Alberta Journal of Educational Research

Making Kin with Multispecies' Flourishing in the Anthropocene: A Multiperspectival Narrative Into Environmental and Sustainability Education

Thi Thuy Hang Tran, Tram-Anh Bui, Dianne J. Kenton, Sreedevi Rajasekharan, Olivia Lu et Steven Khan

Volume 70, numéro 2, été 2024

URI : https://id.erudit.org/iderudit/1112966ar
DOI : https://doi.org/10.55016/ojs/ajer.v70i2.77474

Aller au sommaire du numéro

Éditeur(s)

Faculty of Education, University of Alberta

ISSN

0002-4805 (imprimé)
1923-1857 (numérique)

Découvrir la revue

Citer cet article

Tran, T., Bui, T.-A., Kenton, D., Rajasekharan, S., Lu, O. & Khan, S. (2024). Making Kin with Multispecies' Flourishing in the Anthropocene: A Multiperspectival Narrative Into Environmental and Sustainability Education. *Alberta Journal of Educational Research*, *70*(2), 224–248. https://doi.org/10.55016/ojs/ajer.v70i2.77474

Résumé de l'article

Le développement de l'éducation à l'environnement et à la durabilité (EED) dans la formation initiale des enseignants au Canada a connu des progrès lents mais constants au cours des 40 dernières années. Il n'existe pas encore d'histoire détaillée de la manière dont les individus et les groupes ont influencé sa pratique (Elliott & Inwood, 2019, p. 37). Cet article s'intéressé aux expériences de six formateurs/étudiants diplômés qui ont composé leurs vies dans différents paysages en relation avec l'EED. Nous employons l'autoethnographie collaborative comme méthodologie de recherche. Ensemble, nous participons au processus de raconter, de redire et de revivre nos histoires en relation avec l'EED. Nous accordons également une grande attention aux résonances de nos expériences et rassemblons nos pensées prospectives pour/avec l'avenir de l'EED. Nous espérons développer l'EED actuelle avec une approche plus holistique et durable. Celle-ci inclut l'intégration de la sagesse locale à l'éducation environnementale, la collaboration avec les présences matérielles non pas comme des ressources mais comme des partenaires pour l'épanouissement de plusieurs espèces, ainsi que le maintien des réverbérations intergénérationnelles des pratiques familiales et culturelles et de la littératie quantitative.

Alberta Journal of Educational Research, Vol. 70.2, Summer 2024, 224-248

Making Kin with Multispecies' Flourishing in the Anthropocene: A Multiperspectival Narrative Into Environmental and Sustainability Education

Thi Thuy Hang Tran[1], Tram-Anh Bui[2], Dianne J. Kenton[3], Sreedevi Rajasekharan[4], Olivia Lu[5], Steven Khan[4]

1 Ho Chi Minh City University of Technology and Education & University of Regina, 2 Ho Chi Minh City University of Foreign Languages and Information Technology & Lakehead University, 3 Toronto Metropolitan University, 4 Brock University, 5 University of Toronto

The development of Environmental and Sustainability Education (ESE) in pre-service teacher education in Canada has shown slow but steady progress over the past 40 years. A detailed history of how individuals and groups have influenced its praxis does not yet exist (Elliott & Inwood, 2019, p. 37). This paper attends to the experiences of six teacher educators/graduate students who have been composing their lives in different landscapes in relation to ESE. We employ collaborative autoethnography as our research methodology. Together, we are involved in the process of telling, retelling, and reliving our stories of who we are in relation to ESE. We also pay deep attention to the resonances echoed across our experiences and curate our forward-looking thoughts for/with the future of ESE. We hope to expand current ESE with a more holistic and sustainable approach, which includes integrating place-based wisdom with environmental education; collaborating with material presences not as resources but as partners for multispecies' flourishing; and sustaining the intergenerational reverberations of familial and cultural practices and quantitative literacy.

Le développement de l'éducation à l'environnement et à la durabilité (EED) dans la formation initiale des enseignants au Canada a connu des progrès lents mais constants au cours des 40 dernières années. Il n'existe pas encore d'histoire détaillée de la manière dont les individus et les groupes ont influencé sa pratique (Elliott & Inwood, 2019, p. 37). Cet article s'intéressé aux expériences de six formateurs/étudiants diplômés qui ont composé leurs vies dans différents paysages en relation avec l'EED. Nous employons l'autoethnographie collaborative comme méthodologie de recherche. Ensemble, nous participons au processus de raconter, de redire et de revivre nos histoires en relation avec l'EED. Nous accordons également une grande attention aux résonances de nos expériences et rassemblons nos pensées prospectives pour/avec l'avenir de l'EED. Nous espérons développer l'EED actuelle avec une approche plus holistique et durable. Celle-ci inclut l'intégration de la sagesse locale à l'éducation environnementale, la collaboration avec les présences matérielles non pas comme des ressources mais comme des partenaires pour l'épanouissement de plusieurs espèces, ainsi que le maintien des réverbérations intergénérationnelles des pratiques familiales et culturelles et de la littératie quantitative.

On Coming Together

> i wanted to bring us back to the green of blackness, ease on down into the groove of the bottomsoil, slip inside the underground brilliance of mycelium, pull a lush feeling out from deep inside the earth, think about how people (now) come together outside the digital assistance of intermediary social media apparatuses. i was preoccupied with intimacy, relations between people, relations between all that exists. i began to ruminate on the possibility in coming together, to make friends (not followers) …—Ife, 2021, p.84

In the middle of the trouble that was the COVID-19 global pandemic, a group of six people from different cultures and educational backgrounds, with different ethnicities and genders, and at different stages in life, came together to discuss and share their interest in curricula for multispecies' flourishing (Tran et al., 2020) in relation to mathematics, quantitative and financial literacy, narrative inquiry, inter-cultural well-being, familial curriculum, and sustainable development at weekly online gatherings. These meetings have continued, albeit more irregularly. Emerging from these gatherings is a vision of an American Curriculum Studies in the remaining years of the United Nations' Decade on Ecosystem Renewal through the ecological imaginative (Jardine, 1998) frame of being for multispecies' flourishing, which foregrounds the need to decentre, but not devalue, our anthropocentric focus and take seriously the right of other species, including non-biological entities, to flourish on this shared planet. But first a look at terminology.

On Troubling "Curriculum Studies on the Anthropocene and in an Anthropogenic Context"

According to Farrell et al. (2022), editors of *Teaching in the Anthropocene*, *Anthropocene*, the term that emerged from paleoecology, geology, and atmospheric science, has since been popularized and is now used to acknowledge that "humans are the first species to exert a planetary influence on the Earth's climate and ecosystems" (p. xiv). This is scientifically inaccurate and is a good illustration of ongoing anthropocentric biases—a capitulation to the ideologies of geologic passivity and mutism, which turned living landscapes into extractable resources (Yussof, 2018) and a lack of deep historical planetary and economic understandings in the use of the term by (some) scholars.

Humans are neither the first species nor the only species to exert a planetary influence that can be detected in the geologic record—what is perhaps unique is the geologic pace and nature of such changes. The oxygen in the atmosphere today was the by-product of the activity of cyanobacterial relatives (Biello, 2009) whose slow effects are visible in the various metal oxides removed from the atmosphere and detectable in soils and sediments around the planet. This includes iron, whose bioavailability remains a key factor in the formation, functioning, and regulation of many important biomolecules such as those involved in cellular respiration and oxygen transport (Kaplan & Ward, 2013). The fact that living organisms shape geology over time is only slowly becoming more widely appreciated in the geology curriculum (Thompson, 2022). There is hubris and vanity (Brannen, 2019) in the attempt to claim and name such an epoch after our human species. But this is not the only issue with the term Anthropocene.

A more serious concern is the way the term can be used to mask a simple quantitative fact, as Donna Haraway argued:

> Most peoples on this planet have precisely not lived and exercised the same kinds of processes that break generations, that radically simplify ecologies, that drastically force labor in a mass way that creates a kind of global transformation and global wealth that is in and of itself genocidal and extinctionist. That is not a species act; it's a situated historical set of conjunctures, and I think to this day the term Anthropocene makes it harder, not easier, for people to understand that. (Haraway, in Mitman, 2019)

The historical set of epistemic and discursive conjunctions have been described most aptly by Sylvia Wynter (and others) as *Man* (Wynter, 2003).

