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## New Obligations and Shared Vulnerabilities: Reimagining Sustainability for Live-Able Worlds

*...the language of sustainability is pretty limited...[At] its heart, sustainability, the way we think about it, is embedded in this worldview that we, as human beings, have some ownership over...what we call, resources, and...that we want the world to be able to continue to...keep taking and keep consuming*

(Robin W. Kimmerer, 2016, para. 69)

Early childhood, in the Canadian context, is widely understood as a time to spark imaginations and feed young minds in preparation for transition to primary school and the increasingly deeper concepts they will engage with therein. Through this lens, science, technology, engineering, math (STEM) and sustainability pedagogies emerge as an important part of the promise of setting young children up to progress through childhood's 'ages & stages' in order to acquire the life skills necessary to become independent and productive global citizens in a rapidly changing world (McClure et al., 2017; Saram,

et al. 2018). Sustainability and STEM education have become established concepts in what are understood to be 'progressive' primary and early childhood (EC) programs, and are often held up as a conduit for building better stewards to address the serious ecological challenges ahead. But, what if our very approach to thinking about and doing STEM and sustainability with young children requires a fundamental rethink?

The way young children learn about ecological systems has material consequences in the world. Increasingly, childhood is marked by anxieties about ecological inheritances (Taylor, 2017). Intensified pollution, mass extinction, climate change, and other so-called Anthropocene realities have heightened both a sense of urgency over narrowing possibilities for life on this planet and desires to find solutions. Perhaps we need to ask ourselves if how we are 'living' science in everyday practice is the best approach for preparing young children to respond to these challenging times? Furthermore, if one of the goals of education is to compose better possibilities for shared life, the question we are wondering is, *better for whom?* (Cairns, 2017; Malone, 2015; Nelson, Pacini-Ketchabaw, & Nxumalo, 2018; Nxumalo, 2018a; van Dooren, Kirksey, and Münster, 2016)

In this article we share three stories from our place-based inquiry projects to help us think through these questions and explore some of the neoliberal settler-colonial logics that underpin destructive patterns of living that children must now learn to contend with. These stories emerge from our work with an ongoing action research study with early childhood educators and young children that began in 2011 at a university-based child care program and includes children from 18-months of age until age five years old. We come to this work in different roles: as pedagogists and researchers (Narda and Denise), and as an early childhood educator (Ildikó). The purpose of this research is to implement, disseminate and extend pedagogical approaches outlined in the *British Columbia Early Learning Framework* (Government of British Columbia, 2018). This long-term research study has been reviewed following the university's Human Research Ethics Board process in Canada. As an action research project (MacNaughton & Hughes, 2008), participating educators and children are considered co-researchers, co-shaping the methods used for data collection, the analyses, and the modes of knowledge generation and sharing. Together, we investigate and experiment with curriculum and pedagogy through inquiry projects, working together to make these (partially) visible through the process of pedagogical narration, a teacher researcher tool akin to the practice of pedagogical documentation from Reggio Emilia, Italy (Atkinson, 2012; Government of British Columbia, 2018; Hodgins, 2012).

In pedagogical narrations, moments of practice are captured through observation and recording (e.g., photographs, video, sound recordings, note-taking) for individual and collective reflection with children, educators, and families. Opportunities for ongoing critical reflection arise as these traces get taken up and shared with others through various forms (e.g., poetry, prose, visual art) in varying ways, such as displaying them on classroom walls, in community exhibits, or distribution via family emails or newsletters, journal articles and social media sites, such as Twitter (see Figure 1). Pedagogical narrations and inquiry work invite a range of perspectives and inform the daily planning and engagement of the program's curriculum and pedagogical approaches. It is through this method that stories, such as those highlighted here, emerge and continue to ripple out through the childhood centre and greater community.

