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1. INTRODUCTION AND OVERVIEW OF VOLUME

As an entry point into this final project in a trilogy linking Freirean pedagogies with transdisciplinarity, our Introduction offers a brief synopsis of the chapters focused on this volume's theme of environmental sustainability, along with an analysis of key conceptual themes, at a time of unparalleled crisis and uncertainty for our planet. This assessment was underscored during our writing with the United Nations Intergovernmental Panel on Climate Change (2014) Fifth Report, and their assertion that changes already underway in our global environment threaten peace, global stability and food supplies at an increasingly unsustainable pace.

Our contribution nevertheless aims away from fear and cynicism toward pedagogies of hope such as those envisioned by the Brazilian educator Paulo Freire (1970, 1999) throughout his time in the world. Also at the current juncture, the relatively unheralded rollout of the U.N.'s Decade of Education for Sustainable Development or DESD (2014), which began in 2005, has drawn to a close, and so we find ourselves less cautious in proposing such pedagogies as pathways for transformation. As editors, we are certain that praxis in a planetary context may be informed by such U.N. meta-narratives, yet global instruments of consensus must be coupled with local prioritization of the personal with collective action through grassroots organization and activism. In this instance, the Indigenous "Idle No More" movement is called to mind, as well as the specific activities of the "People's Climate Summit" which paralleled the recent U.N. Climate Summit in New York (Prupis & Lazare, 2014).

United Nations member states have accomplished an extensive body of international law, treaties, norms, practices and institutions that help members manage the emergent facets of interstate relations. All told, over 500 multilateral treaties have been concluded under U.N. auspices, making the organization the world's "central operating system" by performing its functions through member-states in order to generate such policy frameworks as the Millennium Development Goals, notes former U.N. Ambassador for Canada Paul Heinbecker (2013). In the case of Canada, its international stature continues to shrink from a previous reputation as a primarily pristine wilderness and human rights haven (Mitchell & Moore, 2012), a reduced status reinforced by Canada's 2013 withdrawal from participation in (and paltry financial support for) the U.N.'s International Convention on Desertification. The following year Canada was the only member state to raise objections to a

ground-breaking treaty establishing greater protection for the rights of Indigenous people (Lum, 2014). Heinbecker (2013) notes further that while the United Nations is far from perfect in its frequent level of systemic paralysis, as the one organization that can convene the world under one roof on major issues of the day it remains necessary and its effectiveness is in every nation's interest except, he dryly observes, Canada these days.

In a comparative discussion of how Indigenous and European worldviews are colliding to reconstruct the environmental debate, Canadian historian John Ralston Saul (2008) notes how truncated notions constraining efforts toward sustainable development are “scarcely more than modified industrial planning” (p. 86). Problematizing further, he argues “we are trying to impose the European, linear view of a human-centred world” and thus have suffered “from the specialization and narrow silos that dominate our education, administration and policies” (*ibid.*). Canadians, he concludes, “including many within the environmental movement, put more energy into their relationships with technology” than into their relationship with place. This sort of discourse is designed to distract Canadians and garner domestic votes, but “cuts no ice internationally” (*ibid.*). Indeed, he cites leading Australian climate change palaeontologist and mammologist Tim Flannery's description that Canadians have become “spectacularly – almost proudly – cavalier” about global warming and our maladroit exploitation of commodities playing a key role in the increase in global carbon emissions (Ralston Saul, 2008; see also Goldenberg, 2009; McCarthy, 2009). Internationally renowned environmental scientist, activist, and retired Canadian geneticist David Suzuki (2010) also roundly castigates those making dominant economic choices in this nation for jeopardizing the access future generations will require to clean air, clean water, clean soil, clean energy and biodiversity.