Making Kin Again and Again and Again

Our group believes that one goal of education is freedom (Dewey, 1938; Freire, 1998; Giroux, 2003; hooks, 1997; Macedo, 1998), and we draw on different wellsprings of inspiration for our notions of freedom (e.g., Marley, 1980; Nelson, 2021; Sen, 2000) with the common space that the antithesis of freedom—unfreedom—manifests in different ways and times including enslavement, incarceration, limitation of rights, exclusion from participation, penury, and genocide among others. Teachers and students meet the challenge of freedom through awareness and engaging in the mindful practice of identifying bias and reducing discrimination as well as through active emancipatory, abolitionist, critical, anarchist, and other freedom-increasing projects. Freire (1998) recommended the creation and repositioning of a pedagogy that is forged with, not for, the oppressed (p.48) where teachers and students are co-learners and co-creators of knowledge.

We acknowledge that the curriculum scholars identified above operate(d) in different time periods, ecological, and socio-cultural contexts, and construct(ed) freedom differently. Our group's thinking is perhaps most resonant with and influenced by the complex thought of Sylvia Wynter (2000, 2015; Thomas, 2006). Wynter's challenge to/for us, is to attempt to simultaneously re-enchant Humanism outside and beside the epistemic and sociogenic apparatuses employed by the discursive swarm of epistemes she called Man, to move towards an autopoiesis of the human to redefine what it is to be human and for a trans-formative view of freedom that is the foundation of her *After Man* proposal. In this proposal she wondered,

> how then shall we reimagine freedom as emancipation from our present ethno-class or Western bourgeois conception of freedom? And therefore, in human rather than as now, Man's terms? beyond those of Man's oppositional sub-versions—that of Marxism's proletariat, that of feminism's woman (gender rights) and that of our multiple multiculturalism and/or centric cultural nationalisms (minority rights), to that of gay liberation (homosexual rights), but also a conception of freedom able to draw them all together in a synthesis. (Wynter, 2000, pp. 41-42)

Wynter's hope underlies our move and motif in aligning these notions of freedom not as an end point, but as ongoing curricular work or what Walcott (2021b) called the "Long Emancipation" that is bound up with the origins of the notion of *property*, *policing*, and *incarceration* (Montford & Taylor, 2022; Moreton-Robinson, 2015; Nichols, 2019; Walcott, 2021a). These multispecies emancipations are not exclusive to humans (Bezan & McKay, 2022; Colling, 2021; Morin, 2018) and demand a *New Pact of Coexistence* as outlined by Bauer et al. (2019) in discussing the *Anthropocene in Chile* or Conversi's (2021) notion of exemplary ethical communities.

Through our collaborative stories, we attempt to make kin with our multispecies partners and bring our diverse values and missions to raise our voices for the non-dominant communities we are from and working for. Part of our goal is to bring voices from the margins into the existing conversations while acknowledging there is much yet for us as scholars, students, and young Earth-kin to learn.

By sharing our stories, memories, and experiences from our cultural heritage and family perceptions, we understand that this wisdom has shaped who we are and who we are becoming always in relation to the multispecies world upon whom we are obligatorily dependent and to whose flourishing we contribute. van Dooren et al. (2016) used the concept *passionate immersion* as a frame for multispecies studies that unsettles notions of species as clearly bounded genetic entities, and the notion of *types*, opening up ways of knowing and understanding others and with implications for epistemology, political philosophy, and ethics around questions of, "liv[ing] with others in entangled worlds of contingency and uncertainty" and "inhabiting and co-constituting worlds well" (p. 1). It is *passionate immersion* that might be considered our epistemological frame underlying the narrative choices we have made.

As van Dooren et al. (2016) articulated, passionate immersion is firstly about cultivating ways of being attentive and interactive with diverse lifeways including "the lives of the awkward, the unloved, or even the loathed" (p.6).

First, we present our frame of education for multispecies' flourishing. Next, we share our autobiographical narratives in relation to who we are as emerging curriculum scholars with each other. We also retell and relive our storied experiences and pay attention to the resonances. Finally, we discuss our forward-looking thoughts and imagine an Environmental and Sustainability Education curriculum.

Multispecies' Flourishing

Our framework for multispecies flourishing (Khan, 2020; Khan et al., 2022) builds upon Seligman's (2011) PERMA (Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment) framework for human flourishing in positive psychology. Our extension is to foreground critical omissions with respect to the environment and larger socio-political, economic, and ecological contexts (e.g., Jardine, 2016) in such frameworks for human well-being, while acknowledging that widespread human flourishing is dependent on the ongoing flourishing of our many multispecies partners. As Khan and Bowen (2022) stated,

> Multispecies' Flourishing is not another/an Other "plot" … It is an ethics that sits in relation to the multiple interlaced economic systems that span the globe today … It is an ethics that is in opposition to frameworks that seek to relegate any aspect or member of the multispecies world as "property."… Multispecies' Flourishing is the next step in a long emancipation (Walcott, 2021b) not just of oppressed peoples everywhere on this planet, but oppressed species understood very broadly. (p. 5)

In telling, retelling, co-composing, and co-composting our stories, we see our experiences as closely integrated and co-partnering with multispecies living within this cosmopolitan society. We believe that "there is not and has never been human flourishing at community and population levels without—or independent of—multispecies' flourishing" (Khan, 2020, p. 239). We do not take the multispecies world as resources to be exploited for profit, particularly within exploitative and extractive economies (Ghosh, 2021) but as partners involved in engaging in their own

processes of survival, transcendence, dignity, belonging, and challenge (Sakakibara, 2020). We are not opposed to the "farming" of plants, animals or other species but to the type of relationships we have, and we are opposed to large-scale industrial methods embedded within plantation logics (Khan et al., 2022) alongside the policing and carceral structures that end up imprisoning and denying the dignity of many species. We note again that the majority of humans who fall under the current rubric of the Anthropocene are not involved directly or indirectly in such actions and that there are many good examples from Indigenous cultures and other sustainability movements that provide alternative pathways for living communally with our multispecies kin.

Our view of the notion of Curriculum Studies for "sustainability" in the Anthropocene is, by implication, fraught, since practices in many countries are for the most part not sustainable or require a consumptive conception of sustainability that over-represents particular economic and financial interests and posits the individualist consumer's financial choices as the locus of power and social and environmental change (Arthur, 2012). This of course is nonsense as individual choices are drowned by the strong attractors of and exponential level differences between such choices and those of policies that preferentially advantage global financial markets and the military-industrial complex (Ghosh, 2021)—two significant contributors to global environmental precarities. To be blunt, "sustainability" in the West means death for the rest.

Best (2008) noted that our mathematical reasoning skills come from and draw on language comprehension and critical thinking, which cannot be divorced from social context. These social arrangements, according to Best (2008), provide the context within which social problems (statistics) emerge and shape what sorts of numbers gain attention. These skills under the rubrics of Quantitative Literacy or Financial Literacy have been components of Social Studies curricula for decades (Lucey & Cooter, 2018). From our perspective, quantitative literacy and decision-making incorporate personal, local, cultural, and global ecology by developing an understanding of how our decisions impact our future as well as the future of our multispecies kin. When quantitative literacy is culturally situated in kinship with other living/nonliving entities and other species, economics allied with ecology, or relative-ness—that is, an understanding of our relation as a relative—(e.g., Krawek, 2022) teaching and learning can emerge into the development of sustainable relationships that are not profit-motivated (Reinert, 2016) but mutually beneficial and persistent over long periods of time.

Our paper is holding space for members of non-dominant cultural groups of people. We do not follow the traditional format of a scientific paper. This paper invites readers to set aside their expectations and to meet the work where it is and as it is, and to accept multiple realities as being valid. We recognize that it can be difficult to break with culturally valued habits of thinking, doing, and reading especially in the area of what counts as knowledge. In this spirit of being challenged, we hope to build human knowledge from various experiences and perspectives.

Method

Employing Collaborative Autoethnography as our Research Methodology

Autoethnography

Our method of investigation used in this paper is autoethnography, a method not often/commonly used in most educational literature. To clarify,

> Autoethnography is an autobiographical genre of academic writing that draws on and analyzes or interprets the lived experience of the author and connects researcher insights to self-identity, cultural rules and resources, communication practices, traditions, premises, symbols, rules, shared meanings, emotions, values, and larger social, cultural, and political issues. (Adams et al., 2017, pp. 3-5)

According to Adams et al. (2017), autoethnography is a qualitative research method that: 1) uses a researcher's personal experience to describe and critique cultural beliefs, practices, and experiences; 2) acknowledges and values a researcher's relationships with others; 3) uses deep and careful self-reflection—typically referred to as "reflexivity"—to name and interrogate the intersections between self and society, the particular and the general, the personal and the political; 4) shows people in the process of figuring out what to do, how to live, and the meaning of their struggles; 5) balances intellectual and methodological rigor, emotion, and creativity; and 6) strives for social justice and to make life inherently better (p. 2; see also Poulos, 2021, pp. 3-5).

