

Arts as Critical Transdisciplinary Pedagogy: Awakening Relationality Through the Anti-Oppressive Facilitation of Soil Painting on the Land

Anita Chowdhury, Miwa Takeuchi, Mahati Kopparla, Sophia Thraya, Sonder Edworthy
anita.chowdhury@ucalgary.ca, miwa.takeuchi@ucalgary.ca, mahati.kopparla@ucalgary.ca,
sophia.thraya@ucalgary.ca, sonedworthy@cbe.ab.ca
University of Calgary, Calgary Board of Education

Abstract: Mobilizing the power of arts in and through inquiries within the field of learning sciences can forge a new space for learning. Our paper highlights how arts-based methods inaugurate spaces for critical transdisciplinary understanding of soil with refugee children who participated in our multimodal land-based learning program. Refugee children's artwork and dialogic interactions were examined in social and scientific contexts through the conceptual framework of arts integration and critical pedagogy to elucidate relationality through land-based learning experiences. Careful planning and composition of soil portraiture offered insight into soil as a living entity and medium which fostered co-creation and unearthing of sociopolitical awareness surrounding body consciousness and (de)colonial relations with the land.

Backgrounds: Toward critical conceptualization of arts and transdisciplinarity

Evoking the power of arts in and through inquiries within the field of learning sciences can open a new space and opportunity for learning. As Lee (2001) powerfully demonstrated, engaging Black youth in historically salient, rich literature by Black authors can open spaces for their intellectual reasoning to shine. Gutiérrez (2008) showed how migrant youth poetically and poignantly tell their lived histories, *testimonio*, inspired by artistic scholarly texts such as Paulo Freire's (1970) *Pedagogy of the Oppressed*. More recently, arts in the learning sciences have been brought to attention of the field, as Halverson and Sawyer (2022) maintain that arts in the learning sciences research have received relatively little attention, or arts have been reduced to tools to learn more hegemonic disciplines such as Science, Technology, Engineering, and Mathematics (STEM). Our paper highlights how integration of arts created otherwise impossible learning opportunities through the intentional pedagogical design of the Soil Camp (Takeuchi et al., 2021). In this paper, we pay attention to the power of arts to show and deepen racially and linguistically minoritized refugee learners' understanding of disciplinary concepts in STEM, which is entangled with their understanding of "life" (their lives and other lives in intertwined manners). Recognizing that the Western education paradigm has perpetuated oppressive, colonial ways of knowing (Battiste, 2013; Poitras Pratt et al., 2018), the theoretical framework of this research positions arts-based pedagogy as a form of resistance with transformative potential. Decolonial Indigenous frameworks (Battiste, 2013) together with anti-colonial land-based approaches to art education with refugee youth (Bae-Dimitriadis, 2020) inform the research design and interpretations of findings.

These critical ways of seeing arts can challenge underlying disciplinary norms and colonial formation of disciplines, especially in the disciplines of STEM that has historical entanglement of explicit and implicit militaristic and colonial agenda (Philip et al., 2018; Takeuchi & Marin, 2022). As Strong et al. (2016) have demonstrated in their enactment of critical transdisciplinary pedagogy, youth can mobilize the power of arts to invite snapshots of their lives (that is often neglected in school contexts) and their community expertise into STEM disciplines. Arts in embodied forms for youth (e.g., choreography and dance movement developed among Black communities) could be seen as funds of knowledge for learning physics, which has been historically treated as a school discipline removed from youth's lives (Solomon et al., 2022).

Our ways of seeing learning is fundamentally sociocultural and historical. Sociocultural theories of learning helped us to design the learning ecology that could break disciplinary silos between home, community, and school (Gutiérrez, 2008; Lee, 2001). Sociocultural theory of learning sees arts as a medium to bring "horizontal forms of learning, the movement" (Gutiérrez, 2008, p. 150) into disciplinary learning. Our analysis will shine a light on children's sense-making of *the soil as living*, seen through the process of artworks generated by children.