This complexity and interconnectedness of all forms of life on our terrestrial biosphere was captured succinctly by American philosopher J. Baird Callicott in preparation for a conference at the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2012) headquarters in Paris:

We humans are intimately connected – with every breath we take, every sip of liquid we drink, and every morsel of food we eat – to the surrounding bio-chemical-physical world. We are as vortices in a flux of energy and materials, distinguishable only as ephemeral structures in that flux. We cannot – that is, we should not – conceive of ourselves as in any way independent of the natural environment. Rather we are continuous with it. The protection of human health and wellbeing is indistinguishable from the protection of environmental health and wellbeing. (Electronic cite, para. 3)

As Callicott notes, all aspects of human experience in the current era are being shaped by plurality and increasingly intimate ontological connections with our environments that call for reconstructing ‘science’, and its reductionistic claims with cousins in ‘economics’, to a more reflexive, integrative understanding of sustainability that

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embraces the planet holistically. This profound yet easily embraced ontology showing humanity's interconnected relationship with their bio-ecosystemic environments is similarly described within Indigenous epistemologies (Arabena, 2006, 2010; Kahn, 2010; Malott, 2008). Richard Kahn's (2010) astute analysis considers how modern Western science has evolved in large measure through "the assimilation (i.e., 'stealing') of knowledge from non-Western and indigenous traditions" (p. 105). His notion of an emergent, critical expression of "planetary citizenship" (2010, p. 46) in response to the environmental crisis is similar to Murray Island Indigenous scholar Kerry Arabena, who theorizes a "universe referent citizenship" connecting such epistemologies with more balanced ecological perspectives aimed at revolutionizing twenty-first century life on this planet (2010, pp. 260–267). Such 'transdisciplinary' perspectives on how humanity will survive and adapt in coming generations are the focus of each of our contributors to this volume.

SUMMARY OF CHAPTERS

As in the case of our previous projects (Moore & Mitchell, 2008; Mitchell & Moore, 2012) the story of this volume began in an Ontario, Canada post-secondary education (PSE) setting, and quickly evolved from the local to the global. Our university, along with universities around the globe, finds itself in an era of intense transition and such transformations must involve questions of how to effectively and fairly evaluate research, teaching and service metrics at post-secondary institutions. E. L. Boyer (1997) discusses this process of engagement as a revolution in reform of higher education through four dimensions: the initial stages of discovery research and dissemination scholarship, of integration scholarship, of application scholarship, and finally of pedagogical scholarship. Our call for papers resulting in this final collection of contributors to transdisciplinarity in PSE was initially informed by a small, critical qualitative study undertaken at our own institution that collated various definitions of 'sustainability' to inform and then shape our university's first carbon footprint measure (Mitchell, 2011, pp. 13–18; Mitchell & Parmar, 2010; Mitchell, May, Purdy, & Vella, 2012).

Apart from the emissions data in the resulting audit, an additional key finding was the implication of our university's geographical location within one of UNESCO's 600-plus World Biosphere Reserves – the 700 kilometre-long Niagara Escarpment – which to that point had been largely overlooked as a research, evaluative, or recruitment framework. In that study, measures of conservation, socio-economic development, and education were revealed as "transdisciplinary" metrics (Mitchell, 2011, pp. 8–9; see also Giroux & Searls-Giroux, 2004; Robinson, 2008; UNESCO, 2014 for definitions) for researching and understanding these ecosystems as sites of excellence, and for evaluating improvements in sustainable relationships between and amongst human and non-human stakeholders. Similar to Aussie scientists Brown, Harris, and Russell (2010), Canadian geographer John Robinson contends that "transdisciplinarity has less to do with new theoretical frameworks and the unity

of knowledge” than with the emergence of problem- and solution-oriented research incorporating participatory approaches (Robinson, 2008, p. 71).