We have shared our stories about our culture from small agricultural communities as we experienced the transformation of our families, communities, and environments and relate these experiences to the multi-species perspective. From Dianne's personal research, for example, she has shared facets of her heritage, through which she has come to understand how many varieties of cereals spread between Africa and the Caribbean through migration and slave trade—seeds and grains that were harvested, smuggled, planted, and grown to feed labourers in varied environments (Harris, 2011; Tibbetts, 2006). Carolina Gold is one such variety of rice that followed this path and is still in existence today. Rice cultivation, ecological and transformative knowledge, has led to the production of over 400 varieties of rice globally over the last 10,000 years.

From our perspectives as educators, this work exemplifies transformative learning proposed by Dirkx (1998) and Freire (1970). This paper takes knowledge, lived experience, and inter-generational learning from people on the periphery to center stage in this collaborative work. In our opinion, it is an example of meta-cognitive learning, incorporating generational knowledge, lived experience, and culture within a framework (Multi-Species) for interdisciplinary learning.

Agriculture is the single most profound and pervasive transformative force exercised by humans globally for the last 12,000 years. Documented by anthropologists and archeologists, plant and animal domestication by humans' dates to 10,000—14,000 years ago, forming the basis of modern society and economy (Carey, 2023). Furthermore, agriculture, foundational to all complex societies, is a key driver of our Canadian economy for both external and internal trade. Along with grain export (wheat, rye, barley) and petroleum products, these industries form the core of Canadian GDP and directly impact climate change. Canada is an active participant in the global economy and in this paper we, Canadians, are discussing the similar forces of our past, albeit on a smaller scale, that are impacting our present and future.

What are we learning?—Our challenge as educators is to teach history, language, math, and social science from varied contexts that connect culture and environment, with critical reflection that make the subject matter relevant to our learners. Steadfastly demonstrating to our students the value of and respect for our environment, while actively engaging them in how to preserve it, make it flourish, and sustain it for future generations. Therefore, this paper will challenge the readers breadth of thinking in a variety of ways—it requires broad theoretical knowledge that takes an interdisciplinary approach, draws knowledge from non-mainstream histories, and requires complex and lateral thinking, while drawing on personal agency and self-efficacy.

Collaborative Autoethnography as a Methodological Framework

In this paper, we used collaborative autoethnography as a methodological framework. Collaborative autoethnography is a form of qualitative inquiry rooted in storytelling, sharing individual stories, and reflective writing with one another in a community. At a given time, each individual comes to the circle of trust and shares their stories through which they contribute to collective work in "their distinct and independent voices" (Chang et al., 2013, p. 24). The individual makes meaning in their stories through their writing engagement as an inquiring process. Group gatherings embrace multiple voices for group meaning-making in harmony and synergy toward a social-cultural phenomenon.

Our group engaged in concurrent collaboration (Chang et al. 2013), where we were involved in the research process organically and steadily. We chatted, discussed, shared, and reflected on our social, cultural, and personal experiences connected to multispecies flourishing. Besides the solo individual writing time, we were scheduled to meet frequently from spring 2021 to spring 2022 to keep pace with one another and share our work collectively. Through our immersion, we saw various experiences that each member went through and the commonalities we shared as a human being.

Data Collection and Analysis

In this collaborative autoethnography, data is our story. We wrote individually and came together to immerse ourselves in group sharing. We took turns reading our stories out loud. From these moments, we made meaning of them through interaction and deep listening to each other's narratives. We then found emerging narrative threads across stories and collectively negotiated to come up with themes. These themes cover our beliefs and worldviews about the non-human world and how they help to shape our identities as educators, researchers, and, above all, as individuals within the universe where everything and everyone is interconnected.

Our collaborative autoethnography is multivocal and collective with the intention of bringing or offering some useful tools that can help scholars/innovative educators. We have included in our collaborative autoethnographic account or multi-narrative paper individual experiences based on our cultures that may guide our readers/audiences who are educational researchers or educators who would love to explore new horizons of inclusive or sustainable teaching practices in multicultural Canadian classrooms.

Telling Stories of Making Kin with Multispecies' Flourishing

When reflecting on our cultural experiences and the contexts in which they occurred, we found that our cultural identities intersect/overlap in terms of the "resources" we "partner" with, for our flourishing as marginalized people who have strong environmental connections. In this section, we share the narratives of our cultural experiences.

Hang's Story: My Great Family's Rice Field.

I was born and raised in a Vietnamese village
My childhood was full of my grandparents' folk songs
"Hard working will keep you from getting hungry

One grain of rice costs nine sweating drops"
I grew up seeing rice as integral
From my family's rice field to our dining table

When I was three, my grandpa took me to our rice field
I touched the rice plants and smelled their fragrance
I told Grandpa I loved the rice field because of its beauty
My grandpa nodded his head, "it also helps us survive"
I could never forget his first lessons of the rice
In our two hundred years old kitchen
My great grandma taught my grandma to cook the best rice on firewood
Later my grandma taught my mom and my mom taught me
All same lessons started when female generations turned six years old

I remember conversations of villagers passing by our door
Their two most often words were "đất" (land) and "nước" (water)
Because the rice could not grow without them
Later I came to learn a new important word "đất nước"
A combination of land and water, and it means "country"

Six years ago, I left Vietnam with my young children
In my luggage, I carried a pottery eating bowl
Every time our Lunar New Year comes
I use that bowl to measure the rice and bean
To make Bánh Chưng with my children in Canada

I buy Vietnamese glutinous rice and Thai mung bean
Plus, Canadian pork, Filipino banana leaves, and plastic cooking thread
I use my arm length to measure wrapping cords, and hand span to measure the leaves
With a square wood frame, I taught my children how to wrap the cakes
In the same way my grandma taught my mom, and my mom taught me (see Figure 1)

It takes patience, care, and love during the cake wrapping
But the nice smell of well-cooked Bánh Chưng spreads in our house
It lifts up my feeling of connection with ancestors and greater family
My feeling of belonging to the rice field, the buffalo, the land, the water
Tomorrow I will again tell my children the story of our rice field.

Figure 1

Ingredients Needed for Making Bánh Chưng and the Cake After Being Fully Wrapped

Tram-Anh's Story: The Kitchen and the Piggy Bank.

The Kitchen

Growing up in the city, I cherished and experienced the lessons imparted by my mother during our yearly summer visits to our ancestral village in the western region of Ho Chi Minh City (formerly known as Saigon). I witnessed the farmers' diligence in planting and harvesting the crop, their sweat on the farm, and their worries when they did not have a fruitful season. *Bán mặt cho đất—Bán lưng cho trời*, a Vietnamese proverb describes farmers' work in the intense sun in the paddy field. Their faces face the ground, and their backs are exposed to the sun. My Mom taught me to save food and trained me well in eating so that no rice should be spilled out as this was a sign of food wasting and not appreciating the farmers' work.

My Mom always stored cooking oil, rice, salt, and fish sauce in our kitchen as these essential items helped our family survive. She said, "no matter what happens, we need to have this essential food in our kitchen." I carried her wisdom across the border to Canada where my kitchen is always full of these ingredients. My husband and I used to experience financial shortages in our transnational life, but with these essential ingredients, we knew that we still had our safety net and would not starve.

The Piggy Bank

In Vietnam and some East Asian countries, parents and grandparents often give red envelopes (*bao lì xì*) filled with money to the younger generation in the Lunar New Year (*Tết*), the most important celebration in Vietnamese culture. These red envelopes represent prosperity, luck, well-being, and longevity. I was taught to receive the red envelopes with both hands and to send best wishes to the givers as an expression of politeness, respect, and appreciation. I saved my lucky money in a piggy bank and spent the money on my education or on an experience to broaden my knowledge—not the latest toys. Education was a long-term investment and a critical conversation among my family members.

My parents and relatives witnessed a series of wars since they were born, so naturally they learned to prepare for uncertainty and impermanence. They shared with me their stories of experiencing the post-war hardships. Through different war experiences and the red envelope story, my family enabled me to learn how to self-manage our savings and use the money for long-term educational purposes. Although my parents grew up with Confucianism's influence, which did not support girls furthering their education, they always encouraged me to keep learning and developing my career as they believed the benefits of girls' education extend to their children. Building my knowledge and skills allowed me to make meaning of my ways of being to learn, grow, adapt, and flourish in different landscapes.

Diane's Story: From the Caribbean to Canada.