Figure 1: Stuck in the ivy #climateactionchildhoods Tweet



Over the past five years, several of our inquiry projects have explored the everyday relations that the children and educators have with(in) a small urban forest that borders the childhood centre at the edge of the university campus (Haro Woods et al., 2018; Land, et al., 2019; Pacini-Ketchabaw, 2013; Yazbeck & Danis, 2015). Educators regularly take children for walks in the forest, whose inhabitants are also keenly observed through the chain link fence that surrounds their centre's yard. Pedagogists and researchers join the programs for scheduled weekly visits to investigate and document a 'curiosity' together that is related to the inquiry, generally growing out of the previous week's events. Each week ideas are shared, educators and pedagogists write reflections, and we read, watch, or listen to project-related resources (such as works by writer, plant ecologist, and enrolled member of the Citizen Potawatomi Nation, Robin Wall Kimmerer, and British artist and environmentalist Andy Goldsworthy), as we experiment in practice to think, question, and think some more together! Our collective thinking and experimentation is engaged and extended through planned provocations during these visits, as illustrated in "Story 2: Ivy Relations" which traces educator (Ildikó's) curiosities about English ivy, beyond its designation as 'an invasive' (Okerman, 2000). Our focused inquiry projects tend to run from October until June, however the process of collective thinking flows from one year to the next, in the same way the weekly inquiry explorations ripple into day-to-day classroom choices.

## NEW IMAGININGS

Stories shared in this article come from educator and researcher reflections that emerged in connection to one of the program's three-to-five year old classroom inquiry projects. We present them here, in italicized narrative form, as provocations to spark new considerations for creating pedagogies capable of responding to twenty-first century realities. In this article, we take seriously environmental education scholar, Karen Malone's (2015), "*call for 'a new imagining of a 'collective ecology' of human and non-human for future sustainability and environmental education' in the Anthropocene*" (in Taylor, 2017, p. 4). It is with great respect for all educators and researchers trying to make a difference with young children in the field of STEM and sustainability education that we offer this reflective piece to invite considerations of what might be required of us to create situated pedagogies capable of cultivating an ethos of 'real' change. Are we, for example, actively challenging the underlying frameworks for understanding that helped usher in such precarious times? In the Canadian context, this includes reflecting on and engaging in the difficult work of unravelling deeply held settler-colonial values that continue to influence our practices with young children. What theories, events, and webs of relating do we take into consideration in creating early years sustainability and STEM pedagogies and practice?

In this paper, our analysis reconsiders the histories that have shaped mainstream Euro-Western educational frameworks for understanding. We begin with an overview of the theoretical approaches that shape our forest inquiries, an approach we refer to as a common worlds framework. After sharing moments from practice we conclude by reflecting on implications for teaching sustainability and STEM on Esquimalt, Songhees, and WSÁNEC territories, otherwise known as Victoria, BC on the West Coast of Canada.

## COMMON WORLDS FRAMEWORK

In rethinking the frameworks we tend to rely on in implementing STEM and sustainability education with young children, it feels important to ask ourselves how they influence understandings of our (human) place in the world and our connections with (or, disconnect from) others. Dominant contemporary approaches to education are profoundly influenced by inheritances from the imbricated histories of Euro-Western science, developmental psychology, child studies, and education that arose in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, which were in turn moulded by Cartesian scientism from the 17<sup>th</sup>-century (Burman, 2017; Cannella, 1997; Lather, 2017). Two legacies that continue to haunt educational practices today are the conceptualization of nature (phenomenon, knowledge, truth) as quantifiable or knowable and "out there" to be found, rather than seeing ourselves as a deeply en-

meshed part of its existence, and childhood as an imagined separate sphere of ‘innocence and vulnerability’ (Nxumalo, 2018b; Taylor, 2013). Iris Duhn (2012) highlights these legacies as impediments to opening ourselves up to new understandings in sustainability and environmental education:

*The importance of engaging young children in environmental learning has been recognised as a key element in cultivating a potentially life-long disposition of care for the environment (Hacking and Barratt 2007). ECE is a significant site where such a disposition can be fostered as early as possible in a child’s life. It is perplexing, then, to consider that the persistence and strength of the historical trajectory that links ‘the child’ to ‘nature’ may have contributed to ‘a research hole’ around critical analysis of discourses of sustainability and environmental issues in ECE (Davis 2009, 227). A contributing factor could be that ECE has been deeply shaped by wider social and cultural understandings of the child as vulnerable and innocent (Kincaid 1992). The idea of childhood as a time of innocence that should be kept free of complex knowledges (Lesnik-Oberstein 1994) poses a formidable challenge for educators when it comes to developing pedagogies and curricula that address contestable issues, such as climate change, as an early childhood focus. (p. 20)*

In the Canadian context, these views are sustained by Euro-Western binary logics that continue to reinforce notions of an either/or divide between human/nonhuman, nature/culture, Self/Other, and so forth, where one side of the binary is situated as superior to the other (e.g., Man/nature, adult/child, cultivated/wild, civilized/savage) (Barad, 2007; Haraway, 2016; Lather, 2017; Plumwood, 1993).