As Freirean educators, we attempt daily to avoid being co-opted in these pursuits, though we found some solace while editing this volume in the trenchant views of Naomi Klein (2014) while we similarly grapple with the tensions between climate change and capitalism in the research engines of higher education. In addition, the debates regarding transformations necessary for planetary survival and renewal that we carry out on a daily basis with students, colleagues and community partners offer additional refuge from the “tower of babble” wherein we frequently find ourselves (Moore & Mitchell, 2009, p. 30). In this project, we are guided by various ontologies of optimism, and how Paulo Freire looked at anti-oppressive teaching in a mutuality of respect for both teacher and learner (see also Hyslop-Margison & Thayer, 2008; Kincheloe, 2008, 2010). We have taken these ontologies forward and found both formal and informal rhizomatic linkages within diverse discourses from nursing, quantum physics, chemistry, and biology (Holmes & Gastaldo, 2004; Koizumi, 2001; Nicolescu, 2002, 2008; Suzuki, 2010), cardiac epidemiology (Albrecht, Freeman, & Higginbotham, 1998), climate change science and activism (Apgar, Argumedo, & Allen, 2009; Brown, Harris, & Russell, 2010; Klein, 2014), and with theorists in the humanities, social sciences, and critical scholarship grounded in feminist, queer, social justice and interpretive epistemologies (Kincheloe & McLaren, 2005; Leavy, 2011).

As child and youth studies scholars, (we) Mitchell and Moore open the volume with a chapter, *Leveraging Transdisciplinarity in Higher Education: A Study in Transformation*, that presents findings from a two-year investigation aiming to understand some of the competition and contradictions in our own institution through the lens of the U.N.’s Decade of Education for Sustainable Development. The chapter incorporates local/global connections between and amongst themes of environmental sustainability, transdisciplinarity and Freirean pedagogies within Canadian higher education in one PSE institution in Ontario, Canada.

From New Zealand, University of Waikato marketing professor Richard Varey’s chapter, *Marketing for Sustainable Living: A Problem of Crisis Calling for Pragmatism*, grounds the reader first with knowledge of three centuries of a Western, reductionistic worldview that has shaped foundational knowledge creation from classical science to economics, then with his argument for a post-normal standpoint. This “Great Transition” calls for social- cultural learning and a communal participatory strategy that rests on an integrated transdisciplinarity. The process is challenged by the inconvenience of dealing with complexity, and with instrumental, individualistic, corporatist fragmentation that must be abandoned along with its hypnotic qualities of blinding humans to the consequences of our actions. Varey offers pragmatism as a pathway for securing a praxis from which reflective action flows organically toward an emergent map of sustainability.

Congruent with Varey’s articulation of the destructive drive of rampant consumerist worldviews also pervasive within the rhetoric of “sustainable development”,

Indigenous Peruvian feminist Ana Isla presents a discussion that argues forcefully against the inadequacy of market-based solutions for ecological problems. She makes explicit their role in social and ecological destruction in her chapter *Greening Costa Rica: The Political Ecology of Sustainable Development*, and critiques the rhetoric and practices that attempt to link ongoing development and exploitation of the environment with the conservation movement. The historical pathway cultivated by neo-liberal political ecology is documented as the disingenuous argument that “green capital” will move the planet toward “sustainable development.” Isla uses the example of Costa Rica to demonstrate that market-based solutions will continue to perpetuate social and ecological destruction as evidenced in the social injustice, inequity, poverty and environmental destruction ongoing in that state. As an eco-feminist, Isla links the expansion of political ecology and “sustainable development” with “housewifization” and “recolonization” representative of structural violence resulting in the removal of land and products with little or no compensation to Indigenous peasants. She further compels the reader to discern the crisis in nature as one also of women and children being disseminated by global “sustainable development movements” promoted through the United Nations Conference on Environment and Development (UNCED, or “Earth Summits”), by Environmental Non-Governmental Organizations (ENGOS), and by mainstream environmental thinking.