A common experience of agrarian Caribbean countries of the late nineteenth and early twentieth century was food scarcity and rationing due to war (socio-political disruption), drought, or hurricanes. As an undergraduate, I had the opportunity to do research in Barbados and learned that what Bajans call the "kitchen garden"—a small, domestic or family garden of edible foods for household use—occurred all over the Caribbean, Mediterranean, and several parts of North and South America in response to slavery and food scarcity. This practice existed for generations and is still found widely throughout the Caribbean, Africa, Europe, the Mediterranean, Asia, Southeast Asia, Latin America, and North America. These family gardens cultivated cereals (rice, oats, corn, beans, barley, millet), fruits, vegetables, and ground provisions (potatoes, yams, eddoes, breadfruit, cassava, and sweet potato) and raised and maintained small numbers of livestock (cows, goats, sheep, pigs, and chickens) for family consumption and sale at local markets. This is how generations of my ancestors survived and maintained themselves even into the twentieth century (Harris, 2007).

Family farmers from the community acknowledged, shared, and respected their connection to their family land and what it provided. Replenishment and maintenance of family land was practiced throughout island communities, and it was based on the Indigenous knowledge of the interdependence of living organisms in a seasonally driven environment (Harris, 2007).

Sree's Story: Kolam Drawing.

My connection with kolam drawings began after marriage when I moved to Karur, a small city in Tamil Nadu, India. Kolam making is a part of Tamil Hindu women's ritual throughout Tamil Nadu and is also followed by the Tamil diaspora in many parts of the world. Kolams are drawn on house thresholds to announce auspiciousness and inform the neighbours that all is well in the household, and its absence suggests otherwise. I learned to draw kolams from the Tamil women who lived in my neighbourhood.

I like to draw traditional Kolams with rice flour. My favourite Kolam patterns were the ones with lines that go around the dots, a reminder of the practice of dealing with issues that arise in day-to-day life. Drawing fine lines around the dots was a challenge especially since the rice flour is dropped on the ground by moving the index finger against the thumb and our bodies need to move as we draw the Kolam designs on the floor (see Figure 2).

I always enjoyed the meditative aspect of drawing Kolams. Kolams are rebirthed every day after being eaten by insects, birds or are erased by wind and footsteps of people. I used to feel energized whenever I drew Kolams and felt a calming effect of this art on my mind, especially

Figure 2

Sree's Simple Kolam Drawing with Grid Dots, Using Wheat Flour

since the air outside the house was filled with plenty of oxygen early in the morning. This daily ritual of 15–20 minutes helped me improve my patience, problem-solving skills, memory, and creativity, and the posture strengthened my body.

Olivia's Story: The Wheat Story.

Historically in China, provinces that are separated by the Huai River cultivate different grains for their main source of sustenance. The provinces to the north of the river would primarily cultivate wheat and corn, while provinces to the south of the river would cultivate rice. Therefore, those in the northern provinces would generally consume wheat products (e.g., steamed buns), and those from southern provinces would consume rice products (e.g., rice noodles; English & Geeraert, 2020; Robson, 2017).

My grandfather, who grew up in a rural village in the Shandong Province of Northern China, only knew a land of wheat and corn. As a young boy, my grandfather would only consume brown whole wheat steamed buns or corn-based buns, but he dreamed of one day eating a luxurious white steamed bun. Later, he achieved this dream when moving from the farm to the city, where he would finally eat a white steamed bun. When my father immigrated, it was much easier to find Western bread than to hand-make steamed buns, even though they were not a sufficient replacement. And soon after my mother joined him, rice became more of an option for sustenance as their main grain.

My family's experiences have led to my Chinese Canadian lifestyle, growing up with the convenience and accustomed taste of rice as my main form of sustenance. It was only after my grandparents also immigrated to Canada, that I became more in touch with my familial tradition and history surrounding wheat. Now, my grandparents' hand-make whole wheat, white, and corn-based steamed buns for our family. They have shown me the effort it takes to make fresh steamed

buns with patience and physical work. By keeping up with these traditions and listening to my relatives' stories, I was able to learn about adapting societal and cultural changes for sustenance.

Steven's Story: Why Plant Sunflowers?

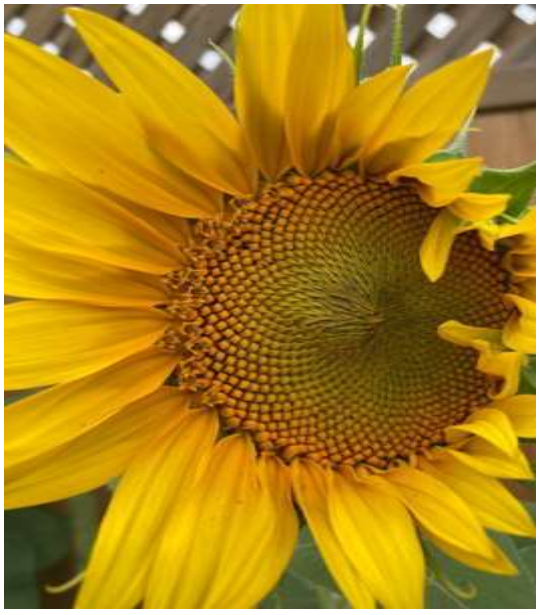
We plant the seeds in Spring
and tend them over the Summer.
Not all survive,
the squirrels and other relatives.
Now in August with temperatures approaching my age,
they teach me to greet the day,
to give thanks for the air, water and to care for our other relatives.
The mason bees, bumblebee, honeybee, pollinator flies, beetles, caterpillars, finches, cardinals, jays, and others who are less visible in the soil (see Figure 3).

Why plant sunflowers?

To teach Fibonacci
Golden spirals
Phyllotaxy patterns and
Optimal packing or
to be reminded, to listen, to attune, to slow down.
To find dignity again,
after pandemic mourning
after wartime invasions.
There is a world in which freedoms yet to come have come at last.
I hope there are sunflowers and bees … and us.

Figure 3

Steven's Sunflower in His Garden (2022)



Results and Discussion

In our retelling and attending to our stories, we slowly awaken to the resonant threads that "echoed and reverberated across" (Clandinin et al., 2019) our experiences. Within the complexity and layeredness of this process, we pay attention to the important knowledge that calls us forward.

Thread One: Making Meaning with Place-Based Wisdom

Multispecies' Flourishing acknowledges the essential and sustainable relationship with land and learning, and through our stories, we found a strong connection to our environment and the wisdom it provides. From our own lived experiences and from the stories of past generations, we create space for conversations about how the land provides in more ways than one. We discuss another dimension of our own interpretations of the reimagined Curriculum Studies in the context of the Anthropocene, where new theoretical eco-orientations and views of residence can generate learning for greater harmony and wisdom with the land (Farrell et al., 2022).

Hang

My poem shows me the significant meaning of places across my experiences as a young child, a grown-up, and a mother. I learn from Basso's (1996) seeing certain places as being imbued with a power to teach individuals in the keyways of wisdom; and this knowledge has been visible in my grandpa's teaching of rice farming. I also find it profound that I carried my grandma and my mom's lessons of our traditional culinary icons to my family's kitchen in Canada. Here I could feel more deeply the place-based wisdom in the familial curriculum making (Huber et al., 2011) that my children and I inherit from our elder generations and co-compose in our everyday practices. I learn how the traditional, historical, political, and economic aspects—and also people living on the land—support or challenge the children's life making. Too, I see the important role of multispecies living on the land in educating children and nurturing children's love and care for animals, plants, and the ecology that surrounds their childhood.

Tram-Anh

From my daily practice of sitting and walking meditation as a tradition of my family, I learn to establish a connection of my body, mind, and soul to my homeland. Through my parents' teachings, I see their memories and attachment to the changes on the land that they witnessed since they were born. The stories of my family and their teachings of appreciating the farmers' hard work have shaped within me the meaning of *quê hương*, a meaningful and spiritual Vietnamese term referring to a homeland. Navigating our lives in a cross borderland in Canada, my husband and I sometimes wonder what *quê hương* means to us and how we could maintain our cultural values in a transnational space where we are on our way for adaptation into a new culture. Learning from the wisdom of Halperin (2014) that places "do not exist a priori but are produced by ongoing human social practices and experiences with the material world" (p. 111), we understand that places not only exist in the physical world but can also be an outcome of our imagination (Phùng, 2020). When leading our life in transition in Canada, even though my husband and I might feel like we are sometimes "floating" (Phan, 2011, p. 107), we always see

ourselves getting closer to the wisdom and tradition of our family, leading us to cultivate and sustain a sense of *quê hươ̛ng* in our transnational life.

Dianne

Successive summer visits to my grandparents' home provided the opportunity to explore and gather knowledge that land not only sustains us but is a place that we are intrinsically connected to. This knowledge was based on informal study and ancestral learning of environmental seasonality, soil depletion, and enrichment using locally gathered natural materials (manure etc.) in a natural cycle. Participation in this process made me acutely aware that our humanity is intimately tied to the land as biological organisms living in a larger ecosystem.