Furthermore, frameworks underwritten by these logics perpetuate an anthropocentric (and Euro-centric) view of the world by promoting understandings of humans as the only agentic stewards to care for the environment and its more-than-human inhabitants, positioning them primarily as resources to fulfill our human desires and needs (Malone, 2015). As Affrica Taylor (2013; 2017) and others (Duhn, 2012; Malone, Truong & Gray, 2017) suggest, this includes a tendency to frame nature as a static and curative backdrop against which childhood development can be enhanced (Chalwa, 2007; Collado & Staats, 2016; Cox et al., 2017; Louv, 2008; Nisbet & Lem, 2015). We believe it is here, within sustainability and STEM approaches, that finding new ways of composing together matter more than ever.

One avenue we find promising is the approach presented through a common worlds theoretical framework. Leaning on the notion of common worlds offered by Bruno Latour (2004), where the social is understood to include all constituents, including nonhuman life forms, forces, and entities, this framework works against the premise that agency is exclusive to humans and that human interests are the paramount starting point and rationale in educational research and related practices. This type of more-than-human relational ontology is often touted in the social sciences as the ontological ‘turn’ or new materialism (Lather, 2017; St. Pierre, Jackson & Mazzei, 2016), however understanding the world as comprised of human and non-human entangled relations has been central to Indigenous knowledges for millennia (Kimmerer, 2003, 2013, 2016, 2017; TallBear 2015, 2017; Todd, 2016; Watts, 2013). Our common worlds conceptual approach is deeply indebted to these knowledges as well as being influenced by the vision of critical place inquiry put forward by Eve Tuck and Marcia McKenzie (2015), where chosen “*methods engage place explicitly and politically*” (p. 3). Common worlding research and educational approaches (re)focus on our past, present, and future entanglements with other beings, nonliving entities, elements, forces, landforms, technologies, discourses, and so forth; this approach is supported through a collective intention to resituate children’s lives within indivisible more-than-human common worlds, (see [www.commonworlds.net](http://www.commonworlds.net); Hodgins, 2019; Pacini-Ketchabaw & Taylor, 2015; Taylor & Pacini-Ketchabaw, 2018).

We are particularly drawn to thinking with feminist anthropologist Anna Tsing’s (2015) call to cultivate the “*arts of noticing*” as a means of promoting a greater appreciation of our fundamentally shared existence while learning to respond to the challenges of twenty first century living. Tsing (2015) argues for passionate attunement to the symbiotic ways that plants, animals, and other creatures – like us – story place, as an essential part of the process of promoting response-able relation-

ships (van Dooren & Rose, 2016). Cultivating approaches to STEM and sustainability education capable of foregrounding our relational dynamics and interdependencies with the world feels critical in a society bent on perpetuating untenable patterns of living that are buoyed by seeing humanity as existing apart from other species (Myers, 2017). What might we learn by opening ourselves up to new understandings of our shared vulnerabilities with other creatures? (Haraway, 2016; Tsing, 2015) How can we, in our educational practices with children, pay attention in ways that provoke meaningful responses to our deep entanglements with other creatures? Might such attunement support a more complicated curriculum, based on what Canadian curriculum theorist Ted Aoki (1993) calls “*curriculum as lived*” in particular bodies, beyond predetermined content and modes of pedagogical enactment? (Nxumalo, Delgado, & Nelson, 2018) Through the stories shared in this article, we argue for cultivating the arts of awareness, attunement and consequence as a conduit for getting somewhere new together in sustainability and STEM pedagogy and practice.

While we bear witness to a growing sense of urgency in the world regarding “children’s futures”, it seems to us that urgency might not be where we think it lies or where we are often told it is by those in authority (Thunberg, 2018). With the words of Tsing (2015), Haraway (2016) and others who advocate for telling situated stories in mind, we suggest that it is in the micro-moments of everyday patterns of relating that new possibilities exist. By reflecting on such moments, we hope to attend to ‘otherwise’ stories, that is, the lively stories that exist outside of the dominance of grand narratives, such as Esquimalt, Songhees, and WSÁNEĆ (also known as the Lekwungen and SENĆOTEN-speaking) peoples’ knowledges of the places we live and work with young children, despite ongoing colonial attempts at extinguishment over the past hundred and fifty-plus years (Deerchild, 2018b; Haro Woods et al. 2018, Land, et al. 2019). Equally important, are the stories yet to come. Whose lives do we (educators and researchers) hold open as having futures and whose do we relegate to a place in history in our practices with young children? Whose stories are invoked and invited as guides along the way in our pedagogical pursuits and practices? And, how might we cultivate something other than a citizenry bent on progress via ‘mastery over nature’, where genuine curiosity about otherwise stories might be one of the most important tools we have in finding a way forward?