Methodology

Our approach was grounded in social design research methodology (Gutiérrez & Jurow, 2016) that centers historicity, diversity, equity, and ecological resilience as design principles and aims to co-design just practices and futures in partnership with a range of communities. Soil Camp pedagogical design was led and facilitated by

preservice teachers, educators, researchers, and various community partners with 85 refugee children and youth (Takeuchi et al., 2021). Child participants hail from Syria, Northern Iraq, Kurdistan, New Guinea, Pakistan, South Sudan, Ethiopia, and Eritrea, having resettled in Canada within the last five years. Eighteen teachers and teacher candidates (who are mainly racialized multilinguals) joined as facilitators of Soil Camp. The participants engaged in numerous environmental justice workshops and were invited to learn more deeply about land stewardship from Indigenous perspectives through the relationships with Indigenous Elders and Knowledge Keepers who storied the land by bringing forward animacy and spirit through circular epistemology (Poitras Pratt et al., 2018, p.5) that centers the importance of multidimensional understandings of our interconnectivity with plants, animals, and the soil. The focus activity of “soil painting” discussed in this paper was nested within these ethos, as a sensory-imbued activity that involves painting with soil pigments and painting about the soil. The pigments were created by mixing a variety of fine soil sediments with an acrylic medium and a few drops of water. The soil samples were crushed with a mortar and pestle or sifted with handmade and professional soil sieves by the children. There was immense variability in the texture, tones, and overall quality of the soil pigments created by the children.

Data and analysis

A team of researchers collected video data, interviews, fieldnotes over two years since 2021. Drawing from the participatory design research framework (Bang & Vossoughi, 2016), our research team invited the participants to engage with us in the documentation of learning and help us highlight telling moments and observations. For this paper, we closely analyzed video data amounting to 157.69 minutes collected during the soil painting activity facilitated by Anita who has disciplinary backgrounds in arts and art histories, and the artworks created by the children and youth. On-site interviews with the participants were conducted to elicit the participants’ backgrounds, their sensory experiences on the land (what they see, feel, smell, and hear), and their developing sense of soil and understanding of the land. Individual artworks were then selected based on iterative analysis of video and transcripts, reflecting the pertinent influence of Marin & Bang’s (2015) framework of nature-culture relations. The research team analyzed 53 soil paintings made by the children and youth, through the lens of Lawrence-Lightfoot’s (2005) notion of portraiture as a method of inquiry to document, analyze, identify, and narrate recurring patterns and themes. In our analysis, we saw arts as a critical tool that provided an opportunity for children to engage in sense-making while glimpsing into their emerging understanding and worldview (Hickey-Moody, 2021). Instead of focusing on pre-set STEM concepts, our analysis focused on the ideas constructed and communicated through children’s artworks and conversations, on their terms. The research question that guided our analysis was: how did children deepen their corporeal relationality with and through soil during the transdisciplinary arts integrated experience of creating soil portraiture?

Findings

The children’s paintings were a direct reflection of land-based learning interactions and their lived experiences on the land. Through their paintings, the children were able to present macro and micro visions of soil and ecosystems. Paintings of the landscape contained depictions of the visible and familiar elements above the ground such as the sun, soil, plants, trees, grass, flowers, and mushrooms. Below the soil surface, children depicted their interpretation of invisible components such as bacteria and other microbes based on their abstract and emerging understanding. We saw expanded visions of soil in how children chose to depict earth’s matter on watercolour paper: macro, micro, introspective, and relationally focused compositions. The invisible complexity of soil ignited the reflexive imagination of our participants and ushered in a network of connections encircling themes of cognizant socio-emotional understanding, cycles in ecosystems (that include human as a part of the ecosystem), and body politics (with a particular focus on human reproduction and soil fertility). For example, one of the children remarked that the microscopic view of soil “looks like the inside of someone’s body.” Similarly, another child, Aly (children’s names are pseudonyms) drew parallels between soil ecosystems and the female reproductive system. As shown in Figure 1, her artwork was composed with a light wash of soil paint and a sketch of roots in the soil which she also exemplified as fallopian tubes, veins, and blood. This network also resembles mycelium (fungal threads) found underground that was showcased in Driver’s (2021) interactive video that the participants watched. Aly spent the majority of time sketching this network of intersecting lines with careful precision while engaging in a conversation with other children at the table (see Table 1). Exposure of the children’s shared understanding and interpretive reflections during the artistic process transformed the space into a site where children could engage in critical dialogue to make sense of their world and the world in which soil invisibly cooperates and exists.