Our food and traditions are connected to the seasonality of our environment and a colonial past. Harris (2007) explained:

> [In] villages of the Caribbean, African culinary know-how was maintained and coupled with the techniques and ingredients of varying European powers to produce dishes like callaloo and fungi, coocoo, kenkey and dokono, which retain the tastes and names, of their African antecedents. (p.38)

I later learned from aunts, uncles, and grandparents that crop domestication for production and export like cocoa, sugar cane, coffee, rice, cotton, spices, and alcohol were the foundation of economic growth from the fifteenth to the nineteenth century. As Harris (2007) noted, for more than 200 years, sugar dominated crop production in the Caribbean, and by the mid-17th century, the Caribbean was poised to become the centre of the sugar revolution beginning in Barbados, spreading to other islands, and turning the region into a monoculture of multiple small farms. With respect to Maroon heritage, I learned that the majority of rice farming was predominantly done by Maroon women (Carney, 2000; Harris, 2007; Rose, 2020); this rice formed the staple dish I grew up with known as rice and peas.

Sree

Kolam is a land art or environmental art that was transferred from remote areas of its origin to modern locations where this art could interact with more common audiences and thus widen the scope of this land art (Rahbarnia & Chadha, 2015). Rice, the material used in Kolam drawings, is part of the agrarian economy of my motherland, Kerala. Based on our experience, we believe that rice wetland ecosystems play an important role in preventing floods and droughts and conserving the diversity of flora and fauna. My grandparents and parents always insisted on growing the natural rice varieties of Kerala, which are tastier compared to the commercial rice types. Cultivation of traditional rice is affected by stress at the biotic level like depletion of groundwater, climatic change, pollution, and shortages of labour (Blakeney et al., 2020). The onus of preserving traditional paddy varieties lies on us, and we can do so by incorporating them in our dishes, though sometimes we may have to innovate the recipes based on the place-based availability of ingredients.

I also believe that in the Anthropocene, climate change must be understood as a crisis that has affected human societies as well as natural non-human environments (Steele et al., 2015) without any binary misconceptions. For us, human existence is inseparable from non-humans, especially since all our cultures/voices/lived experiences are based on land and agriculture.

Olivia

The differences in cultivation of resources from the separation of China's North and South by the Huai River have not only affected the contrasting diets of these regions, but also have created cultural differences in practice, tradition, and relation to my relatives. Some differentiating traits are that the Northern Chinese are often characterized as loud and straight-forward talkers, whereas Southern Chinese are often characterized as soft-spoken and non-confrontational. Through the rice theory, we can understand the disparities of cultivating wheat versus rice with the result of the placed-based differences of ideals/culture in the Anthropocene. Because China has an extensive history, these contrasting regions could have had an impact on the development of communities built around cultivating grains, leading to differences in ideals: whereas wheat regions are thought to have independent and individualistic mindsets, rice regions are thought to have more collectivist, holistic, and community-based thinking (English & Geeraert, 2020; Robson, 2017).

Steven

The biographical poem is a re-telling of multiple histories of migration, colonization, and industrialization. It is a story of how my ancestors—land and slave owners, enslaved, indentured and other came to make a place in a world transforming at all times around them with multispecies partners. Having lived now in three provinces for extended periods of time, the idea that place affects thinking, doing, and being makes more sense. And yet I feel a deep sense of irony and more than a fair share of guilt in the ways I have contributed to teacher candidates' ongoing alienation from their spaces and their species. But it is their challenge to me to help them connect the threads, to find a sustainable home in mathematics that calls to the forgotten field botanist from a lifetime ago to get outside, and to press against the narratives of shame that locate system pathologies and policy failures in individual bodies.

Thread Two: Collaborating with Materials not as Resources but as Partners

A key concept to multispecies' flourishing is the collaborative aspect of showing "reciprocal generosity" (Nagarajan, 2018, p. 209) as well as forming kinship with the materials, ingredients, and species to act as partners for our flourishing rather than resources for our exploitation. This holistic framework provides a mindset that enables us to grow harmoniously with our environment in a sustainable fashion. For Curriculum Studies, we hope our narratives with partnering can help view curriculum making in the ways we learn to engage and interact with materials holistically (e.g., familial curriculum making).

Hang

Extending my knowledge to see the blending of familial curriculum making and multispecies' flourishing, my thoughts bump against the dominant institutional narratives of subject-matter-oriented school curriculum. I wonder about the emergent needs of teachers' bringing children's lives, familial curriculum making, and multispecies' flourishing into inquiry alongside the colonial Western subject-matter-oriented school curriculum. Pulling from Khan's (2020) words, "I have

taken up the challenge of not referring to myself, other teachers, textbooks, and the other elements of classroom learning ecosystem as 'resources,' but as 'partners'" (p. 240), I am hopeful for a greater partnership between teachers, teacher educators, parents, and community members to cultivate flourishing for/with children and multispecies partners. I also hope for more recognition and attention to the children's lived curriculum: the combination of their school curriculum-making world and their familial curriculum-making world. This holistic and long-term curriculum is vital for children's development in the current ever-changing world, geographically, politically, and socially.

Tram-Anh

Quantitative literacy is not just about monetary systems but the deep concepts relating to values, saving, spending, investment, family, and multispecies' connection. When making kin with culinary ingredients (meat, rice, oil, sugar, salt, etc.), I have learned from the teaching of my family that I should only take what I need and appreciate what I have. Reimagining the story of the past when my family went through different hardships, I anchor my contemplation toward the relationship between human beings and other species. I am wakeful to learn that non-human species are not only resources for us to consume; the kinship we establish with them leads us to show a deeper appreciation for the sacrifice of others for our lives and our basic needs.

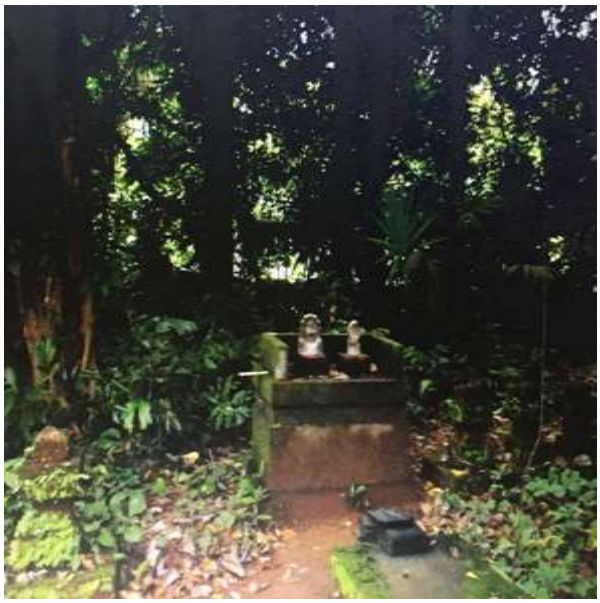
The materialistic convenience in modern life has led us to a more human-centric approach seeing animals and other species as non-spiritual entities, which makes us consume, spend, and use more than we need. In this way, we have left behind our kinship and spiritual connection with nature and other entities. I imagine if the curriculum reflects the interconnectedness and the insight of making kin with multispecies partners and mindful consumption, students will holistically heal themselves and nurture within them the seeds of empathy and compassion not only with other human beings but also with the multispecies world (Brink, 2008).

Dianne

I have come to understand that renewal and replenishment are equally important and a requirement for successful cohabitation and coexistence with our multispecies partners, where a dynamic equilibrium exists in every cyclical exchange. Although the actions and outcomes of this exchange are embedded in the disciplines of biology, physics, environmental science, and medicine, we (as a human species) have not been able to successfully replicate this renewal process within our society. There is a reluctance to address the poverty and depletion that exists within first world nations. Desapriya and Khoshpouri (2018) reported that in 2015, 4.8 million Canadians lived in low-income households; of these, 1.2 million were children. Desapriya and Khoshpouri (2018) further noted that "social injustice is killing people on a grand scale … the social determinants and health inequalities are a substantial challenge to healthcare systems around the world" (p. E805). Significant imbalances in human populations will, over time, reflect in local environments. Socio-economic inequalities have a direct impact on human mortality, our multispecies partners, and physical environment. Forging deliberate, clear, permanent, and mutually beneficial partnerships can be a way forward.

Figure 4

The "sarpa kavu" /Abode of snakes in Sree's home



Sree

When we draw Kolams, there is a good intention of feeding many other species using rice flour and thus helping those species (ants, birds, squirrels, and plants) flourish (Nagarajan, 2018). For me, ecological awareness started as a child of six years during my visits to the sacred groves or *Sarpa Kavu*, an ecologically thick patch of land that is part of my traditional matriarchal home in Kerala (see Figure 4).

