engagements and physical positions of children and teachers through a lens of content, attention, and care and dignity offers us specific insight regarding how returning children's learning to lands and waters fosters their complex ecological reasoning and understanding of geographies beyond colonial framings. We argue that by beginning with Indigenous axiologies, ontologies, and epistemologies in the design of learning environments, ISTEAM nurtures Indigenous children's development and their understanding of socio-ecological-political systems in the here and now that guides them toward adulthood in a way that allows them to thrive. It is important to note, though, that we believe deeply that what we have put forth here through an Indigenous learning context benefits all children. While we frame each dimension above through a separate analysis, what we see in the video clip is an integrated engagement where the dimensions intertwine and build collectively in children's learning through play, inquiry, and social interactions. Fostering opportunities for children to further develop relationships with each other and the natural world through the kinds of activities included in ISTEAM supports their complex reasoning and sets the foundation for future ethical decision-making. Considering the way teachers in this activity fostered rich cognitive and ethical considerations toward a more just world, while respecting children's intelligence and autonomy, offers an example of how we may imagine school-based learning beyond the confines of indoor learning that often makes use of skill-driven instruction and behavioral control. Educators' developing a practice of joining in with children's play and perspective-taking to guide their engagement and deepen their content understandings through caring and respectful interactions, as demonstrated in the example of crab migration scenario, creates the kinds of learning environments where all children can thrive. Continuing to expand land and water education will deepen children's engagement with multiple knowledge systems and support teachers interested in (re)imagining curriculum. Engaging these efforts collectively holds the potential to disrupt coloniality as a central tenet of public education, and together, offer all children opportunities to be their whole, joyful selves.



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