## STORY 1: SOMETHING MORE

*In thinking about how we might share our ideas about sustainability education and our common worlding research, my mind kept coming back to a moment last summer during the height of the worst forest fire season in British Columbia history (Little & Yudza, 2017). I (Narda) question whether I can even call it a season because, for me, the bleed between it and the spectre of the 2016’s record-breaking fires around the Fort McMurray, Alberta tar sands were simply part of a global wildfire continuum that includes California (Tierney, 2018), Greece, Portugal, Romania, Siberia, Chile, Sweden, and South Africa, and most recently Australia (Pierre-Louis, 2017; Readfearn, 2019).*

*But it is not the unprecedented number of hectares burned, nor financial costs, or other ‘quantifiable’ loss that strikes me as something worthy of raising in relation to early years STEM and sustainability education. Rather, it was something a woman described during a CBC call-in radio show last August that made everything suddenly seem clear, in terms of the importance of what we are trying to do together at the childhood centre.*

*The woman called in from a “tiny community” somewhere in the British Columbia Cariboo Region, along an escape route for many people fleeing north from the fires, to share her feeling of helplessness and the decision she and other local women made to create “a compassion station” for folks fleeing the fire to stop for water, food, toilet, and a moment’s respite on their journey north. She described a moment when another woman pulled off the road in a vehicle filled with (as I remember it) three sheep, two dogs, her children and their grandmother. While the children and grandmother got out to stretch and use the facilities, the driver stayed in the vehicle*

*with the animals and wept for a few moments. I cannot imagine how difficult that experience was, but what strikes me most about this moment is that it represents ‘something more’.*

*The questions that emerged for me after hearing this story, in connection to sustainability and STEM education, are: Exactly what kind of worlds are we preparing children for in early childhood education? What types of citizens are we hoping to become together along the way? Do our teaching approaches, frameworks for understanding, and practices promote attunement to our connectedness with so many others in this beautiful, but rapidly changing, world (beyond consumer-culture preoccupations)? Are we supporting children to become capable of responding to that which is constantly unfolding in new and increasingly unpredictable ways?*

While deeply concerned, we do not hold Narda’s narrative up in a fatalistic sense. We are leery in this paper, and our everyday relationships with young children, families, and colleagues, of contributing to a “*shock doctrine*” milieu that, as Naomi Klein (2007) cautions, creates a sense of emotional and moral paralysis where we become more than happy to hand the reins over to anyone with a big stick to solve our problems. The point of STEM and sustainability education is certainly not to prepare young children for ‘the end’. This is simply the beginning. The world has always been in motion and now it seems, after centuries of fire suppression, heavy industrialization, and colonial management approaches to ‘pristine’ spaces and extraction zones, we are in the midst of learning to contend with the materialization of what Anna Tsing refers to as “*the Plantationocene*” (in Haraway, 2016) set in motion. Instead of reducing an imagined static world into separate, ‘quantifiable’ spheres, it feels vital to emphasize the everyday conditions we cultivate together, where monocrops, fish farms, cultured tree blocks, mass herds of domesticated animals, and global pet industries are part of the new reality in motion with us (Nxumalo & Pacini-Ketchabaw, 2017). We now have the added responsibility of teaching children how to respond to shifting global systems as these systems amplify in continuing to respond to us. Again, the stories we tell about this place and wider worlds *matter*, as do our perceptions about our shared responsibilities and vulnerabilities with others. What about the long story of how we got here and why certain bodies are disproportionately and adversely affected by dominant global patterns of living? How might these stories shape and inform our approaches to STEM and sustainability education with young children?