Miller and Cardamone (2021) noted the need to educate students to focus on doing justice to the natural environment and build partnership with the local environment, thus familiarizing them to connect with nature through care and empathy. A firm knowledge of problems related to environmental sustainability along with critical pedagogical skills, attitudes, and values would help teacher education students practice Environment and Sustainability Education (ESE) in schools to transform students' learning (Walshe & Tait, 2019). I think Kolam drawings can help teachers/trainee teacher educators enable students' reflective learning with an emotional connection and commitment to the environment.

Olivia

In the present environmental holistic thinking, we should reflect that our farming practices have evolved, and we should learn from the historical and cultural differences of rice and wheat cultivation. From an agroecological perspective, learning from past cultivation differences in communities allow us to observe how people have worked with the land (Gliessman, 2016). We may understand this from those who cultivated rice, where information about irrigation and weather/climate were communicated between farmers of different crops. This was also observed

from the wheat cultivation story of my grandfather, as I learned about the manual labour and the hard-working animals on the wheat farms. For example, I learned that it was a privilege to own an ox to work alongside when tending to the land. Further, there are lessons we can learn from the traditional methods of cultivating crops—humans working with the land in a more respectful and healthy manner, adopting more sustainable partnerships through the advantageous natural processes, and therefore creating an ecological reciprocating environment during the age of the Anthropocene.

Steven

Sugar, oil, iron, salt, dust, coral fragments, sunflowers, and bees—these are my collaborators as much as the concepts and materials I use and those I collaborate with in thinking, being, and writing. In these collaborations are stories of consumption and environmentally unsustainable practices and ultimately a desire to break with some aspects of those legacies while still acknowledging their contribution to one's becoming. In my teacher education practice, I am beginning to use more diverse materials more intentionally such as sand, soap, and snowflakes—bringing multiple identities and heritages closer (see Figure 5).

Thread Three: Sustaining the Intergenerational Reverberations and Quantitative Literacies

Through our shared stories, there is a clear reappearing connection to the intergenerational wisdoms that express and sustain the cultural, familial, and communal significance within past practices and traditions. As our collective past structures our present, we can foreshadow the future with reverberations from our diverse cultural heritage (past and present) for our learners, relating their perceptions of financial and social actions with environmental change (Pinar, 2004). In this section, these perceptions can be reflected in our notion of Curriculum Studies, which can be prominent in concepts of quantitative literacy and culturally responsive pedagogical practices.

Figure 5

Teacher Candidates' Sand Drawing, Paper Snowflake, and Bubble Minimal Surface

Hang

Young (2005) taught me about intergenerational narrative reverberations through her stories of the spiritual and relational practices she experienced in her home and community places. In my transition to Canada, I carried the spiritual meaning of our homeland to our new home place and in my family's home curriculum. Inwardly, I learned that when my children and I made our Bánh Chưng in the Treaty Six Territory of Indigenous Peoples, we strongly retold and re-lived our homeland's kinship with our wet rice civilization and tradition of cultivating the farm. Significantly, I inherited the cultural, traditional, and intergenerational wealth of my homeland and I clearly recognize my passion to pass these values to my children and grandchildren. Amidst lots of uncertainties in our migration, one thing I know clearly is that our family's intergenerational knowledge guides us through the challenges to keep hopes and sustain our identity and dignity. Furthering my thoughts, I wonder how much intergenerational knowledge has been attended to and taught in our curriculum. I wonder how teachers and educators are experiencing the benefits and challenges of employing intergenerational lessons in their profession.

Tram-Anh

The values of appreciation and gratefulness were passed on to my generation from my parents' and my grandparents' insight through various hardships. Their wisdom of hard work and education shape my understanding of how to become independent but simultaneously reflect deeply upon the interconnectedness of human beings with nature and other species (Thich Nhat Hanh, 2013). We embrace these survival skills and values with us to our transitional adventure in Canada and learn to nurture them to form a familial environment for ourselves and for the upcoming generation.

Dianne

Over the years, I have come to understand that my cultural difference affords me a perspective that equips me with abilities and skills that do not come from formal education. I have learned to embrace the values of family, respect, stewardship of my environment, and legacy. My ancestors had a vision, wisdom, and intelligence that was acquired from living a difficult life and imparted their knowledge to their children and grandchildren in the form of culture, tradition, and the example of a self-sustaining family farm. I believe there is much wisdom and knowledge yet to be learnt from our Indigenous and ancestral homes that can prepare us for the road ahead.

Sree

I heard the story of Andal, who started the practice of Kolam drawings in Tamil Nadu from my Ammumma (maternal grandmother) as she oiled my hair on weekends when I used to visit her. Oiling hair reflects family bonding, and children get acquainted with family stories embedded in the culture as mothers or grandmothers apply homemade oil on our hair. Ammumma was the one who gave her children and grandchildren the *Vishu kaineettam*/the handsel (usually in coins) early in the morning of Vishu, the new year of Kerala. I also follow the same custom of gifting my children money on Kerala's New Year's Day, a cultural practice like the red envelopes in Tram-

Anh's story. My mother had given me a handwritten recipe book of traditional dishes, which are usually prepared during our cultural festivals, and I plan to give the same to my daughter when she starts a family of her own in the future. I hope the handbook will help her accept, adjust, and reorganize herself to any new culture with resilience while retaining her own heritage.

Olivia

As my grandparents have shown me the process of baking steamed buns, I have not only learned our traditional practices, but also our generational wisdom. Through understanding the life challenges of my grandparents and parents, such as hardships of obtaining food and immigrating to the West, I can appreciate the opportunities that I am presented with now. From my grandparents, I now understand the meaning behind the proverb, "面包会有的"—"there will be bread," as it encourages an optimistic thinking, the hope of a brighter future, and strength to carry on when there are hardships. These words have created a stronger meaning in the role that wheat plays in our family heritage, which shall be passed onto future generations. From my experience with the traditions of my ancestors, I believe that by learning the diversity of historical practices, we can ultimately understand the root of certain ideals, and expand our horizons connecting through our lived experiences (Smith, 2020).

Steven

As a teacher, I am challenged by the way my co-authors, friends, and academic kin have taken up this work in vivifying the Multispecies' Flourishing framework through autoethnography and narrative inquiry and by the complex weaving and unweaving of selves and story in this paper. The paper can be thought of as a mycelial network with various observable fruiting bodies connected by a subterranean anastomosing network of relations. I am challenged to rethink what else I think Multispecies' Flourishing might be about in the context of an Environmental and Sustainability Education that takes seriously the implications of needs for survival, transcendence, dignity, belonging, and challenge that are always emerging as living/learning forms from the interactions of land, language, lore, logic, and love, and which are represented in the textured narrative stories above—the stories of parents and children whose curricula require representation in schools and in teacher education. The challenge is one of humility and respect. My orientation has been to be more silent, to attune and attempt to listen more attentively to the biophonies in these stories. There is much yet to learn.

Conclusion

We have taken a critical and skeptical attitude towards Environmental and Sustainability Education in the Anthropocene and an anthropogenic context. We see the value of our work as a hinge discourse or pedagogical pivot (Ellsworth, 2005) that enables play by putting insides and outsides in relation and opening thought to the multispecies world in its complexity. From our narratives, we imagine that Curriculum scholars will benefit from an experience through (oral) storytelling, sharing the wisdom of the land, familial and intergenerational traditions, and culture, and quantitative literacy because the main materials (e.g., rice, wheat, sugar, etc.) that connect our stories have a deep-rooted ecological significance. There are also challenges and dignity embedded in all our stories (the challenges of farming, preserving one's culture, and conserving

place-based wisdom in all its flavours in the process of adaptation to the new home) and transcendence in our living and teaching practices. We hope that readers approach our text generously by considering what these stories might contribute to reimagining Environmental and Sustainability Education in the current context.

The conclusion we have arrived at is that Environmental and Sustainability Education, from whatever beginning is chosen, has always occurred in and alongside and sometimes in complicity with, and sometimes in resistance to, the many world-ending events experienced by humans and their multispecies kin. At this moment, there is a need for deliberation, and there are difficult choices to be made about what Curriculum Studies might be for and not merely against. We suggest that one answer to this curriculum question is to make kin again with other humans and our other-than-human relatives as well as to study their curricula. For we cannot talk about justice or liberation within the Anthropocene without the concrete liberation of the people and other species who inhabit it alongside the economic systems that contribute to their impoverishment and un-freedom (Simpson et al., 2022), and we cannot have those conversations without a discussion of reparations (Táíwò, 2022) alongside reconciliation and ecosystem restoration and regeneration (Hawken, 2021). These are the complicated conversations (Pinar, 2004) that require more of us, which we hope for next.