Similar to preceding contributors, the chapter by Canadian playwright and drama professor David Fancy moves us beyond Cartesian binary thinking in the direction of a deeper intersectional appreciation of social, political, economic and environmental ecologies. In contrast to notions of either pragmatism or eco-feminism, Fancy calls on concepts of “immanence” and “rhizomatic thought” as transformative pathways towards a more harmonious, though frequently turbulent, sustainable planetary praxis. His chapter, *Sustainability, Immanence and the Monstrous in Caryl Churchill’s ‘The Skriker’*, compels the reader toward understanding both an ontological and epistemological “sustainability” as a transdisciplinary praxis by establishing the links between creative arts and environmental education. Infused with rhizomatic reflection, action and being, Fancy’s chapter is complex and invitational while his narrative is interwoven with arguments for “immanence” being found in both the everyday and the grotesque, as evidenced in our frequently wounded identities impervious to the environmental crises swirling around us. His vehicle for such a transcendent integration is further informed by somatic, affective and deeply personal levels of critique, criticism that identifies the subjugation of the so-called “science of sustainability” and understanding the intersectional, social and political ecologies necessarily a part of any redress of planetary degradation.

From a deep reading and understanding of Global Environmental Sustainability movements and consistent with arguments put forth by Fancy, Canadian educator Parris Garramone’s chapter renders an in-depth understanding of structural inequity by emphasizing on the role of affect and creativity in order to redress the complexity of environmental derogation through educational contexts. *‘Digging Where We*

Stand': Unearthing Race, Place and Sustainability in Ontario, explores the integration of knowledge from colonial histories, ecological racism and genocidal politics of empire in the establishment of an education for a sustainable future through place-based pedagogy. This chapter challenges the hegemony of natural sciences as the conventional epistemological and methodological approach to environmental sustainability. Garramone's contention is that science education alone cannot fully account for the complexity of social, ecological and structural issues that impact environmental sustainability. Hers is a similar focus to each of our contributions linking the local with the global.

The chapter co-authored by Canadian and Brazilian environmental scientists Dawn Bazely, Patricia Perkins, Miriam Duailibi and Nicole Klenk, *Strengthening Resilience by Thinking of Knowledge as a Nutrient Connecting the Local Person to Global Thinking: The Case of Social Technology/Tecnologia Social*, rethinks sustainability spaces through the local/global nexus of knowledge from Indigenous peoples. They argue that shared knowledges from disenfranchised, Indigenous communities and individuals, coupled with notions of Social Technology/Tecnologia Social, can form "nutrients" to build capacity for resilience and adaptation through increased knowledge flows. Accordingly, knowledge in this context is simultaneously conceptualized ecologically and transdisciplinarily in an integrated political, ethical, social and scientific response to climate change. Their model was developed on Freirean principles within a Brazilian context, and they argue it has the potential to increase community resilience and adaptive capacity in all regions of the world.

Closing out the text is Patricia Perkins' chapter, *Building Commons Governance for a Greener Economy*, which reinforces themes found throughout the volume by pointing to the need for local, participatory responses in partnership with global movements to address environmental degradation. Through the lens of political ecology/economy, Perkins contends that transformative education praxis and transdisciplinarity facilitate education for all ages, and that policy and grassroots change may foster renewal of the "commons" for democratic governance aimed at mitigating climate change.

PROLOGUE TO TEXT

World-renowned activist and award-winning Canadian author Naomi Klein (2014) rightly identifies climate change as a "civilizational wake-up call", and distills all of this complexity into a convincing dichotomy in her latest volume "This Changes Everything – Capitalism vs. The Climate". She poignantly considers what many of us are beginning to wonder – *is it too late?* (2014, p. 25).

Right now, the triumph of market logic, with its ethos of domination and fierce competition, is paralyzing almost all serious efforts to respond to climate change. Cutthroat competition between nations has deadlocked U.N. climate negotiations for decades: Rich countries dig in their heels and declare that

they won't cut emissions and risk losing their vaulted position in the global hierarchy; poorer countries declare that they won't give up their right to pollute as much as rich countries did on their way to wealth, even if that means deepening a disaster that hurts the poor most of all. (Klein, 2014, p. 23)

And so, while the complex world systems for the pricing of oil close out 2014 with unprecedented gyrations, we close our Introduction with a similar question to Klein's having been implicitly addressed by each of our contributors, though now as an explicit query for each of our readers: "*Is it too late?*"

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