In trying to foster relationality in early childhood, it feels necessary to promote a sense of response-ability and obligation beyond an appreciation for ‘scientific objectivity’ and quantifiable outcomes. Using mathematics as an example, Gert Biesta (2016) advocates for educational approaches that make explicit “*political ways of doing and being (subjectification)*” (p. 24), rather than limiting ourselves to enhancing an individual’s ability to quantify information around them. As he says,

*If, instead of seeing mathematics as a body of knowledge and skills, we approach it as a social practice – a practice with a particular history and with a particular social “present” – we can even begin to develop a rationale for mathematics education that gives a central place to socialization, seeing it as an engagement with the social practice of “mathematizing” rather than as the acquisition of a body of knowledge and skills...[W]e might also explore the moral possibilities of mathematics and mathematizing...by treating division not as an act of carving things up but as one of sharing that raises questions about fairness and justice” (p. 23-24).*

What happens, for example, if we pause in our forest inquiry to look beyond children’s desire to take as many sticks as they can carry out of the forest, and think *with* the children about what the sticks might mean to birds, bugs and the soil communities who live there? As Sherri-Lynn Yazbeck (educator) asked in just such a moment: *how many sticks are “too many” to take from the forest?* (Haro Woods et al., 2018) Who’s forest is it?

Kimmerer (2017) similarly argues for the importance of emphasizing values and rejecting the myth of objectivity when doing science,

*We set aside value in doing our science so that it’s objective and rational – as if that was really possible – but the crises that we face together today are crises of values, are the places where*

*nature and culture meet together...they are issues of values...so we can't just use the tool that is "value free" to solve our environmental problems."* (12:14)

Her words feels particularly salient in light of the challenge of learning with children about the myriad of creatures we share places with, in particular, the squeezed (but still here) creatures who continue to thrive in sometimes unexpected and unsettling ways. Importantly, relational educational approaches that pay attention to plant, animal and other more-than-human ways of storying place also challenge anthropocentric eco-stewardship narratives, which tend to frame Humanity as a monolithic force and the sole actor in charge of setting all terms of existence (Taylor, 2017, 2019). Taking a posthuman approach, Malone (2015) suggests that by *"shifting away from the child as the central object of our gaze by being attentive to and noticing the nonhuman entities through which their world is being encountered, these narratives can support an un/learning, a new imagining for sustainability and environmental education"* (p. 18). It is here that we have the opportunity to rethink early learning approaches, where the arts of consequence, attunement, awareness might help us rethink our inextricable connections with others, including those deemed problematic.

## STORY #2: IVY RELATIONS

*The beautifulness of ivy... That too, is troubling about the ivy in the forest. We are convinced that the vines covering the trees are killing the them. Pulling it off of a tree is not OK, but if we yank them out of the ground we will not hurt the trees. When I (Ildikó) pose the question to the children "Is there anything we may hurt on the ground in our efforts of tearing ivy vines off of the forest floor?", they tell me that it is ok.*

*I have been waiting for this moment, when finally the children do something with the ivy. On our forest walks we notice a group of middle school children working on clearing up a small segment of the forest of invasive plants, such as ivy and blackberry bushes. A few times we spoke with a man who walks through the forest every day. We see him pulling ivy from the ground too. I think all these actions being noticed by the children - finally encouraged - allow them to do something with it too. Watching the man braiding the vines together was the moment, I think, when we began to put the notion to which we have been so attuned behind us: 'Avoid hurting living things, just because we can.' When I bring the children's attention back to their earlier comment (after noticing birds hiding in the ivy) 'but the birds have to live somewhere too!', they readily assure me that, 'the birds like the trees better'.*

*We have been pulling ivy from the ground on our walks. Not always, but in waves, as the children occasionally interact with the ivy in the forest. By pulling them they marvel and cherish how long strands are before their break off from the ground, and they collect 'hearts', as they are convinced that the ivy leaves are heart-shaped; some children note that the veins on the leaves are not symmetrical; they figure out that to form a 'head-band, bracelet, body wrap' the ivy vines don't have to be tied together because they are easier manipulate with just to coil them together; they were curious about the strength of ivy vines, testing it by pulling each-other up on a large rock with the help of ivy vines. Last week, the children decided to bring bunches of ivy vines indoor where more things happened, including braiding some of it into our canvas which had yarn weaved-zigzagged already. Next, the plan (as one child suggested) is to bring this canvas to the forest and add more ivy to the 'art piece.'*