References

Adams, T. E., Ellis, C., & Jones, S. H. (2017). Autoethnography. In J. Matthes, C. S. Davis, & R. F. Potter, Eds. *The international encyclopedia of communication research methods* (pp. 1–11). John Wiley & Sons. https://doi.org/10.1002/9781118901731.iecrm0011

Arthur, C. (2012). *Financial literacy education: Neoliberalism, the consumer and the citizen*. Sense Publishers.

Basso, K. H. (1996). *Wisdom sits in places: Landscape and language among the Western Apache*. University of New Mexico Press.

Bauer, C., Correa, C., Gallardo, L., González, G., Guridi, R., Latorre, C., Navarrete, S., Pommier, E., Riffo, S., Saavedra, B., Simonetto, C.,& Tironal, M. (2019). The anthropocene in Chile: Toward a new pact of coexistence, Las Cruces, April 2017 www.antropoceno.co. *Environmental Humanities, 11*(2), 467–476. https://doi.org/10.1215/22011919-7754578

Best, J. (2008). Birds—Dead and deadly: Why numeracy needs to address social construction. *Numeracy, 1*(1): Article 6. https//doi.org/10.5038/1936-4660.1.1.6

Bezan, S., & McKay, R. (Eds.). (2022). *Animal remains*. Routledge.

Biello, D. (2009, August 19). The origin of oxygen in Earth's atmosphere. *Scientific American*. https://www.scientificamerican.com/article/origin-of-oxygen-in-atmosphere/

Blakeney, M., Krishnankutty, J., Raju, R. K., & Siddique, K. H. M. (2020). Agricultural innovation and the protection of traditional rice varieties: Kerala a case study. *Frontiers in Sustainable Food Systems, 3*, 116. https://doi.org/10.3389/fsufs.2019.00116

Brannen, P. (2019, August 13). The Anthropocene is a joke. *The Atlantic*. https://www.theatlantic.com/science/archive/2019/08/arrogance-anthropocene/595795/

Brink, J. W. (2008). *Imagining head-smashed-in: Aboriginal buffalo hunting on the Northern plains*. Amsterdam University Press. https://doi.org/10.15215/aupress/9781897425046.01

Carey, J. (2023). Unearthing the origins of agriculture, *Proceedings of the National Academy of Sciences, 120*(15) e2304407120. https://doi.org/10.1073/pnas.2304407120

Carney, J. (2000). The African origins of Carolina rice culture. *Ecumene, 7*(2), 125–149. https://doi.org/10.1177/096746080000700201

Chang, H., Ngunjiri, F. W., & Hernandez, K. C. (2013). *Collaborative autoethnography*. Routledge.

https://doi.org/10.4324/9781315432137
Clandinin, D. J., Lessard, S., & Caine, V. (2019). Reverberations of narrative inquiry: How resonant echoes of an inquiry with early school leavers shaped further inquiries. In D. J. Clandinin, *Journeys in narrative inquiry: The selected works of D. Jean Clandinin* (pp. 278–291). Routledge. https://doi.org/10.4324/9780429273896
Colling, S. (2021) *Animal resistance in the global capitalist era*. Michigan State University Press.
Conversi, D. (2021). Exemplary ethical communities: A new concept for a livable anthropocene. *Sustainability, 13*(10), 5582. https://doi.org/10.3390/su13105582
Desapriya, E., & Khoshpouri, P. (2018). Investing appropriately to alleviate child poverty in Canada. *Canadian Medical Association Journal, 190*(26) E805-E806. http://doi.org/10.1503/cmaj.69470
Dewey, J. (1938). *Experience and education*. The Macmillan Co.
Dirkx, J. M. (1998). Transformative learning theory in the practice of adult education: An overview. *PAACE Journal of Lifelong Learning, 7*, 1–14.
Elliott, P., & Inwood, H. (2019). Contextualizing ESE in pre-service teacher education in Canada. In D. D. Karrow, & M. DiGiuseppe (Eds.) *Environmental and sustainability education in teacher education: Canadian perspectives*. (pp. 37–48). Springer. https://doi.org/10.1007/978-3-030-25016-4_3
Ellsworth, E. (2005). *Places of learning: Media, architecture, pedagogy*. Routledge.
English, A. S., & Geeraert, N. (2020). Crossing the rice-wheat border: Not all intra-cultural adaptation is equal. *PLoS ONE, 15*(8): e0236326. https://doi.org/10.1371/journal.pone.0236326
Farrell, A. J., Skyhar, C. & Lam, M. (Eds.). (2022). *Teaching in the Anthropocene: Education in the face of environmental crisis*. Canadian Scholars Press.
Freire, P. (1970). *Pedagogy of the oppressed*. The Continuum International Publishing Group Inc.
Freire, P. (1998). *Pedagogy of freedom: Ethics, democracy and civic courage*. Rowman and Littlefield.
Ghosh, A. (2021). *The nutmeg's curse. Parables for a planet in crisis*. The University of Chicago Press.
Giroux, H. A. (2003). Critical theory and educational practice. In A. Darder, M. P. Baltodano, & R. D. Torres (Eds.), *The critical pedagogy reader*. (pp. 27–56).
Gliessman, S. (2016). Transforming food systems with agroecology. *Agroecology and Sustainable Food Systems, 40*(3), 187–189. https://doi.org/10.1080/21683565.2015.1130765
Halperin, C. T. (2014). Circulation as placemaking: Late classic Maya polities and portable objects. *American Anthropologist, 116*(1), 110–129. https://doi.org/10.1111/aman.12068
Harris, J. B. (2007). Caribbean foodways. In J. T. Edge (Ed.), *The New Encyclopedia of Southern Culture, Volume 7: Foodways*. (pp.37–39). University of North Carolina Press.
Harris, J. B. (2011). *High on the hog: A culinary journey from Africa to America*. Bloomsbury.
Hawken, P. (2021). *Regeneration: Ending the climate crisis in one generation*. Penguin.
hooks, b. (1997). *Wounds of passion: A writing life*. Henry Holt and Company.
Huber, J., Murphy, M. S., & Clandinin, D. J. (2011). *Places of curriculum making: Narrative inquiries into children's lives in motion*. Emerald Group Publishing.
Ife, F. (2021). *Maroon choreography*. Duke University Press.
Jardine, D. W. (1998). *To dwell with a boundless heart: Essays in curriculum theory, hermeneutics, and the ecological imagination*. Peter Lang Inc.
Jardine, D. W. (2016). *In praise of radiant beings: A retrospective path through education, Buddhism and ecology*. Information Age Publishers.
Kaplan, J., & Ward, D. M. (2013). The essential nature of iron usage and regulation. *Current Biology, 23*(15), R642–R646. https://doi.org/10.1016/j.cub.2013.05.033
Khan, S. K. (2020). After the M in STEM: Towards multispecies' flourishing. *Canadian Journal of Science, Mathematics and Technology Education, 20*, 230–245. https://doi.org/10.1007/s42330-020-00089-4
Khan, S. K., & Bowen, G. M. (2022). Why multispecies flourishing? *Journal of Research in Science, Mathematics and Technology Education, 5*(1), 1–10. https://doi.org/10.31756/jrsmte.515

Khan, S. K., LaFrance, S., & Tran, H. T. T. (2022). After plantations' precarities: Curating math thematic curriculum plots in initial teacher education for multispecies' flourishing and a freedom-yet-to-come. *Research in Mathematics Education, 24*(2), 170–186. https://doi.org/10.1080/14794802.2022.2090421

Krawek, P. (2022). *Becoming kin: An indigenous call to unforgetting the past and reimagining our future*. Broadleaf Books.

Lucey, T. A., & Cooter, K. S. (Eds.) (2018). *Financial literacy for children and youth*. Peter Lang.

Macedo, D. (1998). *Foreword in P. Freire's, pedagogy of freedom—Ethics, democracy, and civic courage*. Rowman and Littlefield.

Marley, B. (1980). *Redemption song*. On Legend [CD]. Island.

Miller, W., & Cardamone, A. (2021). Educating through art, ecology, and ecojustice: A rain barrel project. Art Education, 74(1), 40–45. https://doi.org/10.1080/00043125.2020.1825595

Mitman, G. (Host) (2019, June 18). *Reflections on the Plantationocene. A conversation with Donna Haraway and Anna Tsing*. [Audio podcast episode]. Edge Effects. https://edgeeffects.net/haraway-tsing-plantationocene/

Moreton-Robinson, A. (2015). *The white possessive: Property, power and Indigenous sovereignty*. University of Minnesota Press.