As the children were sketching and painting, the facilitator walked around the table to support and assist them. Meanwhile, the children engaged in conversations while simultaneously working on their art. One such conversation as shown in Table 1, unfolded in the absence of the facilitator as Aly was sketching. A lighthearted

conversation that began as making fun of each other led to a moment of critical sense-making as some of the girl-identified children began to unpack their understanding of women’s abortion rights (utterance 6 to 9 in Table 1). While the children were somewhat familiar with the sociopolitical issue through media and lived experiences, they did not take a specific stance or engage in a debate, instead, Lily (utterance 8) and Rita (utterance 9) presented two sides of the argument. This dialogic interaction unraveled naturally and was prompted within several interrelated contexts for ideologies in learning (Philip et al., 2018). Participants shared analogies of the fertile landscape soil exhibits with the female reproductive system and noted similarities and comparisons between root systems and the network of blood and veins that run through human bodies. The last week of Soil Camp occurred in early July 2022 directly after the U.S. Supreme Court’s June 2022 Ruling to overturn *Roe v. Wade* — the decision that had guaranteed a constitutional right to abortion for nearly 50 years. This highlights an intersectional inquiry process that takes place on the land as a response to changing climates, whether they are ecological or sociopolitical.

Figure 1
Aly’s Painting Analogy between Soil Fertility and the Female Reproductive System.



Table 1

	Time Stamp	Speaker	Utterances
1	#00:02:45-2#	Aly	When mom made you, she said, oh gosh, I’m not ever having any more kids ↑
2	#00:02:55-3#	Sherry	When mom made you, she said, ah not another one
3	#00:02:59-3#	Aly	Then why did she keep going on?
4	#00:03:03-8#	Sherry	She had no choice
5	#00:03:05-0#	Habiba	Wait! But how’d you know, she’s older than you!
6	#00:03:09-6#	Lily	I’m confused about the abortion thing, is it in Canada too?
7	#00:03:14-2#	Lily	You know how there’s women’s rights for abortion or something?
8	#00:03:23-1#	Lily	I don’t think it should be a thing, you’re killing babies
9	#00:03:33-2#	Rita	Yeah, it’s tight, it’s not your choice. Before the [embryo develops, you can actually kill it. Before it turns into an actual human. So, it doesn’t matter

Discussion

Through an arts-integrated approach, soil painting provided an opportunity for transformative and liberating learning to occur by establishing a safe space for semiotic expression, embodied communication, and affirmation of identity. By touching, feeling, smelling, observing, and interacting with soil as a whole environment containing millions of living organisms, participants activated interpersonal cognizance by questioning the role soil plays in our own ecosystems and how it contributes to abundance in life. As demonstrated in our findings, a deep sense of belonging to a community can be in essence established by fostering artistic agency with epistemological exploration achievable through artistic engagement and can lead to emancipation and critical awareness (Freire, 1970). A seed for ideological expansion (Philip et al., 2018) was planted in and through these learnings mediated by the participants’ intertwined sense-making of the soil and human body. The explicit deepening of collective knowledge at Soil Camp is reflected in our presented case in findings as a direct result of the artmaking *process*, demonstrating how children obtain obscure information about the life of soil and parallel ideologies surrounding

human reproduction and soil fertility. The children's desire to understand the current and complex sociopolitical milieu illustrates art as a method of communication for heterogeneous understanding of life in and around the soil. Critical transdisciplinary relationality emerged through dialogue on soil paintings and acts of artmaking, where children and youth explored themes of identity, community, belonging, social values, and human rights. The examination of entangled lived experiences through soil painting offers rich perspectives of curiosity, inquiry, and bodily autonomy through critical awareness curated by means of material agency on the land where children actively created and composed extensive life cycles to creatively question, challenge, and disrupt mainstream narratives by breaking the silos between STEM concepts and realities of refugee children (Strong et al., 2016; Takeuchi & Marin, 2022). By expressing feelings visually using lines, shapes, forms, tones, colours, and textures of soil paint, the children emerged as soil advocates or those who value, appreciate, and protect the soil for future generations to heal present day iterations of colonialism.