*I am troubled by the beautifulness of the ivy. I see it as an 'allowed to take', biodegradable material, right at our backyard, at no cost. Is this the perfect way of thinking with sustainable materiality in our early childhood practices? It's not going to happen but, going to the extreme, what would happen if we 'ran out of our ivy supply'? Would we grow some more? Or would we just forget about the ivy completely? (I have to ask the children these questions.) In dialogue with our pedagogists and the children, I wonder why we are 'in-encounter' with such invasive*

species? In a sense, we extend their life, and the children will have the memory that it was nice to 'play' with ivy. We came to understand that it is good to remove ivy from the forest (suggested by Earl Claxton Jr., Tsawout elder, ethnobotanist, and Knowledge-Keeper) so the trees can live, and native plan can grow again, but we also engage in the act of doing it 'because we can'. Watching the children pulling them out with roots also shows how easily they can just end a life of a living thing. Maybe I am overthinking and it is no different than weeding your garden. Natural selection carried out over living things as we humans carry out our needs and wants.

Sometimes I think of the ivy and it's existence as a perfect symbol of the colonization that took place. Colonizers establishing the ivy not knowing it's effect on the environment, then when it gets out of hand, dealing with it in a 'colonizing' way, 'getting rid of it with focused, collective, organized way' or let it live, take over natural environments, because that's the easiest way to deal with. I wonder, are we doing a part of something in the efforts of the reconciliation acts? Removing ivy does feel like we are doing 'something.' I am just troubled by the fact that in the process, there are beautiful art pieces being created by the children.



Figure 2: Ivy Relations

How and why might it matter to learn to recompose our community by learning to live with ivy as a teacher, who is very much connected with the histories that brought them to the forest we visit each week, instead of simply framing the ivy as mechanistic invasive species? Rather than positioning children as 'eco-heroes' saving the forest, how might we approach ivy plants with young children with a sense of curiosity about how and why these creatures wound their way into the forest and our centre's inquiry thinking? How do our cutting, noticing, pulling acts of *car-ing* with the ivy change our framework for understanding worldly relations and ourselves as 'of, and in connection with, the world? However small, these acts are literally enmeshed with(in) the forest, as a reflection of the needs and desires that require us to stretch our imaginations and language in order to better understand what might be possible in order to move forward in a more sustainable (sustain-able) way. What is made visible in the moment a child expresses concerns over why ivy cannot live in the forest with the trees, asking "Why can't they both live here?"

Sault St. Marie Tribe of Chippewa Indians citizen and assistant professor of Native American and environmental studies at Dartmouth College, Nicholas J. Reo discusses the way that colonization shapes mainstream scientific approaches to dealing with the problems posed by so-called invasive species. Commenting on the binary terms 'non-native' and 'invasive', Reo notes that,

*They've been applied to plant and animal communities, or what in a lot of Indigenous nation contexts, we refer to as plant and animal nations. And so within conservation biology and within the broader conservation and land management community we see people talking about introduced plants or animals or plants or animals who move outside their historic territory or range as "invasive", as non-native.... I started to rethink that a little bit and start to see this*

*native/non-native binary as applied to plants and animal nations as a bit arbitrary....We're really trying to think about what might different stewardship approaches look like to various invasive species.... So, that work is trying to very intentionally use the best of Indigenous knowledge and the best of Western science and have that inform our approach to responding to these plants.... I'm just talking with as many people from the communities as I can, how they see these new plants and animals fitting into their worlds....Do we have responsibilities for these new plants and animals?*

(Deerchild, 2018a)

We may not engage children with biological concepts at the same level as Dr. Reo and his colleagues, but we can, and do, start thinking with the children about the language we use to talk about plants, animals, technology and landscape forms in our forest pedagogies. Over the past year, for example, Ildikó, has been reading excerpts of Kimmerer's (2013) *Braiding With Sweetgrass* to the children at naptime for their consideration. Although it exceeds the parameters of this discussion to further detail of our efforts to make space for Esquimalt, Songhees, and WSÁNEĆ territories peoples' place-based knowledges in our everyday practice, we raise it here to signal a serious commitment to include them and other Indigenous knowledges (that are available and appropriate for us to use), as well as an array of speculative feminist scholarship, to decentre and complexify our Euro-Western-centric understandings. We do so as part of an ongoing effort to better appreciate past, present and future connections that continue to shape the places we live and work while creating response-able early childhood pedagogies (Haro Woods et al., 2018).