Morin, K. M. (2018). *Carceral space, prisoners and animals*. Routledge. https://doi.org/10.4324/9781315636986

Nagarajan, V. (2018). *Feeding a thousand souls: Women, ritual, and ecology in India—An exploration of the Kolam*. Oxford University Press.

Nelson, M. (2021). *On Freedom: Four songs of care and constraint*. McLelland & Stewart.

Nichols, R. (2019). *Theft is property! Dispossession and critical theory*. Duke University Press.

Phùng, T. (2020). Grounding the transnational: A Vietnamese scholar's autoethnography. *Research in Comparative and International Education, 15*(3), 217–233. https://doi.org/10.1177/1745499920946225

Phan, L. H. (2011). Fighting for the role of the nation state in knowledge mobilisation and research: An autoethnography of a mobile Vietnamese scholar. In T. Fenwick, & L. Farrell (Eds.), *Knowledge mobilisation and educational research: Politics, languages and responsibilities*. (pp. 100–113). Routledge.

Pinar, W. F. (2004). *What is curriculum theory?* Routledge.

Poulos, C. N. (2021). Conceptual foundations of autoethnography. In *Essentials of autoethnography*. (pp. 3–5). American Psychological Association. https://doi.org/10.1037/0000222-001

Rahbarnia, Z., & Chadha, P. (2015). "Kolam" Hindu Earth Graffiti as land art in the field of new art, *Bagh-E-Nazar, 12*(36), 19–28. http://www.bagh-sj.com

Reinert, H. (2016). About a stone: Some notes on geologic conviviality. *Environmental Humanities, 8*(1), 95–117. https://doi.org/10.1215/22011919-3527740

Robson, D. (2017, January 19). How East and West think in profoundly different ways. *BBC Future*. https://www.bbc.com/future/article/20170118-how-east-and-west-think-in-profoundly-different-ways.

Rose, S. (2020, April 5). How enslaved Africans braided rice seeds into their hair and changed the world. *Blurred Bylines*. https://blurredbylines.com/blog/west-african-slaves-rice-hair-maroon-french-guiana-colonialism/ (accessed online, March 2021)

Sakakibara, C. (2020). *Whale Snow: Iñupiat, climate change and multispecies resilience in Arctic Alaska*. University of Arizona Press.

Seligman, M. E. P. (2011). *Flourish: A visionary new understanding of happiness and well-being*. Atria.

Sen, A. (2000). *Development as freedom*. Oxford University Press.

Simpson, N. P., Clarke, J., Orr, S. A., Cundill, G., Orlove, B., Fatorić, S., Sabour, S., Khalaf, N., Rockman, M., Pinho, P., Maharaj, S. S., Mascarenhas, P. V., Shepherd, N., Sithole, P. M., Ngaruiya, G. W.,

Roberts, D. C., & Trisos, C. H. (2022). Decolonizing climate change–heritage research. *Nature. Climate. Change 12*, 210–213. https://doi.org/10.1038/s41558-022-01279-8

Smith, D. G. (2020). *CONFLUENCES intercultural journeying in research and teaching: From Hermeneutics to a changing world order*. Information Age Publishing.

Steele, W., Mata, L., & Fünfgeld, H. (2015). Urban climate justice: Creating sustainable pathways for humans and other species. *Current Opinion in Environmental Sustainability, 14*, 121–126. https://doi.org/10.1016/j.cosust.2015.05.004

Montford, K. S. & Taylor, C. (Eds.). (2022). *Building abolition: Decarceration and social justice*. Routledge.

Táíwò, O. O. (2022). *Reconsidering reparations*. Oxford University Press.

Thich Nhat Hanh. (2013). *Love letter to the earth*. Parallax Press.

Thompson, J. (2022, July 1). Life helps make almost half of all minerals on earth. *Quanta Magazine*. https://www.quantamagazine.org/life-helps-make-almost-half-of-all-minerals-20220701/

Tibbetts, J. H. (2006). African roots, Carolina gold, *Coastal Heritage Magazine, 21*(1), 2006. https://www.scseagrant.org/african-roots-carolina-gold/

Tran, H. T. T., Khan, S. K., & La France, S. (2020). Mathematics for multispecies' flourishing: Make kin with Vietnamese Bánh Chưng. *Philosophy of Mathematics Education Journal, 36*. http://socialsciences.exeter.ac.uk/education/research/centres/stem/publications/pmej/pome36/index.html

Thomas, G. (2006). PROUD FLESH Inter/Views: Sylvia Wynter. In *PROUDFLESH: A New African Journal of Culture, Politics & Consciousness, 4*. https://www.africaknowledgeproject.org/index.php/proudflesh/article/view/202

van Dooren, T., Kirksey, E. & Münster, U. (2016). Multispecies studies: Cultivating arts of attentiveness. *Environmental Humanities, 8*(1), 1–23. https://doi.org/10.1215/22011919-3527695

Walcott, R. (2021a). *On property: policing, prisons and the call for abolition*. Biblioasis.

Walcott, R. (2021b). *The long emancipation: Moving toward Black freedom*. Duke University Press.

Walshe, N., & Tait, V. (2019). Making connections: A conference approach to developing transformative environmental and sustainability education within initial teacher education. *Environmental Education Research, 25*(12), 1731–1750. https://doi.org/10.1080/13504622.2019.1677858

Wynter, S. (2000). Africa, The West and the analogy of culture: The cinematic text after man. In J. Givanni (Ed.), *Symbolic Narratives/ African Cinema: Audience, theory and the moving image* (pp. 25–76). British Film Institute.

Wynter, S. (2003). Un-settling the coloniality of being/power/truth/freedom: Toward the human, after man, its over-representation. *CR: The New Centennial Review, 3*(3), 257–337.

Wynter, S. (2015). The ceremony found: Towards the autopoetic turn/overturn, its autonomy of human agency and extraterritoriality of (self-)cognition. In J. R. Ambroise & S. Broeck (Eds.), *Black knowledges/black struggles: Essays in critical epistemology* (pp. 185–252). Liverpool Scholarship Online. https://doi.org/10.5949/liverpool/9781781381724.003.0008

Yussof, K. (2018). *A billion Black anthropocenes or none*. University of Minnesota Press.

Young, M. I. (2005). *Pimatisiwin: Walking in a good way. A narrative inquiry into language as identity*. Pemmican.

Dr. Thi Thuy Hang Tran has been a lecturer at Ho Chi Minh City University of Technology and Education, Vietnam for 15 years. She completed her PhD in Elementary Education at the University of Alberta, Canada. Her dissertation, *Narrative Inquiry into the Experiences of Vietnamese Children and Mothers Composing Lives in Transition to Canada*, received three awards of Outstanding Dissertation in

Canada and the US, and was published into a book by Springer Nature. Currently, Dr. Tran is a postdoctoral scholar at the Child Trauma Research Centre, University of Regina. She can be reached at hangttt@hcmute.edu.vn.

Dr. Tram-Anh Bui (Trâm-Anh Bùi) earned her PhD in Educational Studies with the Outstanding Doctoral Dissertation Award from Brock University. She has been a full-time lecturer at Ho Chi Minh City University of Foreign Languages and Information Technology (HUFLIT), Vietnam. She is a scholar-practitioner in international education, currently working as an international student advisor, and an Adjunct Professor, Lakehead University. Her research interests are student mobility, intercultural competence, internationalization, and contemplation and mindfulness-based inquiry. She loves working with and for international students. Her email: tbui2@lakeheadu.ca.

Dianne J. Kenton holds both an MEd and BEd (Adult Education), Brock University and an Hon. BSc, University of Toronto, and is currently completing studies in Data Management and Statistics, at Toronto Metropolitan University with plans to purse doctoral studies. Dianne has eighteen years post-secondary instructional experience in business management, financial services, curriculum and human development. Her research interests are social justice, equity, risk, adult and mathematics education, environmental and global citizenship. She can be reached at dkenton01@gmail.com.

Dr. Sreedevi Rajasekharan has PhD in Biology from Manonmaniam Sundaranar University, India. She has a BEd from Annamalai University, India and M.Ed. in Administration and Leadership from Brock University, Canada. Sreedevi is currently teaching at a high school in Northern Manitoba. Her research interests include Land Based Pedagogy, Environmental Sustainability Education, and Multispecies' Flourishing. She can be reached at shrisekh@gmail.com.

Olivia Lu is a Chinese Canadian Doctoral student in Mathematics Education at the University of Toronto, Canada. Her research interests include mathematics education, alternative education, educational change, ethnomathematics, and teacher education. She can be reached at olivias.lu@mail.utoronto.ca.

Dr. Steven Khan is an Associate Professor in Mathematics Education and the Director of Teacher Education Programs at the Department of Educational Studies, Faculty of Education, Brock University, Canada. He can be contacted at skhan6@brocku.ca.