References

- Bae-Dimitriadis, M. (2020). An anticolonial land-based approach to urban place: Mobile cartographic stories by refugee youth. *Studies in Art Education*, 61(2), 106–122. <https://doi.org/10.1080/00393541.2020.1738177>
- Bang, M., & Marin, A. (2015). Nature-culture constructs in science learning: Human/non-human agency and intentionality. *Journal of Research in Science Teaching*, 52(4), 530–544. <https://doi.org/10.1002/tea.21204>
- Bang, M., & Vossoughi, S. (2016). Participatory design research and educational justice: Studying learning and relations within social change making. *Cognition and instruction*, 34(3), 173–193. <https://doi.org/10.1080/07370008.2016.1181879>
- Battiste, M., (2013). *Decolonizing education nourishing learning spirit*. Purich Publishing.
- Driver, H. (2021, June 11). *Secrets of Soil*. Retrieved November 2022, from https://store.steampowered.com/app/1610820/Secrets_Of_Soil/
- Freire, P. (1970). *Pedagogy of the oppressed*. Herder and Herder.
- Gutiérrez, K. D. (2008). Developing a sociocritical literacy in the third space. *Reading Research Quarterly*, 43(2), 148–164. <https://doi.org/10.1598/rrq.43.2.3>
- Gutiérrez, K. D., & Jurow, A. S. (2016). Social design experiments: Toward equity by design. *Journal of the Learning Sciences*, 25(4), 565–598
- Halverson, E., & Sawyer, K. (2022). Learning in and through the arts. *Journal of the Learning Sciences*, 31(1), 1–13. <https://doi.org/10.1080/10508406.2022.2029127>
- Hickey-Moody, A., Horn, C., Willcox, M., & Florence, E. (2021). *Arts-based methods for research with children*. Palgrave Macmillan.
- Lawrence-Lightfoot, S. (2005). Reflections on portraiture: A dialogue between art and science. *Qualitative Inquiry*, 11(1), 3–15. <https://doi.org/10.1177/1077800404270955>
- Lee, C. D. (2001). Is October Brown Chinese? A cultural modeling activity system for underachieving students. *American Educational Research Journal*, 38(1), 97–141. <https://doi.org/10.3102/00028312038001097>
- Philip, T. M., Gupta, A., Elby, A., & Turpen, C. (2018). Why ideology matters for learning: A case of ideological convergence in an engineering ethics classroom discussion on drone warfare. *Journal of the Learning Sciences*, 27(2), 183–223. <https://doi.org/10.1080/10508406.2017.1381964>
- Poitrass Pratt, Y., Louie, D. W., Hanson, A. J., & Ottmann, J. (2018). Indigenous education and Decolonization. *Oxford Research Encyclopedia of Education*. <https://doi.org/10.1093/acrefore/9780190264093.013.240>
- Takeuchi, M.A., Chowdhury, A., Koppala, M., Thraya, S., Yuen, J., Czuy, K., Mambo, T., Olsen, R., Sobh, H., & Fakih, A. (2021). *Soil camp: Learning with the land toward refugee integration, diversity and sustainability through community partnerships 2020-2021*. University of Calgary. <http://hdl.handle.net/1880.113973>
- Takeuchi, M.A. & Marin, A. (2022). “Globalization,” coloniality, and decolonial love in STEM education. *Oxford Research Encyclopedia of Education*. <https://doi.org/10.1093/acrefore/9780190264093.013.1655>
- Solomon, F., Champion, D., Steele, M., & Wright, T. (2022). Embodied physics: Utilizing dance resources for learning and engagement in STEM. *Journal of the Learning Sciences*, 31(1), 73–106. <https://doi.org/10.1080/10508406.2021.2023543>
- Strong, L., Adams, J. D., Bellino, M. E., Pieroni, P., Stoops, J., & Das, A. (2016). Against neoliberal enclosure: using a critical transdisciplinary approach in science teaching and learning. *Mind, Culture, and Activity*, 23(3), 225–236. <https://doi.org/10.1080/10749039.2016.1202982>
- Vossoughi, S., Hooper, P. A. K., & Escudé, M. (2016). Making through the lens of culture visions for educational equity. *Harvard Educational Review*, 86(2), 206–232. <https://doi.org/10.17763/0017-8055.86.2.206>