### STORY #3: FALSE SUSTAINABILITY

*Those 15 minutes breaks (one in the morning, one in the afternoon) when we educators attempt to remove ourselves from the child and educator colleague-filled space, just for a short while, are valuable moments. We give ourselves a chance to have some "Namaste" time. A few days ago I (Ildikó) was doing just that, enjoying my quiet time in our cozy, full of natural light break room, sitting on a comfortable couch, looking out the window. I saw someone, a substitute educator or a parent, placing many empty cardboard boxes over the fence. I noticed that her face and body language suggested excitement while she carried and piled up those boxes by the entrance door.*

*"Oh... gosh, so many boxes! Look at all that print on the boxes! Terrible. Great! Not! The prints on the boxes are free advertisements for the companies, finding the minds of the most receptive and 'conditional-able' audience: the children. There must be some 20 boxes stacked up there! Geez, so many boxes, that is just overwhelming! Why do we have to create this feeling that 'throw-away' materials should be brought in for the children to interact with? Crossing that silver fence-line, expressing love and CARE, but doing it materialistically. It's just troubling sometimes." I said this stream of thinking out loud.*

*"That's ok, the kids will love it!" exclaimed my colleague who happened to overhear my saying-out-loud thoughts. "I guess, they will." But I felt sad, as if I had just found and lost something.*

*I've been thinking about the phenomenon of "sustainability." Sustainability for me, and many of my colleagues, is not about reusing things. Bringing empty used wrapping materials, such as boxes, to the places where children spend their days, does not mean that we are acting sustainably. Often, we forget about the materiality of sustainability. Which is a slippery slope. Yes, reusing biodegradable materials is better than not reusing. But doesn't this just create the unavoidable notion of wanting more of them, to have these materials again and more frequently in our spaces? Doesn't this feel-good-act of collecting and reusing stop us from thinking about the consumption that brought these here in the first place? Where does it come from? Why and how did cardboard become a 'sustainable material'? What about the particular ma-*

*terials that were created and packed in that box? How far did they come from? What/whose needs did they serve? And for how long? And now, as a result of all that consuming, we have this pile of cardboard boxes. Do we need them? Is this what sustainability looks like?*



Figure 3: *Mattering with materials in ECE*

Prior to engaging in our collective inquiry process, the boxes might have been welcomed into the centre without a moment's hesitation. But our ongoing thinking together about our imperfect, entangled relations and responsibilities to our world complicates that which, on the surface, might seem simple. A recent study led by the University of Leeds (2018) found that no country currently meets its citizen basic needs at a globally sustainable level of resource use. Of particular resonance, when thinking about Canadian approaches to sustainability, are the words of waste flow scholar, Mira Hird, who points out:

*We tend to think that if other countries were like Canada, the planet could be saved...But if every country was like Canada-in terms of all-out consumerism and waste, the planet would be even more messed up than it is. What really hits the uninitiated is the flow of it all – the nightmarish relentlessness with which waste keeps coming, keeps needing a place to go, to hide, to die, sometimes to be reborn” (in Wilkins, 2017, para. 9).*

As such, working to foreground complexity, ongoing connections, and obligation in our practices feels like an important habit to cultivate in thinking about STEM and sustainability with young children.

Of course, ethical-political-material complexity is, and always has been present; we are just learning to see, pay attention, listen, and remember it. Belgian philosopher of science and ecologist, Vinciane Despret and Michel Meuret (2016), suggest that “[to] learn is to learn how to see and to pay attention. This is a transformation of ways to feel.... What Stroobants calls ... ‘the creation of a new relation to the world and to another world a way to inhabit a new milieu’” (p. 31). We believe this includes resisting the perpetuation of what George Monbiot (2018) describes as “the mistaken belief that a better form of consumerism will save the planet” (para. 7) in our approach to sustainability with young children. That we would *not* have paused to reflect on reusing cardboard boxes in our practice, prior to engaging in this inquiry work, may in part be due to a largely romanticized vision of early childhood education as apolitical, and certainly in part due to dogmatic rule of “child-centered” curriculum (e.g., “the children will love it!”). Innocuous as they may seem, our previous lack-of-pause to think about the materiality of cardboard boxes also reflects dominant recycling discourses that, however well-meaning, on some level “green-wash” consumption in many Canadian educational sustainability programs (Hird, 2012, 2013). As Monbiot (2018) points out, perhaps we need to focus more on the question of “How we should live?” (para. 5) rather than “what else should we be using?”, in terms of materials used in STEM and sustainability pedagogies.

Relevant to the question of ‘how we live’ STEM and sustainable pedagogies in early childhood, are the histories of sustainability discourses being co-opted by neoliberal forces. According to Lynley Tulloch and David Neilson’s (2014), the early 1970s social movements in the ‘North and South’ that birthed

radical sustainability concepts were firmly rooted in critiques of expansionist logics of capitalism, by seeking “to address the environmental and social cost of economic growth” (p. 29). Since then, Tulloch and Neilson argue, an unsettling shift in mainstream sustainability discourse has occurred, transforming it from a powerful movement based on critiques of everyday patterns of consumption to one of reimagining the relationship between economy and ecology as: 1) fused, and, 2) equally important and mutually constraining wherein the economy is understood “as the means by which ecological sustainability is to be achieved” (p. 27). Of course, global market forces are powerful and their transformation toward carbon-neutrality is imperative, however this clearly cannot be achieved by perpetuating the hyper-extractive consumptive patterns these times are predicated on. The assertion that radical sustainability concepts have been neutralized and marginalized also calls on those of us working in an overwhelmingly de-politicized milieu of early childhood to reflect on our own approach to pedagogy and practice.

Key within the neoliberal project is a belief that “*human–nature relations are reframed in terms of a depoliticised construction of humans as nature’s managers and nature as private property*” (Tulloch & Neilson, 2014, p. 32). Within such a paradigm, “*the environment is something to be ‘managed’, nature becomes ‘commodified’ and tradeable*” (p. 34). These beliefs are closely linked with the racist and colonial beliefs that continue to marginalize Indigenous, Black and other racialized groups, as seen in Indigenous-led land-defender movements such as recent Unist’ot’en pipeline protests on Gitumden Terrioty in northern British Columbia (Hamelin, 2018). In failing to actively challenge ourselves to rethink the way neoliberal and racist narratives continue to get taken up in our work with young children, we risk blindly perpetuating them in our approaches to sustainability and STEM educational projects.

## CONCLUDING THOUGHTS

With the seriousness of the task at hand (that is, shifting everyday patterns of relating toward a more live-able one) in mind, we are excited to experiment with and think about the potential sustainability and STEM pedagogies might hold for co-creating exciting openings with young children in regard to radically shifting mainstream understandings of the world and their place in it. As discussed, we believe this necessitates a self-reflective approach to thinking about the narratives and deeply held values we draw on to craft our early learning practices without perpetuating, however inadvertently, colonial and neoliberal modes of relating. In the opening quote by Robin W. Kimmerer (2016), we are challenged to resist accepting a sustainability narrative that “at its heart...is embedded in this world-view that we, as human beings, have some ownership over these, what we call, resources, and that we want the world to be able to continue to keep...taking and keep consuming” (online presentation). Highlighting the importance of engaging children in STEM education early, Sniedeman (2013) states:

*I like to think about STEM as much more than an acronym. STEM really is a philosophy. STEM is a way of thinking about how educators at all levels—including parents—should be helping students integrate knowledge across disciplines, encouraging them to think in a more connected and holistic way (NAAEE website).*

What happens if we embrace a radical read of this statement as reminder of the obligation we have, as educators and researchers, to approach sustainability and STEM education with a wide and critical lens to ensure we are creating pedagogies that work in the service of opening, rather than closing, possibilities for all children to inherit.

In this paper, we have argued for rethinking our approaches to sustainability and STEM education in early years education. One of the questions we have been working with over the past few years is ‘what can be done’ to strive toward something Collard, Dempsey and Sundberg (2015) call “*abundant futures*” rather than contributing to narrowing trajectories. We are inspired by environmental education scholars, Indigenous knowledges, and other feminist scholarly voices such as Anna Tsing (2015) to cultivate the arts of noticing in our approach to learning about ‘what *else* might be possible with young children?’ As discussed in this piece, we also actively try to engage in the unsettling work of

challenging our deeply held settler colonial ways of approaching our forest pedagogies and practices. It is our hope that in using a common worlding approach in early childhood education we might, in some way, shift anthropocentric and colonial understandings about ecologies and our place in them in these colonized and ecologically challenged times.

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